Tighe&Bond

Wastewater System Asset Management Plan Report

Prepared For:

Department of Public Works
Jaffrey, New Hampshire

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Section 1
Introduction

1.1 Project Overview and Goals

Jaffrey's wastewater system consists of nearly 20 miles of sewers and six pumping stations. The infrastructure collects wastewater from throughout Jaffrey that is treated at the Jaffrey Wastewater Treatment Facility (WWTF). Over the years, the Town of Jaffrey has been proactive in maintaining its wastewater infrastructure through regular system inspections and repairing and/or replacing outdated infrastructure. These activities have reduced or eliminated sanitary sewer overflows (SSOs), reduced infiltration and inflow (I/I), and improved overall system reliability. A recent wastewater treatment facility upgrade has also reduced the need for repair and replacement activities at the WWTF.

Despite the Town's numerous successful projects, many of the previous repairs and replacement activities have been performed in response to observed problems rather than through a planned asset management program. This reactive approach can divert staff and resources away from other important activities and make financial planning difficult for system managers. Through the planned wastewater asset management program outlined in this report, the Town will be better equipped to proactively plan repair and replacement work, manage capacity, and reduce the overall cost of operations.

An additional driver for establishing this asset management plan is to streamline Jaffrey's future NPDES permit requirements. In particular, EPA's Capacity Management Operation and Maintenance (CMOM) program requirements, including more detailed mapping, development of a Collection System Operation and Maintenance Plan, and increased compliance reporting, are being incorporated into NDPES permits through the renewal process.

The goal of this project is to develop a comprehensive wastewater asset management plan for the Town's wastewater treatment facility, pumping stations, and wastewater collection system. The following pumping stations were evaluated:

- Hadley Road Pumping Station
- Erin Lane Pumping Station
- Cross Street Pumping Station
- Jaffrey Center Pumping Station

The Town's other two pumping stations, the Nelson Circle Pumping Station and the River Street Pumping Station, were not included in this evaluation since they are currently being upgraded. The locations of the pumping stations and wastewater treatment facility are shown in Figure 1-1.

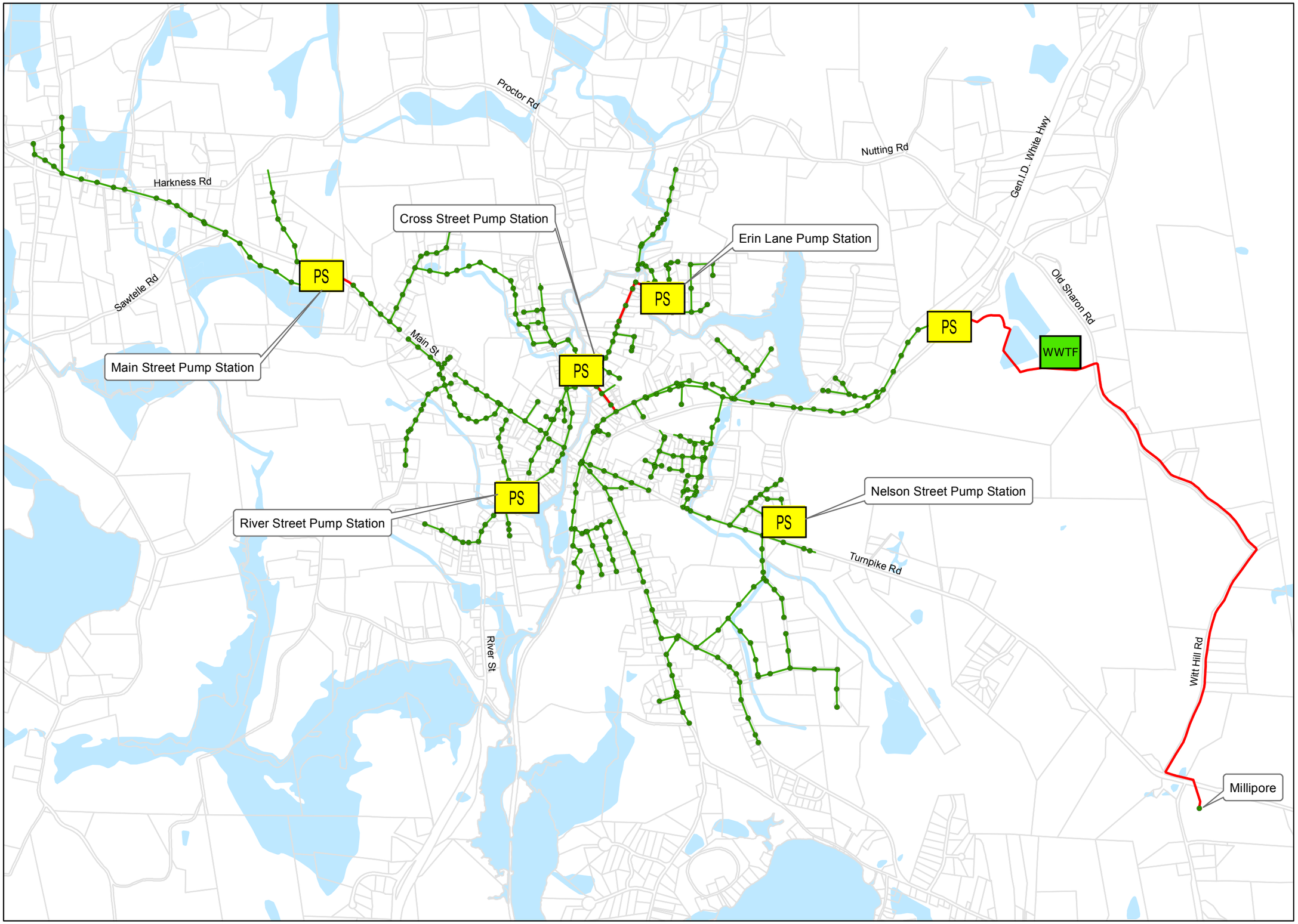

Figure 1-1
Pump Station Locations

LEGEND

- PS — Pump Station
- WWTF — Treatment Plant
- Sewer Manhole
- Sewer Main
- Force Main

LOCUS MAP

N

0 375 750 1,500
Feet
1:18,000

NOTES

River Street and Nelson Circle Pumping Stations were undergoing upgrade projects during the time of this evaluation.

Jaffrey
New Hampshire

June 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

The Pump Station and Wastewater Treatment Facility Assessment was developed for the purpose of identifying, prioritizing, and budgeting for wastewater infrastructure improvements at the pumping stations over a 20-year planning horizon. The plan will provide the Town with the ability to prioritize expenditures, plan for and normalize expenditures over the planning period, as well as minimize operating and maintenance costs.

1.2 Project Scope

On October 16, 2015, a kick-off meeting between the Town of Jaffrey and Tighe & Bond personnel was conducted to discuss the Pump Station and Wastewater Treatment Facility Assessment. The purpose of the meeting was to review the project's goals, objectives, and methodology; collect documentation; and solicit staff input on items or systems that may be experiencing operational or functional problems at the pump stations or WWTF.

After the kick-off meeting, on November 5 and December 17, 2015, on-site assessments of the wastewater pumping stations and the WWTF were conducted to evaluate the condition of the facilities and identify needed repairs and equipment replacements to maintain reliable performance. The following items were considered:

- Civil – Access roads, pavement condition, sidewalks, fencing, gates, and drainage structures in proximity to the facilities
- Process/Mechanical – Major mechanical equipment, chemical feed systems, process valves, equipment accessibility, individual WWTF unit processes and operational challenges
- Structural/Architectural – Overall integrity of foundations, roofing systems, exterior and interior walls, wall coverings, floor and floor coverings, structural frames, interior columns where appropriate, condition of miscellaneous metals and painted surfaces
- Electrical – Motor Control Centers (MCCs), panelboards, motors, motor starters, disconnect switches, lightning protection, lighting systems, backup power generators, and compliance with National Electric Code (NEC) guidelines
- HVAC – Condition of heating/air conditioning systems, ventilation systems, dehumidification systems and sump pumps.
- Instrumentation and Controls – Condition of flow measurement, level control, safety devices, and SCADA functionality
- Safety – Interview operations staff and identify potential safety issues

The scope of work for the facilities evaluation did not include the following:

- Hydraulic capacity evaluation of pump systems
- A detailed review of the SCADA system reliability and performance

The results of the on-site facilities evaluations at the pumping stations and WWTF as well as collection system evaluation results are presented in Section 2. A description of the risk based prioritization methodology utilized in this project is presented in Section 3. At the end of Section 4, recommendations and budgetary costs associated with these recommendations are summarized.

1.3 Service Life of Equipment

The condition assessment was based upon visual inspection, age of the equipment/structure, known deficiencies, criticality, energy efficiency, and regulatory concerns. In addition to drawing upon Tighe & Bond's experience, we considered equipment manufacturer recommendations and guidance from professional organizations to determine the expected remaining service life. Table 1-1 summarizes the expected equipment life for a variety of the types of equipment found at the facilities.

It should be noted that some equipment items have longer or shorter operating lives depending upon the quality of the original equipment and installation, the specific environment, service conditions, and operation and maintenance practices.

1.3.1 Process Equipment

The following summarizes the expected service life for most of the major equipment and systems found in Jaffrey's pumping stations and WWTF.

1.3.1.1 Pumps

In general, the average service life for pumps is approximately 20 to 30 years, although pumps often remain in service for a longer period of time. Although pumps can be rebuilt once or twice, they should be replaced after that because they lose operating efficiency. Pumps in wastewater service may have a shorter life due to additional wear from grit and other solids present in the wastewater collection system.

1.3.1.2 Process Valves

The typical service life for process valves is commonly 25 to 30 years. Few control valves that are produced today remain reliable beyond 30 years. The average service life of ductile iron valves is expected to be longer.

1.3.2 Instrumentation

The typical service life of monitoring equipment such as pressure and flow transmitters is 15 to 20 years, which is driven more by technological advancements than failure of the equipment.

1.3.3 Electrical

Panelboards and transformers have typical service life expectancies of 30 years. Electrical wiring, under optimum conditions, has a typical life expectancy of 50 years. Incandescent and fluorescent light fixtures have a useful service life of about 30 years.

1.3.4 HVAC

ASHRAE performed studies to determine service life of typical HVAC equipment. The values given depend on duty cycle, exposure to corrosive elements and maintenance but present a useful guidance to determine the state of systems.

Table 1-1 Equipment Life Expectancy Summary

Item No.	Equipment	Typical Life Expectancy (Years)[1]	Source
1	Pumps	20 to 30[2]	Tighe & Bond experience/Equipment Manufacturers
2	Venturi Flow Meters	20 to 25	Tighe & Bond experience/Equipment Manufacturers
3	Metering Pumps	15	Tighe & Bond experience/Equipment Manufacturers
4	Process Valves - Cast Iron	> 30	Tighe & Bond experience/Equipment Manufacturers
5	Actuators	15 to 30	Equipment Manufacturers
6	Process Piping and Valves - Chemical Systems	15	Tighe & Bond experience/Equipment Manufacturers
7	Tanks - High Density Polyethylene	15 to 20	Tighe & Bond experience/Equipment Manufacturers
8	Tanks - High Density Crosslinked Polyethylene	15 to 20	Tighe & Bond experience/Equipment Manufacturers
9	Tanks - Steel	>30	Tighe & Bond experience/Equipment Manufacturers
10	Mixing Equipment	20 to 25	Tighe & Bond experience/Equipment Manufacturers
11	Sample Pumps	10	Tighe & Bond experience/Equipment Manufacturers
12	Transfer Pumps	5	Tighe & Bond experience/Equipment Manufacturers
13	Differential Pressure Transmitter	15	Tighe & Bond experience/Equipment Manufacturers
14	pH Analyzers	10 to 15	Tighe & Bond experience/Equipment Manufacturers
15	Magnetic Flow Meters	10 to 15	Tighe & Bond experience/Equipment Manufacturers
16	Sump Pumps	10	Tighe & Bond experience/Equipment Manufacturers
17	Unit Heaters (Electric)	15	ASHRAE/Tighe & Bond experience
18	Unit Heaters (Hot Water)	20	ASHRAE/Tighe & Bond experience
19	Unit Heaters (Gas)	13	ASHRAE
20	Water Heaters	15	Tighe & Bond experience/Equipment Manufacturers
21	Exhaust Fans	20	ASHRAE/Tighe & Bond experience
22	Ventilation Louver Actuators	20 to 25	Tighe & Bond experience/Equipment Manufacturers
23	Air Cooled HVAC Equipment	20	ASHRAE
24	HVAC Thermostats	20	Tighe & Bond experience/Equipment Manufacturers
25	Dehumidifiers	15 to 20	Tighe & Bond experience/Equipment Manufacturers
26	Standby Generators	15 to 30	Equipment Manufacturers
27	Motor Control Centers	30	Tighe & Bond experience/Equipment Manufacturers
28	Panelboards	30	Tighe & Bond experience/Equipment Manufacturers
29	Switchboards	30	Tighe & Bond experience/Equipment Manufacturers
30	Transformers	30	Tighe & Bond experience/Equipment Manufacturers
31	Automatic Transfer Switches	30	Tighe & Bond experience/Equipment Manufacturers
32	Wiring	50	Equipment Manufacturers
33	Incandescent/Fluorescent Lights	30	Tighe & Bond experience/Equipment Manufacturers
34	Motion Sensors	12 to 15	Tighe & Bond experience/Equipment Manufacturers
35	Smoke Detectors	15	Tighe & Bond experience/Equipment Manufacturers

[1]Equipment life expectancies will vary greatly depending on a multitude of factors such as moisture, heat, chemical delivered, hourly use, and maintenance frequency.

[2]Pumps typically can be rebuilt one or two times; however, following the second rebuild, the pumps should be replaced due to a loss of operating efficiency.

Electric unit heaters have service life expectancies of approximately 10-15 years. External louvers and fan life is about 15-25 years and depends on the fan type. Ductwork is expected to last for 20-30 years and associated actuators for 15-30 years. Residential type dehumidifiers can last 2-8 years.

1.4 Ongoing Activities & Recent Capital Projects

Staff currently conducts routine daily inspections and performs routine maintenance of the pumping stations and wastewater treatment facility. Replacement of pumps and other equipment, as well as tasks such as wet well cleaning, are currently performed on an as-needed basis.

The River Street and Nelson Circle pumping stations were not evaluated as a part of this report because they were undergoing replacement projects at the time of this asset management study.

The River Street pumping station is located near #42 River Street (Route 202), and is a below-grade pneumatic ejector style pumping station. Upgrade work at the River Street pumping station includes installation of a new pig launch manhole, demolition of the existing pneumatic ejector pumping station, installation of a new precast concrete wet-well, and construction of a new pre-packaged suction lift pumping station and generator.

The Nelson Circle pumping station is a submersible pumping station located within the right-of-way of Nelson Circle. Upgrade work to the Nelson Circle pumping station includes the installation of a new grinder pump station and service structure adjacent to the existing submersible pump station, conversion of the existing submersible wet-well into a manhole structure that will continue to service the new grinder pump station, and connection to a new sanitary manhole at the intersection of Nelson Circle and Hillcrest Road. Substantial completion for the River Street and Nelson Circle Pump Station replacement projects is anticipated in November 2016.

Section 2
Field Findings

On November 5, 2015, Tighe & Bond conducted facility inspections to review existing conditions at four of the Town's wastewater pumping station facilities. The following stations were visually inspected:

- Hadley Road Pump Station
- Erin Lane Pump Station
- Cross Street Pump Station
- Jaffrey Center Pump Station

The WWTF was inspected on December 17, 2015. Narratives discussing our findings for these facilities are provided in Sections 2.1 through 2.4, respectively. The WWTF is discussed in Section 2.5.

During the inspections, the equipment remained in service. For each structure, an interior and exterior inspection was completed to assess its condition.

Appendix A contains condition summary tables consisting of recommended improvements for all pumping stations and Appendix B contains photographs taken during the site visits. Recommended improvements are discussed and organized as follows:

- Process/Mechanical (process and mechanical recommendations designated as P1, P2, etc. following the facility name)
- Instrumentation and Controls (Facility Name-I1, I2, etc.)
- Structural/Architectural (Facility Name-S1, S2, etc.)
- Electrical/Standby Power (Facility Name-E1, E2, etc.)
- HVAC (Facility Name-H1, H2, etc.)
- Civil/Security (Facility Name-C1, C2, etc.)

Improvements discussed in Sections 2.1 through 2.5 are referenced using the aforementioned designations.

2.1 Hadley Road Pump Station

The Hadley Road Pump Station was originally constructed in 1985 and received a significant upgrade in 2004. Wastewater from the entire collection system, except for Millipore, flows to the pump station where it is screened and pumped to the WWTF. The Hadley Road Pump Station is designed to pump an average of 1.25 mgd with a peak pumping capacity of 3.2 mgd. The building is divided into two-halves in a wet well/dry well configuration. The east half of the building serves as the dry well, with three 30-HP Gorman-Rupp self-priming centrifugal pumps, each designed to deliver 1440 gpm at 45' total dynamic head (TDH) located in the lower level. The upper two floors contain the electrical and controls components, an emergency generator, and a plant water system. The wet well is located in the west half of the building and is accessible through a second doorway right of the dry well door. There is no hazardous gas detection system present in the wet well. There is no odor control system; however, the Town has not received odor complaints.

The pump station is connected to the WWTF's SCADA system. Building security is limited to locks on the access doors. Bypass piping connections are located outside the front of the building, allowing the Town to connect a portable emergency pump and pump wastewater from the grit chamber to the force main in the event of a failure of the station pumping systems.

Overall, the station is in good condition. The typical life expectancy of equipment at wastewater pumping stations is 20 to 30 years, and it is anticipated that the pumping station will not require any major upgrades within the next 10 years. There are some structural, electrical, HVAC and site improvements recommended for the short term to increase the longevity of the building, increase operator safety, and improve security.

2.1.1 Process / Mechanical

Raw wastewater enters the wet well portion of the pumping station and flows through an influent channel manual bar rack with 2-inch bar spacing. Flow continues through the channel and a combination of three stop gates and seven slide gates (collectively named STG-1 through STG-10) that can be opened or closed to divert flows depending on operational parameters. Two stop gates (STG-4 & STG-10) were replaced in 2004. The seven slide gates, manufactured by Waterman Industries (STG-1, 2, 3, 5, 7, 8, and 9), appear to be original to the station and are in good working condition. Two 12-inch knife gate valves (Hadley-P110) control flow between the three wet well tanks. The knife gate valves appear to be original to the pump station and are in good working condition. Although the slide gates and knife gate valves are in serviceable condition, all except STG-4 and STG-10 are more than 30 years old and have exceeded their life expectancy. Therefore, we recommend planning for their replacement.

Under normal conditions, wastewater flows through an Auger Monster channel grinder and auger (Hadley-P106) after flowing through the bar rack at the head of the plant. The Auger Monster was installed as part of the 2004 upgrade and is intended to grind, screen, and

wash influent screenings. The Auger Monster is currently offline, and according to plant staff, has not worked properly since installation. Influent flow is instead diverted through a bypass channel and 1½-inch spaced manual bar rack. There is a ragging problem on some WWTF equipment, which is indicative of poor screenings removal at the headworks area. The failed Auger Monster should be replaced as soon as possible with a mechanically cleaned fine bar screen and washer compactor that would capture finer screenings, protect downstream equipment, and eliminate the need for manual screenings removal by plant operators. The washer compactor discharge chute could either be directed out the side of the building into a dumpster or alternatively into a receptacle located in the headworks area that could be hoisted out by means of the mechanical hoist. Either method would eliminate the need for operators to manually carry the heavy and wet screenings up the stairs and out of the facility. The Town may wish to consider removal of the 2-inch manual bar rack. The 1½ - inch spaced bypass channel bar rack should remain to provide screenings during maintenance activities.

The Hadley Road Pump Station is equipped with three self-priming centrifugal pumps manufactured by Gorman-Rupp (Hadley-PINF-1,2,3). Each pump is equipped with a variable frequency drive (VFD) and a 30 HP motor, and is designed to deliver 1440 gpm at 45 ft TDH when run individually and 1150 gpm (2300 gpm total for both pumps) at 54 ft TDH when two pumps are run simultaneously. Pump No. 1 and Pump No. 3 were installed as a part of the 2004 upgrade. Pump No. 2 was installed in 2001, and as a part of the 2004 upgrade, its motor was replaced and a new VFD installed. The pumps are in good condition with the expected wear and tear of a 12 year old pump. There is some condensation rust evident on each pump. The pumps' suction and discharge pressure gauges appeared to be in good working condition. The bottom seal oil in Pump No. 1 was observed to be dirty, and should be changed. The pumps will likely need to be replaced in the next 6 – 10 years once they exceed their life expectancy.

Gorman-Rupp suggests replacing each pump's wear plate every one to two years, while checking and adjusting tolerances as needed. In addition, Gorman-Rupp suggests replacing just the pump's rotating assembly every 5 to 10 years as needed in lieu of replacing the entire pump.

Process piping and process valves all appear to be in good condition. Once the piping and valves exceed their life expectancy they should be replaced in kind (Hadley-P104).

An automatic water sampler that was installed to collect influent samples is no longer in use and has been abandoned. Influent samples are now collected at the WWTF. There is evidence of rodent nesting on the automatic sampler. If there are no plans to use this system in the future, it is recommended that it be removed by the Town to provide more working/storage space in the pump station (Hadley-P105).

Service water equipment at the pump station was installed around 2009 and is in good working condition. The system consists of two 50 gallon tanks, one 0.5 HP pump manufactured by Goulds, and service water piping. The service water equipment should be replaced at the end of its useful life, likely not for another 10 – 20 years (Hadley-P105).

Two simplex submersible sump pumps are located in the lower level of the dry well. The ½ HP sump pumps manufactured by Myer Pumps were installed as part of the 2004 upgrade. An on/off float switch in each sump controls the operation of the pump. Each pumps' capacity is approximately 40 gpm at 20 ft TDH, and they discharge into the wet

well above the high water level. The sump pumps appear to be in good condition and will likely need to be replaced in the next 5 – 10 years (Hadley-P111)

The bypass pumping system was installed as part of the 2004 upgrade. Influent channel stop and slide gates divert flow into the former grit chamber. Bypass suction piping runs from the former grit chamber to the outside of the building, and bypass discharge piping runs from the outside of the building to the force main header in the lower level of the dry well side of the pump station. The Town connects a portable emergency pump to the outside suction and discharge connections and pumps wastewater from the grit chamber to the force main. The bypass pumping system appears to be in good condition.

2.1.2 Instrumentation and Controls

Instrumentation at the facility consists of a parshall flume with an ultrasonic flow measuring device in the influent channel, and submersible pressure transducers for level sensing in the wet wells. The transducers are located in each of the three wet wells and work with the PLC to control the three pumps' activation and run speeds. The wet well also contains a backup float switch system in each wet well to activate the pumps independent of the PLC in the event that the level sensor or PLC should fail.

The flow meter (Hadley-I103) and level sensors (Hadley-I101) were installed as a part of the 2004 upgrade, and appear to be in good condition. These instruments will likely need to be replaced in the next 5 – 10 years. During the site inspection, plant staff indicated that only the top portion of the wet wells are cleaned; an effort should be made to clean the entire wet well to prevent fouling of equipment and false readings. The backup float switch system appears to be original and was not tested during the site visit inspection. The system should be tested and the float switches replaced in the next five years(Hadley-I102).

Combustible gas detection instrumentation was not observed in either the wet well or dry well areas. A combustible gas detector should be immediately installed in the wet well. The gas detector should be connected to an alarm, an auto dialer, and warning lights should be provided inside and outside of wet well, in accordance with NFPA 820.

2.1.3 Structural/Architectural

The pump station facility is a single-story masonry structure with a wood framed gable roof and below grade headworks and pump rooms. The headworks room, where the sewage enters the pump station, is located on the west side of the pump station, and houses the bar rack and screening equipment. The headworks room is located approximately 4 feet below grade. The generator room, which also houses the electrical controls for the pump station, is located on the east side of the pump station. The pump room is located below grade below the generator room.

The pump station exterior building walls are multi-wythe, load bearing masonry walls. The exterior face of the wall is brick masonry and the interior face is constructed of concrete masonry units (cmu). The below grade building walls are constructed of reinforced concrete. The building has a sloped gable roof. Asphalt shingles cover the wood framed roof.

Overall, the Hadley Road Pump Station is in fair to good condition. We observed some minor deterioration throughout the facility, but nothing that we consider severe or needing immediate attention.

Structural / Architectural Recommendations

The following are some of the more significant architectural and structural observations and recommendations that were noted during the site inspection of the Hadley Road Pump Station during our field visit.

On the building exterior it is recommended that the deteriorated joint sealant in the masonry control joint located in the south elevation of the building be removed and replaced. (Hadley-S102). The concrete stairs for both the generator/pump room and wet well are deteriorated and should be removed and replaced (Hadley-S103 and Hadley-S104). The deteriorated joint sealant around all door frames and louver frames around the perimeter of the building should be removed and replaced (Hadley-S105). For the exterior stairs at the main entrance the concrete stairs should be repaired and the stair nosings be replaced (Hadley-S103). The joint sealant in the control joints between precast concrete wall panels, around window and louver frames, and at other miscellaneous locations, have started to deteriorate. New elastomeric joint sealants are recommended at these joints (Hadley-102 & 105). One-part silicone or polyurethane joint sealants are suitable products for this application. Guardrails should be installed around the landing for the escape-way door located on the south side of the building (Hadley-S110).

The facility doors and hardware show signs of deterioration and need attention. The double doors to the control/pump room should be painted (Hadley-S106). The door hardware for the control/pump room should be removed and replaced (Hadley-S107). The headworks escape-way single door located on the south side of the building should be removed and replaced (Hadley-S108). The headworks door hardware for the escape-way door should be removed and replaced (Hadley-S109). The wet well single door located on the north side of the building should be painted (Hadley-S111). The door hardware for the headworks single door located on the north side of the building should be removed and replaced (Hadley-S112). The double door to the headworks located on the north side of the building should be painted (Hadley-S113). The headworks double door hardware located on the north side of the building should be removed and replaced (Hadley-S114).

The asphalt shingles are deteriorating. The deteriorated asphalt shingles should be removed and replaced (Hadley-S101).

In general, the interior of the facility is in relatively good condition. However, several items were observed throughout the pump station facility that will need to be repaired or will require additional investigations. The mechanical seals around the 6-inch diameter and 8-inch diameter pipes passing through the north concrete wall on the intermediate level of the pump room that are leaking and should be repaired (Hadley-S115). The mechanical seal around the 10-inch diameter pipe passing through the south concrete wall on the lower level of the pump room that is leaking should be repaired (Hadley-S116). The pump room walls at the intermediate level are peeling and should be repainted (Hadley-S117). The interior concrete stairs in the headworks room are deteriorated. The stair nosings and concrete should be repaired (Hadley-S118). In the wet well, the monorail beam and support structures are corroded. It is recommended that the monorail beam and supports be painted (Hadley-S119).

2.1.4 Electrical/Standby Power

The Hadley Road Pump Station electrical service is a 400A, 277/480V, three phase service with its main circuit breaker located in a 400A switchboard on the ground level. The electrical distribution equipment consists of the utility meter, main breaker switchboard, motor control center, panelboard, 175kW Caterpillar diesel driven backup generator with integral breaker, and an automatic transfer switch (ATS). Additional electrical equipment includes control panels, newer VFDs, and communications equipment. The large majority of the electrical equipment is located on the ground level. The main switchboard and MCC were installed in 2005 and the generator and ATS were installed in 2010. Overall, the majority of the electrical equipment at the station is in good condition. The panelboard, fire alarm panel and security control panel are in fair condition, but are old and should be replaced in 6 to 10 years (Hadley-E102, E103, & E106).

The drywell lighting is older inefficient T12 fluorescent and should be replaced with high efficiency LED fixtures in 6 to 10 years (Hadley-E101). The outdoor lighting is old and appears to be inoperable; it should be replaced in the near future (Hadley-E109).

The electrical service does not currently have any surge protection installed. We recommend providing surge protection (at least 200kA/phase) in the near future to protect the electrical equipment in the facility (Hadley-E105).

The following issues are code violations or safety hazards and should be addressed immediately. There are no emergency lighting units or illuminated exit signs in the building; the facility should be provided with emergency lighting and exit signs throughout the building (Hadley-E110). There is no combustible gas detector in the wet well. A combustible gas detector should be provided and connected to the auto dialer for remote alarming (Hadley-E111). In addition, warning lights and a horn should be provided in accordance with NFPA 820. There is a broken receptacle that poses a safety hazard located behind the generator day tank that should be replaced (Hadley-E104). Additional less critical recommendations are listed in the Conditions Summary Table.

2.1.5 HVAC

The HVAC system is in good condition on the dry well side, the wet well requires some additional maintenance and replacement of items.

The system in the dry well consists of exhaust ducts, louvers, exhaust pipe for the generator, electric unit heaters, and some fans. The wet well is served by an exhaust fan with louvers and screens and has an electric unit heater as well. Hose bibs are located on the exterior and interior of the wet well.

The screen covering the wet well exhaust fan is clogged by more than 25%, which reduces overall air exchanges. We recommend cleaning of this screen as a first step (Hadley-H110). The actual exhaust fan was not visible from the inside or outside and should be inspected closely during the cleaning process. The associated exhaust louver is dirty as well but appears to be in good condition. The louver should be cleaned and receive a closer inspection afterward (Hadley-H111). The intake louver, damper and actuator are in need of cleaning and closer inspection as well. The bird screens on both openings are intact. The louvers are expected to require replacement within the next five years (Hadley-H112). All visible parts of the wet well electric unit heater are rusty and should be replaced (Hadley-H113).

The dry well has less urgent needs. While the age of the air inlet louver/damper above the entrance door is unknown it appears to be in good condition and should not require replacement for another 10 years (Hadley-H101). The unit heaters on the first floor and the first subfloor are manufactured by CPE, a company that went out of business around 1990. This suggests that they are older, perhaps original to the facility, and we recommend that these unit heaters be replaced within the next 5 years (Hadley-H102 and Hadley-H106). The generator exhaust duct and its louver system were installed in 2009 and are clean and in good condition. The expected remaining service life is greater than 10 years (Hadley-H104 and Hadley-H103). The electric unit heater on the lowest dry well floor was manufactured in 2005. While it is newer than the other units it is close to reaching the end of its expected service life. This will also likely need to be replaced within the next five years, although not as urgently as the wet well units (Hadley-H105). The dry well ventilation duct and fan are in good condition and should last for another 10 years (Hadley-H108 and Hadley-H107). Within the next five years, maintenance to and possibly replacement of the generator engine exhaust pipe will be required. This exhaust pipe is currently showing significant rust at the drain (Hadley-H109). The drain cap should be removed and replaced. During this process an inspection of the drain shut off valve and the pipe should be performed. Replacement may be necessary if significant deterioration of the pipe interior is apparent.

2.1.6 Civil/Site Security

The site is at the end of Hadley Road and is accessed by a paved driveway. The surrounding ground is level, and the land transitions from overgrown grass to wooded area behind and west of the building. A bituminous concrete parking area is located on the east and front side of the building, with a concrete parking pad on the west side of the building. The bituminous concrete and concrete parking areas are in good condition with minor cracking (C102). There is no fence surrounding the property, and no security cameras on the outside of the building. The Town did not report vandalism or trespassing at the site. There is a light on the outside of the dry pit side of the building next to the door; however, the light is old and seems to be inoperable. The lighting should be replaced with new LED light fixtures with motion detectors to help increase safety (Hadley-E109).

Access into the pump station is restricted to authorized personnel only. All doors are kept locked. A warning sign on the front of the building reads "Do Not Enter Without Proper Authorization. Please Call 603-532-6914 In The Event Of An Emergency". There is no security alarm system to detect unauthorized entry and it is recommended that a security alarm be installed (C103).

The building and site does not have a drainage system, except for two sumps located inside the basement of the dry pit. We recommend a drainage system on the middle floor of the dry well in case of leaks from the plant water system. This flow could be directed to the pump room sumps (Hadley-C106).

There are several access hatches throughout the station, and the current practice is to install temporary poles and chains around the openings when they are open. These hatches should be retrofitted with fall-protection grating systems to save time and to increase operator safety (P107).

2.2 Erin Lane Pumping Station

The Erin Lane Pump Station was constructed in 1984. The wet well is located in front of the pump station building and is accessible through a manhole cover in the parking area that is not locked. The building consists of one room at grade level and a pump vault extending to approximately 24 feet below grade accessible only by an entrance shaft. The first floor of the building houses the Motor Control Center and Emergency Generator. The pump vault houses two 5 HP Gorman-Rupp self-priming centrifugal pumps. The pump vault and entrance tube is a confined space. There is a ventilation pipe running from the pump vault up through the building roof. There is no hazardous gas detection present. There is no odor control system; however, the Town has not reported odor complaints. The pump station is not connected to the WWTF's SCADA system. Building security is limited to locks on the access doors. There is no bypass piping connection.

Overall, the station is in good to fair condition. The typical life expectancy of equipment at wastewater pumping stations is 20 to 30 years. This station is now more than 30 years old. It is anticipated that the pump station will require upgrades within the next 5 years. There are also some structural, electrical, HVAC and site improvements recommended for the short term to increase the longevity of the building, increase operator safety, and improve security.

2.2.1 Process / Mechanical

Raw wastewater enters the wet well through an invert pipe into the wet well chamber. An air bubbler wet well level control system monitors the water level in the well and in turn calls for the pumps to be turned off and on.

The two self-priming centrifugal pumps are original to the facility (30+ years old) and are located approximately 24 feet below grade. They pump water from the wet well up into a common horizontal discharge pipe that exits the station approximately 15 feet below grade. The pumps are run at constant speed in a lead/lag configuration. The pumps do not have soft starters. The pumps are in good condition with the expected wear and tear of 30 year old pumps. There is significant condensation rust on both pumps, pump stands, and flanges. There are no suction or discharge pressure gauges on either of the pumps. The seal oil on both pumps appeared to be clean and full at the time of our site visit. The pumps will likely need to be replaced in the next 5 years as they have exceeded their life expectancy (Erin-P201 & Erin-P202).

Gorman-Rupp suggests replacing each pump's wear plate every one to two years, while checking and adjusting tolerances as needed. In addition, Gorman-Rupp suggests replacing the pump's rotating assembly every 5 to 10 years as needed in lieu of replacing the entire pump. The Town may want to evaluate this option in lieu of full pump replacement.

Process piping and process valves appear to be original to the facility and are in fair condition. The piping and valves have heavy surface rust from condensation. The check

valve on the suction side of Pump No. 2 is missing the recoil spring, which should be replaced as soon as possible. Both discharge side check valves are mounted vertically, which is not the recommended configuration for a check valve. *TR-16 Guidelines for the Design of Wastewater Treatment Works* recommend that check valves be placed on a horizontal section of discharge line between the pump and shutoff valves. We recommend reconfiguring the check valves and mounting them horizontally. We recommend cleaning and repainting the process piping and valves. Once the valves exceed their life expectancy they should be replaced in kind (Erin-P203).

A simplex submersible sump pump that discharges to the wet well is located in the pump vault. The sump pump manufactured by Myer Pumps is severely rusted. An on/off float switch in the sump controls the operation of the pump. The sump pumps appears to be in fair condition, and its operability could not be confirmed during the site inspection. It is recommended that the sump pump be replaced in the next 5 years (Erin-P204).

2.2.2 Instrumentation and Controls

Instrumentation at the pump station consists of a bubbler level indicator system for level sensing in the wet well, float-type wet well high and low level and alarm level indicators, and a remote alarm dialing monitor.

The bubbler level system appears to be in good working condition and provides the primary run signal for the pumps. However, this system appears to be original to the pump station and due to its age it is recommended that the system be replaced with ultrasonic level transducers (Erin-I201). It is recommended that the back-up floats also be replaced (Erin-I202).

According to env-wq 700, sewage pump stations equipped with constant speed pumps with capacities of 250 gpm or more shall have a flow recording and totalizing instrument. It is recommended that a magnetic flow meter be installed on the horizontal discharge pipe to read and record discharge flow (Erin-I204). Power monitoring equipment beyond the facility's electrical meter was not observed in the field and should be added during the facility's next instrumentation upgrade.

The pump station does not currently have a SCADA system. Flow data is not currently recorded at the pump station, but the above-recommended magnetic flow meter could be tied into the SCADA system to automatically collect and record daily flow. The pump station is currently set to alarm during high water and low water events. This remote alarm dialing monitor is designed to telephone operators that there is a problem. A SCADA system could replace the remote alarm dialing monitor (Erin-I203). It is recommended that a SCADA system be installed to record and transmit flow, water level, pump performance alarm and other data back to the WWTF via a radio antenna. It is recommended that an Allen-Bradley MicroLogix or CompactLogix transmitter be installed in each of the pump stations. The SCADA system should be compatible with the Allen-Bradley DF-1 protocol and communicate directly with the WWTF.

2.2.3 Structural/Architectural

The Erin Lane Pump Station was constructed circa 1984. The pump station facility is a single story concrete masonry (CMU) structure. A below-grade concrete wet well is located just outside the building. The pump chamber is located below the building and is a pre-engineered steel structure. The building is approximately 17'-4" long and 16'-0" wide and houses the generator and the controls for the facility.

The exterior single-wythe CMU walls are covered with 4-inch clapboard siding. The building has a sloped gable roof with asphalt shingles.

Overall, the Erin Lane Pump Station is in good condition. During the site investigation some minor deterioration of the facility was observed; however, this deterioration was not considered severe or in need of immediate attention. The following are some of the more significant architectural and structural observations that were noted during the site inspection of the Erin Lane Pump Station during our field visit.

On the building exterior, the wood building trim is deteriorated. We recommend painting the exterior wood building trim (Erin-S201). The facility doors need some attention. The exterior paint on the exterior double door and frame is deteriorated. We recommend painting the exterior door and frame (Erin-S202). In addition, the hardware on the exterior double door is deteriorated and should be replaced (Erin-S203).

In general, the interior of the facility is in good condition. The paint on the interior of the below-grade pump chamber walls is deteriorated. We recommend painting the steel pump chamber walls (Erin-S204).

2.2.4 Electrical/Standby Power

The Erin Lane Pump Station electrical service is a 100A, 277/480V, three phase service with its main circuit breaker located indoors. The electrical distribution equipment consists of the utility meter, main circuit breaker, 480V panelboard, 120/208V panelboard, 17kW Onan diesel driven backup generator, and an automatic transfer switch (ATS). Overall, the electrical equipment at the station is in fair condition, but the majority of it is old and should be replaced in 6 to 10 years.

The outdoor lighting is old and appears to be inoperable; it should be replaced in the near future (Erin-E211). The electrical service currently has old, small surge protectors installed. We recommend that a new, larger surge protection device of at least 120kA/phase be provided in the near future to protect the electrical equipment in the facility (Erin-E210).

The following issues are code violations or safety hazards and should be addressed immediately. There are no emergency lighting units or illuminated exit signs in the building; the facility should be provided with emergency lighting and exit signs throughout the building (Erin-E209). In addition, the receptacles in the lower level pump chamber are not ground fault circuit interrupter (GFCI) protected, and these receptacles should be replaced with GFCI-type receptacles (Erin-E206). Additional less critical recommendations are listed in the Conditions Summary Table.

2.2.5 HVAC

The HVAC system is overall in good to fair condition. The equipment consists of louvers for the generator, heaters for the control room and pump chamber, air piping and ducting throughout the facility, and a fan and dehumidifier for the bottom of the pump chamber.

Some items require short term maintenance activities, but with proper operation and maintenance may not require replacement for a number of years. It is recommended that the generator exhaust pipe be cleaned of its rust and repainted with a rust protective coating (Erin-H205). The manhole ventilation pipe should have a protective screen installed on the end to prevent rodents, birds, and insects from entering the pipe (Erin-

H207). It is recommended that the generator exhaust ductwork be repainted for corrosion protection (Erin-H203). The dehumidifier located in the bottom of the pump chamber is a residential-grade unit of unknown age. It is recommended that this dehumidifier be replaced with an industrial-type unit within the next five years (Erin-H209). The louvers and associated actuators appear to be in good condition and should not need to be replaced for at least 10 years (Erin-H202 and Erin-H204). The unit heaters are approaching the end of their life expectancy and we recommend planning for replacement within the next 5 years (Erin-H201 and Erin-H208). The air exhaust fan that removes air from the bottom of the pump chamber shows slight rust but is overall in good condition and will likely not need to be replaced for at least 5 more years (Erin-H206).

2.2.6 Civil/Site Security

The site is accessed by a paved driveway. The ground in front of the pump station is relatively level while the grounds behind the station gradually slope away in a southerly direction. The site consists of a well maintained grassy area with some vegetation and woods to the north and east and residential properties to the south. A bituminous concrete parking area is located on the left (east) and front (north) side of the building. The bituminous concrete driveway and parking area are in good condition with minor cracking (Erin-C201). There is no fence surrounding the property. There is a light on the outside of the dry pit side of the building next to the door; however, the lighting is old and appears to be inoperable. The lighting should be replaced with new LED light fixtures with motion detectors to help increase safety (Erin-E206).

Access into the pump station is restricted to authorized personnel only. All doors are kept locked. A warning sign on the front of the building reads "Do Not Enter Without Proper Authorization. Please Call 603-532-6914 In The Event Of An Emergency". There are no security cameras on the outside of the building. The Town did not report vandalism or trespassing at the site, however, it is recommended that a building security alarm system be installed (Erin-C202).

A safety lanyard is provided for staff to utilize when they enter the pump vault; however, the lanyard is not long enough to reach the bottom of the pump vault. It is recommended that the existing safety lanyard be replaced by a safety harness and lanyard system that will safely reach the bottom of the pump vault (Erin-C204). Additionally, during the site visit there was no fire extinguisher in the existing designated fire extinguisher storage area. The missing fire extinguisher should be replaced as soon as possible (Erin-C205).

There is currently no bypass pumping connection at this station. In order to maintain sewer service during a critical pump station failure, we recommend installing a bypass connection. Construction of an emergency bypass pumping connection system would include excavation down to the force main and installation of a gate valve and box, temporary line stop, tapping sleeve and valve, and bypass piping. The bypass piping connection could be located at or above grade for easy operator access. During a pump station failure, a portable bypass pump would pump sewage out of the existing wet well and into the bypass piping connection (Erin-C206).

2.3 Cross Street Pump Station

The Cross Street Pump Station was constructed in 1993. Two wet well manholes are located below the pump station building, one 5 ft diameter and one 8 ft diameter. The wet wells are accessible through two manhole covers in the pump station building. The building consists of one room that houses the two 25 hp Gorman-Rupp pumps, standby pump engine, panel board, and controls. There is no odor control system; however, the Town has not reported odor complaints. The pump station is not connected to the WWTF's SCADA system. Building security is limited to locks on the access doors. There is no bypass piping connection.

Overall, the station is in fair to poor condition. The typical life expectancy of equipment at wastewater pumping stations is 20 to 30 years, and this station is now more than 20 years old. It is anticipated that the pump station will require upgrades within the next 5 years. There are also some structural, electrical, HVAC and site improvements recommended for the short term to increase the longevity of the building, increase operator safety, and improve security.

2.3.1 Process / Mechanical

Raw wastewater enters the 5-foot diameter manhole wet well through two 12-inch sewer lines. A 24-inch PVC connecting sewer pipe allows wastewater to flow from the bottom of the 5-foot diameter manhole into the 8-foot diameter manhole. An air bubbler wet well level control system monitors the water level in both wells, calling for the pumps to be turned off and on.

The Cross Street Pump Station is equipped with two self-priming suction lift pumps manufactured by Gorman-Rupp. Each 25 hp pump is designed to deliver 925 gpm at 43.86 ft TDH each when run individually and 1,225 gpm at 46.19 ft TDH when the pumps are run simultaneously. The pumps are in good to fair condition with the expected wear and tear given their age. There is significant oil and grease splatter on both pumps and the pump skid, indicating seal leaks. Additionally, there is some condensation rust and chipped paint on both pumps. Pump No. 2 is missing its suction side pressure gauge. The pumps will likely need to be replaced in the next 5 years as they have exceeded their life expectancy (Cross-P301 & Cross-P302).

Gorman-Rupp suggests replacing each pump's wear plate every one to two years, while checking and adjusting tolerances as needed. In addition, Gorman-Rupp suggests replacing the pump's rotating assembly every 5 to 10 years as needed in lieu of replacing the entire pump. The Town may want to evaluate this option in lieu of full pump replacement.

The two pumps are backed up by a 30 hp liquid propane fueled standby pump engine that is original to the facility. This standby engine, a Gormann-Rupp Watchdog, is mounted on the pump No. 1 skid and will automatically start during a power outage. The standby engine was connected to the pump No. 1 motor by a belt. The engine does not appear to

provide backup to Pump No. 2. While the standby engine runs the pump motor, it does not provide backup power to the air intake or exhaust louvers, which means there is no ventilation while the backup engine is running and the pump room gets extremely warm. The evidence of this excessive heat can be observed by the heat damage to the electrical conduits in the area around the pump station. We recommend replacing the standby engine with an external backup generator that will provide backup power to the entire pump station. In the meantime, the electrical conduits near the standby engine should be protected with a heat shield, and the ventilation system be improved to allow proper ventilation during standby engine operation (Cross-P303).

Process piping and process valves appear to be original to the facility and are in fair condition. The piping and valves have surface rust on many of their flanges and hardware. Both discharge side check valves are mounted vertically, which is not the recommended configuration for a check valve. *TR-16 Guidelines for the Design of Wastewater Treatment Works* recommends that check valves be placed on a horizontal section of discharge line between the pump and shutoff valves. It is recommended that the check valves should be reconfigured and mounted horizontally. We recommend cleaning and repainting the process piping and valves. Once the valves exceed their life expectancy they should be replaced (Cross-P304).

2.3.2 Instrumentation and Controls

Instrumentation at the pump station consists of a bubbler level indicator system for level sensing in the wet well, high and low water alarms, strap on Doppler-type ultrasonic flow meter, and a remote alarm dialing monitor.

The bubbler level system appears to be in good working condition, and provides the primary run signal for the pumps. However, the bubbler level system appears to be original to the pump station and due to its age we recommend that the system be replaced with ultrasonic level transducers (Cross-I303).

The strap on Doppler ultrasonic flow meter is attached to the 12-inch discharge pipe and appears to be in good to fair condition. The flow rate is displayed on a digital readout as well as being recorded with a totalizer. The flow meter is aging, the paint is chipping off, and there is an indentation in the transducer likely caused by overtightening of the metallic hose clamp that holds the transducers to the discharge pipe. Due to its age and condition, we recommend planning for replacement of the Doppler ultrasonic flow meter, preferably with a magnetic flow meter that would be installed on the discharge pipe (Cross-I301).

The pump station does not currently have a SCADA system. Flow data is not currently recorded at the pump station on a flow totalizer; however, the above recommended magnetic flow meter could be tied into a SCADA system to automatically collect and record daily flow. The pump station is currently set to alarm during high water and low water events. This remote alarm dialing monitor is designed to telephone operators that there is a problem. A SCADA system could replace the remote alarm dialing monitor (Cross-I3041). It is recommended that a SCADA system be installed to record and transmit flow, water level, pump performance alarm and other data back to the WWTF via a radio antenna. It is recommended that an Allen-Bradley MicroLogix or CompactLogix transmitter be installed in each of the pump stations. The SCADA system should be compatible with the Allen-Bradley DF-1 protocol and communicate directly with the WWTF.

2.3.3 Structural/Architectural

The Cross Street Pump Station was constructed circa 1995. The pump station facility is a single story pre-engineered metal building with a below grade concrete wet well. The pump station exterior building walls are constructed of metal panels with batt insulation on the interior face. The building has a sloped gable roof with a standing seam metal roof and integral gutters running along the eave.

Overall, the Cross Street Pump Station is in fair condition. During the site investigation deterioration throughout the facility was observed; however, none of the deterioration was considered severe or needing immediate attention. The following are some of the more significant architectural and structural observations that were noted during our field visit.

On the building exterior the building concrete slab-on-grade is being undermined. It is recommended that a concrete foundation wall be constructed and the void beneath the slab be filled with a flowable fill material (Cross-S301). The exterior concrete stairs are deteriorated. It is recommended that the concrete stairs be removed and replaced (Cross-S303). In addition, the concrete stairs do not have handrails or guardrails. It is recommended that aluminum handrail and guardrails be installed on the exterior concrete stairs (Cross-S304). The paint on the exterior double door to the pump station is deteriorated and should be repainted (Erin-S202).

In general, the interior of the facility is in fair condition. Some deterioration was observed that will need to be repaired. Part of the insulation batt is damaged. Where torn and ripped, the batt should be repaired or replaced (Cross-S305).

2.3.4 Electrical/Standby Power

The Cross Street Pump Station electrical service is a 200A, 120/240V, single phase service with its main disconnect switch located indoors. The electrical distribution equipment consists of the utility meter, main disconnect switch, and a panelboard. The station does not have a generator, but has a propane engine that is capable of operating one of the pumps. The engine is automatically started after a time delay when a utility power outage occurs, and a small power system (powered by the engine) keeps the control system up and running. Overall, the electrical equipment at the station is in good condition, but the conduit and wiring is in very poor condition as described below and should be replaced immediately (Cross-E301).

All conduit and wiring in the building has been heated to the point of softening and significantly drooping throughout the building. This is putting major strain on the wiring, connections and wiring insulation. Furthermore, the conduits have become disconnected in a number of locations, and should be reconnected to avoid tearing and disconnecting of the wires (Cross-E302). All of the softened and drooping conduit should be replaced immediately along with all wiring running through the conduits since the wiring is now unreliable and unsafe due to overheating and physical strain from the stretching caused by the softening/dropping conduits. We believe that the overheating is due to the ventilation louvers being disconnected and the engine exhaust not being insulated.

The outdoor lighting is old and appears to be inoperable, and should be replaced in the near future (Cross-E308).

The electrical service does not currently have any surge protection installed. We recommend installing surge protection of at least 100kA/phase in the near future to protect the electrical equipment in the facility (Cross-E305).

The following issues are code violations or safety hazards and should be addressed immediately. There are no emergency lighting units or illuminated exit signs in the building; it is recommended that emergency lighting and exit signs be installed throughout the building (Cross-E307). As indicated above, some conduits have softened/drooped to the point of disconnection. If these conduits are not replaced immediately as recommended, then at the very least the disconnected conduits should be properly reconnected immediately. The circuit breakers in the panelboard are likely unreliable due to probable overheating, and it is recommended that the panelboard and breakers be replaced immediately (Cross-E303). Additional less critical recommendations are listed in the Conditions Summary Table.

2.3.5 HVAC

The Cross Street Pump Station is in poor condition and shows clear signs of insufficient cooling. Nearly all of the HVAC equipment needs to be replaced as soon as possible due to age, condition and arrangement insufficiencies.

The pump station's HVAC equipment consists of a manual louver, an automatic louver/damper, ventilation exhaust fan, residential style dehumidifier, and an electric wall heater.

The ventilation air inlet louver/damper is not functional. The actuator linkage is not attached and it is unclear whether the actuator motor reacts to the generator start-up. It is recommended that the louver, damper, and actuator be replaced immediately in order to prevent future overheating problems in the pump station (Cross-H301). The ventilation fan operates by an integrated thermostat which is operational. The associated louver/damper opens accordingly. The louver itself is bent and rusty in places. It is unknown if the fan is interlocked to start with the generator or controlled only by the thermostat. It is recommended that the wall opening be increased, the louver be replaced, and the fan be replaced with a larger one (Cross-H302). A manual louver is installed in the enclosure. We recommend relocating this louver to a location where it is easier to operate (Cross-H303). The generator engine exhaust pipe is rusted through the wall penetration and its replacement is recommended (Cross-H304). The pump station's electric heater appears to be old and the fuse is typically turned off. The electric heater is not controlled by a thermostat and must manually operated. We recommend replacing the electric heater (Cross-H305). The dehumidifier is not working properly and we recommend replacing it with an industrial-type unit (Cross-H306).

Due to the observed heat damage to sections of the insulation and electrical conduit, it is evident that the ventilation system is not operating properly or was not designed appropriately. We recommend a significant rehabilitation of the ventilation system. The exhaust fan should be relocated to the location of the existing manual louver after the manual louver has been removed. The main air inlet needs a new louver, damper and actuator. The size of air supply and exhaust fan should be increased to assure proper cooling as required by the generator manufacturer. To accommodate relocation of the fan, the engine exhaust pipe must be redesigned to provide proper clearances as required by code. We recommend testing and possibly updating the ventilation control system so the fan and louver start/open in conjunction with generator operation.

2.3.6 Civil/Site Security

The pump station is accessed by a paved driveway. A bituminous concrete parking space is located on the left (east) and front (north) side of the building. The bituminous concrete driveway and parking area are in good condition with minor cracking (Cross-C301). The pump station is raised approximately 4 feet above grade. The grounds behind (south) and to the right (west) of the station slope away in a northerly direction. The site in front of and to the right of the property is a well maintained grassy area. Behind and to the west of the station the site consists of overgrown vegetation. There are brambles growing up and around the propane tank and telephone poles. There is a fence surrounding a portion of the property. A fence runs along both sides of the driveway and along the east side of the station. There is a fence running along the west edge of the property that is damaged and should be repaired (Cross-C302). The building's gutters are clogged with debris and should be cleaned (Cross-C303). There is a light located on the outside of the building to the right of the entry door; however, the lighting is old and appears to be inoperable. The lighting should be replaced with new LED light fixtures with motion detectors to help increase safety (Cross—E305).

Access into the pump station is restricted to authorized personnel only. All doors are kept locked. A warning sign on the front of the building reads "Do Not Enter Without Proper Authorization. Please Call 603-532-6914 In The Event Of An Emergency". There are no security cameras on the outside of the building. The Town did not report vandalism or trespassing at the site; however, it is recommended that a building alarm system be installed (Cross-C304).

There is currently no bypass pumping connection at this station. In order to maintain sewer service during a critical pump station failure, we recommended installation of a bypass connection. Construction of an emergency bypass pumping connection system would include excavation down to the force main and installation of a gate valve and box, temporary line stop, tapping sleeve and valve, and bypass piping. The bypass piping connection could be located at or above grade for easy operator access. During a pump station failure, a portable bypass pump would pump sewage out of the existing wet well and into the bypass piping connection (Cross-C306).

2.4 Jaffrey Center Pump Station

The Jaffrey Center Pump Station was originally constructed in 1970 and upgraded in 1993. The wet well is located outside of the pump station, west of the building, and is accessible through a manhole cover in the parking area that is not locked. The building consists of one room at grade level that houses the two 5 HP Gorman-Rupp self-priming centrifugal pumps, control panels, and power equipment. An emergency generator is located on the northwest corner of the property. There is no hazardous gas detection equipment. There is no odor control system; however, the Town did not report issues with odor complaints. The pump station is not connected to the WWTF SCADA system. Building security is limited to locks on the access doors. There is no bypass piping connection.

Overall, the station is in good to fair condition. The typical life expectancy of equipment at wastewater pumping stations is 20 to 30 years, and it has been more than 20 years since this station's last upgrade. It is anticipated that the pump station will require upgrades within the next 5 years. There are also some structural, electrical, HVAC and site improvements recommended for the short term to increase the longevity of the building, increase operator safety, and improve security.

2.4.1 Process/Mechanical

Raw wastewater enters the wet well through a pipe running from the adjacent influent manhole. An air bubbler wet well level control system monitors the water level in the well and in turn calls for the pumps to be turned off and on.

The two self-priming centrifugal 5 hp Gorman-Rupp T-Series pumps were installed as a part of the 1993 upgrade project and are mounted to a pump skid that also houses the control panel. They pump wastewater from the wet well up into a common discharge pipe. The pumps are run at constant speed in a lead/lag configuration. The pumps are in good condition with the expected wear and tear of 23 year old pumps. There is minor condensation rust on both pumps. There are no suction or discharge pressure gauges on either pump. The seal oil on both pumps appeared to be clean and full at the time of our visit. The pumps will likely need to be replaced in the next 5 years as they have exceeded their life expectancy (Jaffrey Ctr-P401 & Jaffrey Ctr-P402).

Gorman-Rupp suggests replacing each pump's wear plate every one to two years, while checking and adjusting tolerances as needed. In addition, Gorman-Rupp suggests replacing the pump's rotating assembly every 5 to 10 years as needed in lieu of replacing the entire pump. The Town may want to evaluate this option in lieu of full pump replacement.

Process piping and process valves appear to be installed as a part of the 1993 upgrade and appear to be in good condition. The piping and valves have minor surface rust from condensation. Both discharge side check valves are properly mounted in the horizontal configuration. Paint is chipping off a section of the vertical common discharge header. It is recommended that the process piping be cleaned and repainted where needed. Once the valves exceed their life expectancy they should be replaced in kind (Jaffrey Ctr-P403).

2.4.2 Instrumentation and Controls

Instrumentation at the pump station consists of a bubbler level indicator system for level sensing in the wet well, float backup wet well, alarm level indicators, and a remote alarm dialing monitor.

The bubbler level system appears to be in good working condition and provides the primary run signal for the pumps. The bubbler level system appears to have been installed as a part of the 1993 upgrade project. It is recommended that within the next ten years the bubbler level indicator system be replaced with ultrasonic level transducers (Jaffrey Ctr-I402). It is recommended that the back-up floats also be replaced (Jaffrey Ctr-I403).

According to Env-Wq 705.05, sewage pump stations with capacities of 250 gpm or less with constant speed pumps may have a meter that indicates the cumulative running time of each pump, or continuous flow recording and totalizer capability; larger pumps and all pumps equipped with VFDs must have a totalizing flow meter. The station is equipped with run-time meters but there is no flow meter. While the station meets the requirements

of Env-Wq 705.05, we recommended, as a low priority item, providing a magnetic flow meter on the horizontal discharge pipe (Jaffrey Ctr-I404) in order to enhance system monitoring capability. There is no power monitoring equipment except the facility's electrical meter. We recommend adding power monitoring equipment as part of the facility's next instrumentation upgrade.

The pump station does not currently have a SCADA system. Flow data is not currently recorded at the pump station, but the above-recommended magnetic flow meter could be tied into the SCADA system to automatically collect and record daily flow. The pump station is currently set to alarm during high water and low water events. This remote alarm dialing monitor is designed to telephone operators that there is a problem. During the site inspection, the high water alarm was tested and it successfully activated the dialing monitor. A SCADA system could replace the remote alarm dialing monitor (Jaffrey Ctr-I405). It is recommended that a SCADA system be installed to record and transmit flow, water level, pump performance alarm and other data back to the WWTF via a radio antenna. It is recommended that an Allen-Bradley MicroLogix or CompactLogix transmitter be installed in each of the pump stations. The SCADA system should be compatible with the Allen-Bradley DF-1 protocol and communicate directly with the WWTF.

2.4.3 Structural/Architectural

The Jaffrey Center Pump Station was constructed circa 1970 as a below grade facility and was upgraded in 1993 to the existing facility. The pump station facility is a single story concrete masonry (cmu) structure with a below grade concrete wet well. The building is approximately 13'-10" long and 10' wide and houses the pump and the controls for the facility. The exterior building walls are constructed of single-wythe cmu. The building has a sloped gable roof with asphalt shingles.

Overall, the Jaffrey Center Pump Station is in fair to good condition. During the site investigation some minor deterioration of the facility was observed; however, this deterioration was not considered severe or in need of immediate attention. The following are some of the more significant architectural and structural observations that were noted during the site inspection.

On the building exterior, tree branches are overgrown on to the roof along the south building elevation. It is recommended that the branches be cut back (Jaffrey Ctr-S402). The existing paint on the cmu block is deteriorated, and it is recommended that the exterior surface of the cmu block be painted (Jaffrey Ctr-S404). The roof shingles along the south side of the ridge are deteriorated and should be removed and replaced (Jaffrey Ctr-S403). The facility doors are in need of attention. The exterior door and frame are corroded. It is recommended that the exterior door, door frame, and hardware be removed and replaced (Jaffrey Ctr-S401).

In general, the interior of the facility is in fair condition. The ceiling does not have attic access as required by the International Building Code (IBC) section 1209.2. We recommend providing a 20"x30" attic access per the building code (Jaffrey Ctr-S405) if the interior of the facility is upgraded.

2.4.4 Electrical/Standby Power

The Jaffrey Center Pump Station electrical service is a 100A, 120/208V, three phase service with its main disconnect switch located outdoors. The electrical distribution equipment consists of the utility meter, main disconnect switch, panelboard, 60kW Caterpillar diesel driven backup generator with integral breaker, and a 100 amp automatic

transfer switch (ATS). Overall, the electrical equipment at the station is in fair condition, but the majority of it is old and should be replaced in the next 6 to 10 years.

The lighting on the exterior of the pump station is old and appears to be inoperable, and we recommend replacing this lighting in the near future (Jaffrey Ctr-E410). The electrical service does not currently have any surge protection installed. We recommend that surge protection of at least 100kA/phase be installed in the near future to protect the electrical equipment in the facility (Jaffrey Ctr-E406).

The following issues are code violations or safety hazards and should be addressed immediately. There are no emergency lighting units or illuminated exit signs in the building. We recommend installing emergency lighting and exit signs throughout the building (Jaffrey Ctr-E407). There is a conduit with exposed abandoned wiring, which should be removed (Jaffrey Ctr-E403). There is a cable that appears to carry the level switch signal that is tie-wrapped to conduits throughout the station. This cable should be installed in a conduit (Jaffrey Ctr-E404). The 12”x”12 PVC junction box in the corner of the station is open and missing screws; the missing screws should be replaced (Jaffrey Ctr-E405). The float switch conduit does not appear to include an explosion proof seal (EY Fitting). An explosion proof seal should be provided to prevent transmission of potentially explosive gases from entering the building (Jaffrey Ctr-C404). Additional less critical recommendations are listed in the Conditions Summary Table.

2.4.5 HVAC

The HVAC system at the Jaffrey Center Pump Station consists of a small wall fan and an electric wall mounted unit heater. Both items will need to be replaced within the next 5 years.

No observations were made suggesting excessive heat development. The fan provides sufficient air changes and is operational but lacks an insect or bird screen. The fan’s age is unknown but is estimated to be beyond 10 years, and its sleeve is rusty. We recommend planning for replacement of the fan within the next 5 years (Jaffrey Ctr-H401). The electric heater is estimated to be more than 10 years old, and while operational, it is dirty and has a bent grill. We recommended replacing the heater (Jaffrey Ctr-H402). Additionally, sufficient rodent, insect, and bird protective screen should be installed in external openings to prevent intrusion to the pump station.

2.4.6 Civil/Site Security

The site is accessed by a short paved driveway off of Main Street. The surrounding ground is fairly level, sloping gradually downward in the rear southeast corner of the property, and sloping gradually upward along the western edge and road side of the property. The land around the pump station on the north (front) and west side of the property is well maintained grass and vegetation that transitions to wooded area behind the building and on the eastern and western edges of the property. A bituminous concrete parking area at the end of the driveway is located on the east side and front of the building. The bituminous concrete driveway and parking area is in fair condition. There is significant spider cracking running throughput the driveway, and we recommend planning for replacement of the driveway and parking area within the next 10 years (Jaffrey Ctr-C401). There is a short section of fencing with some barbed wire running along the west and south side of the property; however, it does not surround the property. The fencing and barbed wire is in fair condition with some damage. We recommended that the fence be replaced, repaired (Jaffrey Ctr-C402), or removed if preferred by the Town. There is a

light on the outside of the building to the right of the entry door; however, the light is old and appears to be inoperable. The lighting should be replaced with new LED light fixtures with motion detectors to help increase safety (Jaffrey Ctr-E408). Access into the pump station is restricted to authorized personnel only. All doors are kept locked. There are no security cameras on the outside of the building. The Town did not report vandalism or trespassing at the site; however, it is recommended that a building alarm system be installed (Jaffrey Ctr-C406)

The site does not have a drainage system. In the building, the pump station skid catchment basin has a drain that discharges to the wet well. As discussed in the electrical section, there does not appear to be a gas-tight seal between the wet well and pump room, which could allow potentially harmful gases to enter the pump room and cause the room to be a classified space. We recommend installing a gas/vapor barrier or valve between the wet well and pump room drain hole (Jaffrey Ctr-C404). Additionally, the fire extinguisher is missing from its designated storage area. We recommend providing an appropriately rated fire extinguisher in the pump station as soon as possible (Jaffrey Ctr-C405).

The wet well manhole cover adjacent to pump station is cracked. We recommended replacing this damaged manhole cover in kind (Jaffrey Ctr-C403). The ladder and concrete within the manhole are in good condition with no evidence of corrosion or damage.

There is currently no bypass pumping connection at this station. In order to maintain sewer service during a critical pump station failure, we recommend installation of a bypass connection. Construction of an emergency bypass pumping connection system would include excavation down to the force main and installation of a gate valve and box, temporary line stop, tapping sleeve and valve, and bypass piping. The bypass piping connection could be located at or above grade for easy operator access. During a pump station failure, a portable bypass pump would pump sewerage out of the existing wet well and into the bypass piping connection (Erin-C206).

2.5 Wastewater Treatment Facility

The Town of Jaffrey Wastewater Treatment Facility has an annual average design capacity of 0.75 million gallons per day (mgd) and a maximum month design capacity of 1.25 mgd. The WWTF is a biological nutrient removal activated sludge plant with tertiary treatment. The WWTF was originally constructed in 1985 and received a major upgrade in 2007. The 2007 upgrade included improvements to the influent grinding and screening system, vortex grit removal, septage receiving facilities, biological nutrient removal oxidation ditches, secondary clarification, return sludge pumping, waste sludge pumping, scum pumping, waste sludge storage, sludge dewatering system, chemical storage and feed systems, effluent aeration, ultraviolet disinfection system, instrumentation and controls, and SCADA system.

Overall, the WWTF is in good condition. Much of the equipment at the WWTF will not need to be replaced within the next 10 years; however, there are equipment items and structures that are in need of replacement or repair within the next 5 or 10 years, and in some cases sooner than that.

2.5.1 Influent Grinding & Screening

The influent grinding and screening for the WWTF occurs at the Hadley Road Pump Station. The condition of this equipment was discussed in section 2.1.

2.5.2 Influent Channel and Grit Removal

Wastewater enters the WWTF influent channel from the Hadley Road Pump Station, Sanitary Pump Station No. 1, the WWTF's Yard Pump Station, Millipore, and the WWTF Septage Receiving facility. Wastewater flows through the influent channel to the Grit Removal Chamber, which is located outside the Process Building. The influent channel concrete is in poor condition. Much of the channel concrete surface has corroded due to hydrogen sulfide gases and ultimately sulfuric acid. It is recommended that the damaged concrete be repaired, and a protective epoxy coating be applied to the concrete (WWTF-S501). Additionally, the Town may wish to consider installing a fan to draw potentially corrosive air out of the influent channel.

Wastewater flows down the influent channel to the grit removal system. The grit removal system is manufactured by EIMCO Water Technologies and consists of a circular concrete chamber, grit paddle drive system, grit pump, grit dewatering screw conveyor, and a grit receiving cart. The grit chamber contains a rotating paddle that induces a circular flow within the chamber and drives the solids toward the center. The grit paddle wheel and drive assembly appeared to be in good working condition. With proper operation and maintenance, the grit paddle wheel and drive assembly should not need to be replaced for at least 10 years (WWTF-PGPW-1).

Efflorescence was observed on the exterior concrete of the grit chamber. Efflorescence is indicative of cracking in concrete and water seeping through the cracks. It is recommended that these cracks be repaired within the next 5 years (WWTF-S502)

The settled grit is collected in a center hopper within the grit chamber, and is pumped to the Grit Dewatering Room. The grit pump is a Wemco horizontal torque-flow pump with a design capacity of 250 gpm and operates on either a manual or automatic cycle. The grit pump is located in the Process Building Pump Room and appeared to be in good working condition; however, there is no hand guard around the pump shaft and there is evidence of a minor seal leak. Additionally, there is no backup for the grit pump. It is recommended that a hand guard be installed around the grit pump shaft for operator safety, and the Town may want to consider installing or having onsite a backup grit pump. With proper operation and maintenance, the grit pump will likely not need to be replaced for more than 10 years (WWTF-PGT-1).

In the Grit Dewatering Room, grit is pumped into a grit concentrator where it is conveyed up to the grit classifier. The classifier carries the grit up an incline, allowing the liquid to drain to the Yard Pump Station. There is a plant water connection to the grit pump suction piping that activates prior to the pump operating to agitate and liquefy the accumulated grit. The grit is then deposited in a grit cart. The grit concentrator and classifier appeared to be in good working condition. There is some condensation rust on the equipment piping.

With proper operation and maintenance, the grit concentrator and classifier will likely not need to be replaced for another 10 years (WWTF-PGC-1).

2.5.3 Septage Receiving

The septage receiving facility is located northeast of the Process Building. This facility includes a septage receiving connection to a screening unit, one septage storage tank with a storage capacity of approximately 10,000 gallons, one submersible septage pump, and a recirculation nozzle assembly. The manual aluminum bar rack is located in the inlet structure channel. The septage pump is a Wemco Chop-Flow Pump, Model CFSA. The septage pump was not observed during the site visit, although it is believed to be in good working condition. The pump should be replaced in kind at the end of its useful life (WWTF-PSEP-1).

2.5.4 Biological Nutrient Removal Oxidation Ditch

Secondary treatment consists of a biological nutrient removal oxidation ditch system that removes both nitrogen and phosphorus. This wastewater treatment system consists of two parallel trains, and each train consists of two anaerobic basins, one anoxic basin, and an oval-shaped oxidation basin. During the site visit Oxidation Ditch Train No.2 was offline. Overall, the system appears to be to be working well and the Town is meeting the seasonal monthly average effluent limits of 1.0 mg/L ammonia nitrogen as N and 1.64 lb/day total phosphorus.

The anaerobic basins allow for the growth of polyphosphate accumulating organisms, which have the ability to absorb several times more phosphorus than other microorganisms resulting in less phosphorus in the liquid phase. Phosphorus is removed from the system by removal of the polyphosphate bacteria through the normal wasting of the activated sludge. Each anaerobic basin contains a 1.5 hp mixer that ensures the mixing of the reactor contents. The mixers, manufactured by EIMCO, appeared to be in good working condition. The offline mixers had rags wrapped around their cables, which indicates that ragging in the tank is likely a common problem, resulting from poor screenings removal in the Hadley Road Pump Station and the Septage Receiving Facility. If the ragging issue is addressed upstream, and if the mixers are properly operated and maintained, then they will likely not need to be replaced for at least 10 years (WWTF-PANM-1, WWTF-PANM-2, WWTF-PANM-3 and WWTF-PANM-4).

Denitrification occurs in the anoxic zone. Nitrates produced from the aerobic zone nitrification process are recycled back to the anoxic zone for denitrification. Denitrification occurs when the nitrate contacts the raw soluble BOD5 under anoxic conditions. The biological population separates the oxygen for respiration, and off-gases nitrogen to the atmosphere. The probability of this contact occurring is increased by submersible mixers. Each anoxic basin contains a 2.3 hp mixer manufactured by EIMCO. The mixers appeared to be in good working condition; however, similar to the anaerobic zone mixers, ragging was observed. The mixers' life expectancy will be increased and required maintenance decreased if the ragging problem is resolved. With proper operation and maintenance the mixers will likely not need to be replaced for at least 10 years (WWTF-PAXM-1 and WWTF-PAXM- 2). There did not appear to be any scum removal mechanism in the anoxic basins, and if the Town starts to incur scum issues in the anoxic zones then a removal mechanism should be installed.

The first phase of biological nitrogen removal, nitrification, occurs in the aerobic zone where influent ammonia contacts the aerobic zone's biomass in the presence of oxygen.

Each aerobic basin is equipped with two mechanical aerators. The aerators maintain a channel velocity adequate to maintain all the biological solids in suspension and dissolve air into the system to satisfy the process oxygen demand. The 20 hp mechanical aerators are manufactured by EIMCO. Overall the mechanical aerators appeared to be in good working condition. Epoxy paint was chipping off all four of the aerator drives and motors with some evidence of minor condensation rust. The oil sight glass on Mechanical Aerator No. 1 was cracked. An oil leak was noted near the recirculation piping beneath the motor of Mechanical Aerator No. 2. A congealed oil-like substance was observed around the dipstick and oil sight glass on Mechanical Aerator No. 4. We recommend recoating these drives and motors and repairing these minor leaks and cracks as a part of the WWTF's maintenance plan. With proper operation and maintenance, the mechanical aerators will likely not be in need of replacement for at least 10 years (WWTF-PMA-1, WWTF-PMA-2, WWTF-PMA-3, and WWTF-PMA-4).

To assist in monitoring the conditions in the oxidation ditches, a dissolved oxygen (DO) probe and pH probe are installed in each of the ditch tanks. The DO probes are luminescent dissolved oxygen (LDO) type manufactured by Hach. Each DO probe is connected to a Hach SC100 controller that displays the DO concentration in its tank and sends a signal to the Carrousel Process Control Panel in the Electrical Room of the Process Building. These signals are used by the process control PLC to adjust aerator speed to maintain the desired DO set point. The DO probes appeared to be in good working condition; however, the DO probe in the offline tank was not properly stored. It is recommended that the DO probe, particularly the end cap, be properly stored and protected to improve the probe's life expectancy and performance when it is brought back online. The DO probes have exceeded their life expectancy of approximately 5 years as recommended by the manufacturer and should be replaced (WWTF-IAE/AI-40A & WWTF-IAE/AI-40B).

The pH probes in the oxidation ditches are also manufactured by Hach. Similar to the DO probes, each pH probe is connected to a Hach SC100 controller that displays the pH in its tank and sends a signal to the Carrousel Process Control Panel. The pH probes appeared to be in good working condition; however, both probes had warning messages that need to be addressed as part of standard probe maintenance practice. Both probes had a "Replace Sensor" warning message, which means the probe's salt bridge needs to be replaced. This is a relatively inexpensive and easy maintenance activity that will improve the accuracy and reliability of the instrumentation. The offline pH probe was still turned on, not properly stored, and flashing an error message indicating that it needed calibration. It is recommended that the pH probes be properly stored or at least the end caps be protected when not in use, and that calibrations be made as required as a part of probe maintenance activities. The pH probes have exceeded their life expectancy, which is 5 to 8 years, and should be replaced (WWTF-IAE/AI-40C & WWTF-IAE/AI-40D).

If the SC100 controllers are replaced, we recommend upgrading to Hach's SC200 controller, which would only require one controller per oxidation ditch rather than two because each controller allows for two inputs. Both the DO probe and pH probe could plug into one controller.

2.5.5 Secondary Clarifiers

Wastewater flows from the oxidation ditches to the secondary clarifier flow distribution structure where flow is directed towards one of two secondary clarifiers. Each of the two 50-foot diameter center-feed secondary clarifiers has a 12.5 foot sidewater depth and is

enclosed in a dome. The clarifiers were constructed as a part of the 2007 WWTF upgrade. The clarifier equipment is manufactured by EIMCO Water Technologies and includes spiral blade sludge collection mechanisms, energy dispersion inlet baffles, Stamford density current baffles, rotating scum skimmers, and ¾ hp drive assemblies. At the time of inspection, both clarifiers were online, so much of the equipment could not be observed; however, the observed clarifier equipment appears to be in good working condition. There was some condensation rust and paint chipping on both clarifiers' drive assemblies, particularly around bolts and fill ports that would be opened and closed for maintenance activities. An oil absorbent pad was located on the Clarifier No. 2 drive assembly, indicating possible oil leakage. With proper operation and maintenance the secondary clarifiers will likely not be in need of replacement for at least 10 more years (WWTF-PSCD-1 & WWTF-PSCD-2).

2.5.6 Scum, RAS, & WAS Pumping

Scum is collected in the secondary clarifiers by full radius, rotating scum skimmers and then flows by gravity to the secondary scum well. Once collected in the secondary scum well, the scum is pumped to the sludge holding tanks by a submersible chopper pump. The 250 gpm scum pump is a Chop-Flow Pump Model CFSA manufactured by Wemco. The scum pump is equipped with a recirculation nozzle and 3-way valve that homogenizes and de-stratifies the wet well contents and allows the floatables to be more readily pumped. The scum pump was not observed during the site visit, but was not identified by operators as having problems. With proper operation and maintenance, the scum pump will likely not be in need of replacement for at least 10 years (WWTF-PSC-1).

The return activated sludge (RAS) pumping system consists of three 15 hp horizontal non-clog screw impeller centrifugal pumps rated at 170 to 660 gpm each. The pumps are manufactured by Wemco-Hidrostal, Model-E5K-LM-E2W, and run in a two active/one common standby configuration. The return sludge pumps transfer secondary activated sludge from the bottom of the two secondary clarifiers back to the oxidation ditches. Overall, the pumps were observed to be in good condition. All three pumps' discharge side bolts had chipped off paint, indicating pump disassembly, most likely for rag removal. A large rag ball was located on the floor adjacent to pump No. 1. The apparent ragging issue is likely caused by poor screenings removal at the Hadley Road Pump Station. Pump No. 2 was missing its suction side pressure gauge. With proper operation and maintenance, the return sludge pumps will likely not need to be replaced for at least 10 years (WWTF-PRS-1, WWTF-PRS-2, WWTF-PRS-3). The return sludge flow is measured by two electromagnetic flow meters manufactured by Krohne that appeared to be in good condition. The flow meters should be replaced in kind at the end of their useful life, but should function properly for at least 10 more years with proper maintenance and calibration (WWTF-IFE-50A & FE-50B).

The waste activated sludge (WAS) pumping system consists of two horizontal non-clog screw impeller centrifugal pumps, each rated for 250 gpm. The pumps are manufactured by Wemco-Hidrostal, Model E4K-S-E2W, and run in a one active/one standby configuration. The waste sludge pumps transfer secondary sludge from the bottom of the secondary clarifiers to the sludge holding tanks. The pumps appeared to be in good working condition. Similar to the RAS pumps, the waste sludge pumps have chipped paint on their bolts indicating that the pumps have been disassembled multiple times, likely for rag ball removal. Both pumps were equipped with the proper safety shaft guards in place. With proper operation and maintenance, the waste sludge pumps will likely not need to be replaced for at least 10 years (WWTF-PWS-1 & WWTF-PWS-2). The waste sludge flow

rate is measured by an electromagnetic flowmeter that appears to be in good condition. The flow meter will likely not be in need of replacement for at least 10 more years with proper maintenance and calibration (WWTF-IFE-55A)

The process building basement contains a sump with a duplex sump pump system that pumps to the yard pump station. The sump pumps are controlled by two float switches, pump on and pump off, and discharge to the yard pumping station. The pumps appeared to be in good working condition, although they were not tested during the site visit. The pumps have surface rust. It is expected that the sump pumps will need to be replaced within the next 5 years (WWTF-P114).

2.5.7 Sludge Holding and Dewatering

Waste sludge and scum skimmed from the secondary clarifiers are stored in one of two sludge holding tanks. Each tank holds approximately 66,000 gallons of unthickened waste sludge and scum. The tanks appeared to be in good to fair condition. The tanks' hatches are equipped with appropriate fall protection. The concrete exteriors of the tanks have minor cracks surrounded by red stains that indicate water seepage, likely at cold joints in the concrete. It is recommended that the tanks' cracks be repaired (WWTF-P113). The tank contents are mixed and aerated by EPDM membrane disc diffusers, part of the Sanitaire fine bubble diffused aeration system. The diffusers were not visible during the site visit, although they are believed to be in good condition and should not need replacement for at least 10 years. Air is supplied to the sludge storage tank by either of two rotary lobe Roots-EasyAir 8000 Factory Blowers located in the Process Building Blower Room. The 40 hp blowers are equipped with VFDs for speed adjustment based on the tank liquid level, and are each rated to supply 270 to 540 icfm at up to 12 psig. The blowers are in very good condition and the blower piping is in excellent condition. The blower room and equipment was observed to be clean. There was no abnormal belt wear on either blower and the oil level and cleanliness was good in both blowers at the time of our visit. With proper operation and maintenance, the blower system will likely not be in need of replacement for at least 10 years (WWTF-PSTB-1 & WWTF-PSTB-2).

The sludge dewatering system consists of sludge grinders, centrifuge feed pumps, a polymer feed system, a centrifuge, and a screw conveyor.

The progressive cavity centrifuge feed pumps are located in the lower level of the Process Building and are rated at 100 gpm. These pumps draw sludge from the sludge holding tanks and through in-line sludge grinders that macerate particles. The feed pumps are Moyno 2000 Series and the sludge grinders are Moyno Anhilator Series 4. The sludge grinders appear to be in excellent condition and with proper operation and maintenance will likely not be in need of replacement for at least 10 years (WWTF-PGR-1 & WWTF-PGR-2). The centrifuge feed pumps and their seal water systems appear to be in good working condition. There is a small oil leak from the discharge side plug valves after both centrifuge feed pumps. With proper operation and maintenance the centrifuge feed pumps will likely not be in need of replacement for at least 10 years (WWTF-CFP-1 & WWTF-CFP-2). There were no check valves located on the discharge lines of the centrifuge feed pumps, and we recommend installing check valves on these lines to prevent backflow and potential damage to the pumping and grinding equipment (WWTF-P123).

The feed pumps convey sludge to the centrifuge located in the Dewatering Room on the first floor of the Process Building. The polymer feed system provides dilute polymer to the centrifuge sludge feed line to aid in the flocculation of the sludge. The polymer system is

described in more detail in the following section. The centrifuge was manufactured by Westfalia Separator. The centrifuge generates a minimum 20% solids sludge cake and can process up to 80 gallons per minute of sludge. The centrifuge was installed in 2007 and appears to be in good working condition. With proper operation and maintenance the centrifuge will likely not be in need of replacement for at least 10 years (WWTF-CEN-1).

A horizontal screw conveyor manufactured by Spirac moves the caked sludge from the centrifuges to a 40-yard roll-off container in the sludge loading bay. The sludge conveyor appears to be in good working condition, and with proper operation and maintenance the conveyor will likely not be in need of replacement for at least 10 years (WWTF-C-1).

2.5.8 Chemical and Polymer System Feed and Storage

Chemicals stored and fed at the WWTF consist of magnesium hydroxide, ferric chloride, and polymer.

Magnesium hydroxide (MAG) is used for alkalinity addition and pH adjustment. The system consists of a 2,000-gallon storage tank located in the Process Building, two chemical feed pumps manufactured by Masterflex, and a tank mixer. MAG is pumped and discharged into an injection nozzle on the 8-inch return activated sludge pipe. During the site visit, MAG was observed to have leaked at this chemical injection point. The injection point should be cleaned and the connection should be checked for tightness. The MAG feed pumps have a design flow rate of 10-2900 ml/min at speeds of 6-600 RPM. The MAG system equipment appeared to be in good working condition. We recommend planning for replacement in kind of the pumps and mixer within the next 10 years, at the end of their life expectancies (WWTF-PMAG-1,2 & WWTF-PALK-3)..

Ferric chloride is used as a phosphorus treatment coagulant and flocculation aid for the secondary and tertiary treatment processes. The ferric chloride system consists of a 1,600-gallon storage tank located in the Process Building adjacent to the MAG storage room and two chemical feed pumps manufactured by Masterflex. Ferric chloride can be pumped and discharged to a chemical injection nozzle in the oxidation ditch effluent pipe located in Chemical Injection Manhole No. 1, the Secondary Clarifier effluent in Chemical Injection Manhole No. 2, and the return activated sludge line in the Process Building Pump Room. The ferric chloride feed pumps have a design flow rate of 10-2900 ml/min at speeds of 6-600 RPM. The ferric chloride system equipment appears to be in good working condition. We recommended planning for replacement in kind of the ferric pumps within the next 10 years, at the end of their life expectancy (WWTF-PPAC-1&2). This said, immediate work is recommended in the ferric chloride storage area. All ferric chloride feed equipment is located within the spill containment area, and there is no clear unobstructed path to a wash-off station. To increase operator safety, it is recommended that a wash-off station be installed within the spill containment area (WWTF-P117).

Polymer is used to aid in the dewatering process. The dewatering system polymer blending unit manufactured by DynaBLEND provides a flocculent agent to aid in dewatering waste activated sludge and improve flocculation and water separation during tertiary clarification and filtration. The system dilutes neat polymer delivered to the treatment plant in 55 gallon drums. The skid mounted polymer mixing and feed system consists of feed water control valves, an automatic metering pump, and product mixing system. Polymer is metered by a reciprocating positive displacement pump that can automatically determine a feed rate that linearly corresponds to an operator set sludge feed rate. A variable speed/ variable stroke LMI Model A951-86R metering pump controls the flow. The polymer system

appears to be in good working condition, and should be replaced at the end of its useful life, likely within the next 10 years (WWTF-P115).

2.5.9 Tertiary System

Tertiary treatment at the WWTF consists of a ballasted flocculation and clarification system for phosphorus removal. The tertiary treatment system is an ACTIFLO system supplied by Kruger, Inc. This is a proprietary physical chemical water treatment process. The purpose of the ACTIFLO system is to meet the Town's seasonal total phosphorus limit of 1.54 lb/day April through October, while the Town's 10.4 lb/day November through March total phosphorus limit can be met with biological nutrient removal in the secondary treatment process. The system appears to be working as it should. The ACTIFLO process is a two train system, each train consisting of coagulation, injection, maturation, and settling phases.

Secondary effluent flows through Chemical Injection Manhole No.2 where ferric chloride is added to the wastewater prior to entering the coagulation tank. In the coagulation tank, constant speed mixers destabilize the suspended solids and colloidal matter, and these destabilized particles collide and begin early stage floc formation. The coagulation tank mixers are manufactured by Philadelphia Mixing Solutions. The mixers are in good to fair condition, and during the site visit were making a loud squeaking sound, perhaps indicating a bearing failure. The coagulation tank mixers should be repaired and maintained to increase their life expectancy. The mixers should be replaced in kind at the end of their useful life, likely in the next 10 years (WWTF-PCM-1,2).

The coagulated wastewater flows into the injection tank where microsand is added to initiate floc formation. Constant speed mixers manufactured by Philadelphia Mixing Solutions provide mixing to incorporate microsand into the coagulated wastewater. The microsand provides a large contact area for floc attachment and acts as a ballast. The injection tank mixers were observed to be in good to fair condition. During the site visit, both mixers were making an abnormal humming sound as if there were some type of mechanical vibration or rubbing. There is paint chipping off the mixers as well. It is recommended that the paint be touched up and the vibration and humming sound be addressed. The injection tank mixers should be replaced in kind at end of their useful life, likely in the next 10 years (WWTF-PIM-1,2).

From the injection tank, wastewater flows into the maturation tank. The maturation tank is used for flocculation and maturation of the solids, as well as polymer addition for binding of the floc and microsand particles. The VFD-controlled mixers in the maturation tank are also manufactured by Philadelphia Mixing Solutions and appear to be in good working condition. The maturation tank mixers should be replaced in kind at end of their useful life, likely in the next 10 years (WWTF-PMM-1,2).

From the maturation tank, wastewater flows into the settling tanks where the ballasted floc settles out. Each settling tank includes a scraper mechanism that slowly rotates to convey the settled sludge to a pump. The VFD controlled ¾ hp settling tank scrapers are manufactured by Clearstream and consist of rake arms, plow blades, and shaft protectors. The settling tank scrapers could not be fully observed during the inspection; however, they appeared to be in good working condition. The settling tank scrapers should be replaced in kind at end of their useful life, likely in the next 10 years (WWTF-PSTS-1,2).

The ballasted floc sand-sludge mixture collected at the bottom of the settling tank is withdrawn by one of the five rubber-lined centrifugal microsand recirculation pumps. The 5 hp microsand pumps are located in the Tertiary Building Pump Room. The pumps are manufactured by McLanahan, Model LPT IIIr Pump, Dry Gland, and have capacities of 22 gpm at 65 ft. TDH each. Two pumps are dedicated to each train with one pump serving as a backup. The microsand pumps appeared to be in good working condition. Water leaks at all of the drive shafts were observed. According to the operators, when taken apart, the pump internal components and rubber impellers were in good condition. The microsand recirculation pumps should be replaced in kind at end of their useful life, likely in the next 10 years (WWTF-PMRP-1,2,3,4,5).

The collected sludge and sand is pumped to one of four hydrocyclones. The hydrocyclones, manufactured by Krebs, Model U3-10-1838, use centrifugal forces to separate the sludge from the higher density microsand. Once separated, the clean microsand is concentrated and discharged out the bottom of the hydrocyclones and injected back into the injection tank for reuse, while the sludge is discharged out the top of the hydrocyclones and conveyed to the yard pump station. The hydrocyclones appeared to be in good working condition. The hydrocyclones should be replaced in kind at end of their useful life, likely in the next 10 years (WWTF-PHC-1,2,3,4). A small amount of microsand is lost through the train each day, and operators need to ensure that sand is added back into the system as necessary, through the injection tank.

2.5.10 Post Aeration System

The post aeration system is designed to increase the level of dissolved oxygen prior to discharge. Wastewater flows to the post aeration tank after receiving tertiary treatment prior to disinfection. The system consists of the post aeration tank, a fine bubble diffused aeration system by Sanitaire Corporation, and two rotary lobe positive displacement blowers by Roots-EasyAir. The blowers are housed within the UV Disinfection Building in the Blower Room. One blower is active and one is on standby. The blowers, Roots-EasyAir 8000, are rated for 180 inlet cubic feet per minute (icfm) and are in very good condition. No abnormal belt wear was observed during the site inspection. With proper operation and maintenance, the blower system will likely not be in need of replacement for at least 10 years (WWTF-P119). The diffuser system, consisting of Sanitaire Silver Series II membrane diffusers, was not observed during the site inspection, but is believed to be in good working condition. The Town and plant staff did not report any problems pertaining to the post aeration system on the site visit. With proper operation and maintenance, the fine bubble diffused aeration system will likely not be in need of replacement for at least 10 years (WWTF-P118). The system can be bypassed with flow directed to disinfection after tertiary treatment.

2.5.11 Ultraviolet Disinfection System

The ultraviolet (UV) disinfection system uses high intensity low-pressure ultraviolet light to inactivate pathogens' reproductive systems in wastewater effluent. The UV disinfection system is manufactured by Trojan Technologies, Model UV 3000PLUS™. The system consists of 2 channels with 2 banks each and a total of 64 UV lamps per channel that help the Town meet its permitted monthly average of 126 E. coli/100 ml and daily maximum of 406 E. coli /100ml . The system also has a weir level controller and control panel. The UV system is designed to treat a peak flow of 3.89 mgd with one channel and two banks in service. The system was installed as a part of the 2007 upgrade, and appears to be in good condition. A rusted tint color was noted in the effluent channel. The UV system will

likely need to be replaced at the end of its life expectancy in approximately 10 years (WWTF-PUV-1A,B & UV-2A,B).

2.5.12 Plant and Well Water Systems

The plant water system supplies water to unit processes, housekeeping hosebibs, and hydrants throughout the facility. The plant water system pumps withdraw plant effluent from the UV disinfection channel sump and pump high pressure water into a distribution piping system. The distribution system includes a 450-gallon pressure vessel for storage and equalization. The plant water system is equipped with two 12-stage centrifugal pumps that are capable of high output pressure and flow. The pumps are made by Goulds and each is rated for 200 gpm at 65 psi and 150 gpm at 75 psi. The system maintains a working pressure between 70 and 100 psi. The pumps and storage tanks appear to be in good condition. There is some condensation rust on the pumps and discharge check valves. This rust should be removed and the equipment repainted. With proper operation and maintenance, the plant water system will likely not be in need of replacement for at least 10 years (WWTF-P120). During the site investigation it was noted that the ductile iron and SCH80 PVC plant water piping interface in the Process Building Pump Room looked vulnerable to failure. It is recommended that this interface be further evaluated and reinforced if necessary (WWTF-P116). This potential failure could lead to a critical flooding event in the pump room, particularly if the float switch or sump pumps also fail or cannot keep up with the flow. Plant water pressure and flowrate is monitored through the SCADA system, and should pressure drop significantly and flow increase, as would be the case in a pipe or connection break, the plant water system should shut down.

The well water system was upgraded as part of the 2007 upgrade project and provides the Process Building with potable water and water that is distributed to the boiler and for use as process water. This system utilizes a Goulds Well Pump, pumping from a deep bedrock well that is located northeast of the UV Disinfection Building. The well pump supplies water to a 450-gallon pressure tank designed to maintain the system between 70 and 100 psi. The pump and pressure tank appeared to be in good condition. A flow regulating controller, Pump Saver 20, keeps the well pump running consistently throughout the well and system operation range. Backflow protection is provided on process water, potable water, and boiler water feed mains. With proper operation and maintenance, the well water system will likely not be in need of replacement for at least 10 years (WWTF-P121).

2.5.13 Electrical Support Systems

All of the major electrical equipment supporting the Wastewater Treatment Building (switchboard, main distribution panel, motor control centers, panelboards, transformers, etc.) was installed as a part of the 2007 WWTF upgrade project and has a recommended service life of 30 to 35 years. We recommend inspection, testing, and servicing of this equipment on a regular basis, or alternatively, implementation of an electrical preventative maintenance (EPM) program. Either measure would maximize the service life of WWTF electrical equipment. The intensity of the maintenance schedule will depend on the environmental conditions, the importance of the equipment, and its loading and use. However, EPM should be performed at least once every three years, and more often for critical components. The first step in an EPM program is a complete thermographic inspection of all electrical equipment prior to a scheduled outage. This survey is a non-invasive method of identifying high temperature excursions which indicate potential problem areas due to loose or dirty connections, load imbalances, or improper installation of equipment. This initial step helps in determining the resources that are needed during

the scheduled outages to perform EPM. Ideally, a thermographic inspection should be done during peak-load conditions by a certified, experienced thermographer. Plans should be made to have all circuit breakers and disconnect switches repeatedly opened and closed during the shut-down period to ensure proper operation. In addition, protective relays and circuit breaker trip devices need to be tested and calibrated on a regular basis.

Electrical preventive maintenance is cost-effective in several different ways. First, it is less expensive to make repairs to equipment before it fails. When electrical equipment fails, particularly protective devices like circuit breakers or relays, there is usually subsequent damage to other components in the system. Often the equipment cannot be repaired and must be completely replaced. New equipment does not always replace the failed component in-kind and may require other modifications to make the system whole. Failed equipment results in unplanned outages that can be very costly when replacement equipment cannot be easily found. Instead of having a planned system outage for EPM at the most convenient time for your operation, equipment failures often occur at inopportune times. Emergency repairs are very costly due to the urgency of the situation where temporary work is required before a permanent repair can be done.

In addition, an effective EPM program can improve equipment efficiency and reduce utility bills. A loose or dirty connection has increased resistance which results in higher power losses. By simply tightening and cleaning electrical connections, you can lower these energy costs. When considered over a period of time, these energy losses can be significant.

Conduit, Wiring and Receptacles

Electrical wiring, conduit, and receptacles have a recommended service life of 50 years. The conduit, wiring, and receptacles for the building are in good to very good condition, with the following exceptions. There are a number of locations where the field threads were not coated with proper corrosion resistant coatings. It is recommended that a PVC coating rated for the application be provided on all conduit threads to prevent rusting. The locations where coatings are required are noted on the Conditions Summary Table.

Security System

The treatment plant has door contacts and motion sensors, and a keypad in place. The system appears to be in good condition.

Interior Lighting

All interior light fixtures are in good condition and are reasonably energy efficient T8 fluorescent type.

Exterior Lighting

The existing exterior lighting for the building consists of HID wall mounted fixtures that are in good condition. The exterior light fixtures on the Process Building are left on all day. It is recommended that a photocell on the lighting circuit be provided to turn the lights off during daylight hours (WWTF-E2).

Emergency Lighting and Exit Signs

Emergency and exit lighting in the facility appears to comply with NFPA 101 (Life Safety Code), with the exception of the Electrical Room. It is recommended that a two-head emergency light towards the north end of the west wall be installed (WWTF-E11). One

additional emergency light fixture should be provided on the west wall. The fixtures throughout the facility appear to be in good condition, although the fixtures were not tested during the site visit. The fixtures should be tested on a normal basis to ensure they continue to operate properly.

Code Compliance

The electrical equipment at the Facility was evaluated for compliance with National Electrical Code (NEC) guidelines. The following observations were noted during inspection.

Several local disconnect switches at the plant are in violation of the working space requirement of the NEC. These disconnect switches include the following:

- Odor Control Disconnect Switch (WWTF-E4)
- Plant Water Pump Disconnect Switches (WWTF-E20, Qty. 2)
- SC-1 Disconnect Switch (WWTF-E24)

The above working space violations were noted at the treatment plant during the site inspections. The NEC (National Electrical Code) requires a certain amount of clear space around electrical equipment that is likely to be worked on while energized. This clear working space required around equipment is:

- Depth: From the cover of the equipment out to 42 inches for 480V equipment and out to 36 inches for lower voltage equipment.
- Height: from the floor to 6.5 feet above the floor (or to the structural ceiling).
- Width: 30 inches or the width of the equipment (whichever is larger)

It is assumed these installations were approved by the local inspector(s) and at this point we do not believe it is required to correct this type of violation, as long as the equipment is not worked on while it is energized. We recommend that when the equipment is replaced in the future, the new equipment be installed in conformance with the code.

Standby Power

The plant has a 450 kW standby generator that was built in 2008 (Caterpillar model C15, serial number G6B13512). The typical service life of standby power equipment is 15 to 30 years, and depends largely on service conditions, the adequacy of routine maintenance, and frequency of scheduled run times. The generator appears to be in good condition. Periodic load bank testing is recommended to ensure that the generator will perform well at 100% of its nameplate rating and limit the potential risk of generator failure during an emergency. Load-bank testing should be a regular part of a generator maintenance program to avoid mechanical failure caused by extreme stress on the engine and other components when the generator is used in a power outage. It also helps maintain vital engine system parameters such as oil pressure and coolant temperature.

2.5.14 Administration Building

The Administration Building was constructed in 1986. The building is located just off Old Sharon Road at the entrance to the WWTF. The building is a single story concrete masonry structure with a brick veneer. Some of the control joints on the building exterior do not have the proper quantity of joint sealant. It is recommended that the control joints be repaired with the proper amount of sealant (WWTF-AB1). The roof system is original to the building and is wood truss-framed with plywood sheathing and asphalt shingles.

Although the roof appears to be in good condition, it is now 30 years old and has exceeded its life expectancy. It is recommended that the roof be replaced in kind (WWTF-AB2).

The Administration Building houses an emergency generator, an oil-fired hot water boiler, men's locker room, an office, a laboratory, and a garage. In 2010 the Town replaced the emergency generator with a 60 kW CAT D60-6. With proper operation and maintenance, the generator will likely not be in need of replacement for another 15 to 20 years (WWTF-AB3). The boiler for the forced hot water heater was replaced in 2009 and should likely not be in need of replacement for another 10 to 15 years (WWTF-AB4).

The men's locker room is not currently American Disabilities Act (ADA) compliant. To become ADA compliant, grab bars need to be installed in the toilet stalls and shower stalls, plus roll-in access to the shower needs to be made available (WWTF-AB5). The building is equipped with a fire alarm system that includes strobes in the hallway and building exterior, heat detectors, lighted exit signs, and a pull station near the front entry door. It is recommended that additional strobe lights be installed in the locker room, laboratory, and office areas. Additionally, pull stations should be installed in the laboratory and office areas (WWTF-AB6).

The Administration Building currently contains a one-bay garage. Space for storage of equipment is very limited in the existing garage. An alternative in the 2007 WWTF Plant Upgrade Project included the addition of a two-bay garage to the Administration Building. This addition was not built. Nearly 10 years later the Town is still in need of additional storage space at the facility. The garage bay could store and protect equipment such as bypass pumps, skid steers, vehicles, snow removal equipment, etc. It is recommended that a 2-bay garage be constructed as an addition to the existing Administration Building (WWTF-AB7).

The laboratory is equipped with instrumentation and equipment to assist with process monitoring and control of the WWTF performance. Table 2-1 below summarizes the laboratory equipment inventory. The in-house testing equipment is in good condition. Laboratory equipment should be replaced at the end of its useful life, which in most cases is in 6 – 10 years (WWTF-AB9 through WWTF-AB24).

2.6 Collection Systems Evaluations

The Town of Jaffrey owns and maintains a collection system of approximately 20 miles of sanitary sewer lines including both gravity and force main sewers. The Town, over the last 30 years, has investigated the overall collection system, and more recently has focused investigative efforts on a prioritized basis. The following is a breakdown of monitoring, inspections performed, and their procedures, as well as a brief summary of system capacity and sewer connection policies.

2.6.1 Continuous Flow Monitoring and Isolation

In the past, the Town has installed temporary flow monitoring equipment in the wastewater collection system. Based on the flow monitoring data, flow isolation was conducted in certain areas of the system to locate potential sources of infiltration. Flow meters for wastewater flow monitoring typically use a pressure or ultrasonic level transducer in tandem with a Doppler velocity sensor to determine flow rates. Flow readings are normally taken every 15 minutes, however, this value changes if a pump station is upstream of the meter, in which case, readings would be taken every 5 minutes.

Flow isolation is conducted by temporarily plugging upstream pipes so that flow measurements can be obtained for pipe segments (manhole to manhole). Portable pre-calibrated weirs can be installed at the outlet of each monitoring location to collect data.

Table 2-1 WWTF Laboratory Equipment Inventory

Instrument	Estimated Replacement Cost
Thermo Scientific Orion 3 Star benchtop pH meter	$2,000
Hach Sension 3 pH meter	$1,600
Mettler AE 160 Scale	$4,000
Ohaus Explorer Pro Scale	$700
Precision Gravity Convection Oven	$1,200
Quincy Lab Inc. Gravimetric Oven	$1,400
Welch Vacuum Pump	$1,200
Westover Electron Microscope	$2,100
Thermo Scientific magnetic stir plate	$500
Hach DR 2800 Spectrophotometer	$8,000
Hach DRB 200 digestion block	$2,100
Thermolyne muffle furnace	$4,300
Lab-Line Ambi Hi-Lo incubator	$8,000
Kenmore lab refrigerator	$1,200
Kenmore freezer	$1,300
GE Dishwasher	$1,200
YSI 550A dissolved oxygen meter	$1,400
Total	**$42,200**

In 1984, Jaffrey completed a Town-wide Sewer System Evaluation Study (SSES) that included flow monitoring, flow isolation, and manhole and television inspections. More recently, in 2011, flow monitoring was utilized to evaluate infiltration and inflow as part of a two phase I/I study. As a part of the study, flow monitoring occurred at the Cross Street Pump Station for a period of four weeks between March 28, 2011 and April 27, 2011. During this time a Programmable Logic Controller received and translated flow data at 10 second intervals from the Cross Street Pump Station's ultrasonic flow meter, which was then downloaded onto a laptop. Subsequently a flow isolation study was conducted in this area during a period of high groundwater, dry weather, and low domestic flow (12 AM to 5 AM) between May 5th and May 14th, 2011. Figure 2-1 indicates the Study Areas for the 2011 I/I Study. The entire study area, with the exception of a small portion of the

system flowing to the Erin Lane Pumping Station, was flow isolated to locate potential sources of infiltration.

2.6.2 Closed Circuit Television Inspection (CCTV)

Closed circuit television inspection (CCTV) verifies defects within pipelines as well as locates sources of or the presence of previous infiltration. Generally, pipelines that received CCTV inspections are the reaches that exhibited active infiltration or visible defects during flow isolation inspections, or by Town personnel observation. The Town of Jaffrey conducted CCTV inspections in 1984, 1997, and 2011. Figure 2-2 shows the historical CCTV inspection locations.

2.6.3 CCTV Inspection Procedures

The Town has typically utilized the services of an I/I sub-consultant to perform light cleaning (one to two passes with hydraulic flushing equipment) and interior television inspection of gravity sewer mains. All of these inspections are performed in accordance with the National Association of Sewer System Companies (NASSCo) Pipeline Assessment Certification Program (PACP) procedures. NASSCo has established guidelines for performing sewer system evaluations to achieve predictable, repeatable analysis of sewer infrastructure.

The CCTV program has historically identified locations of infiltration sources within the sewer along with structural defects. Subsequently, the information is used to develop a cost-effective sewer rehabilitation program. In addition, the television inspection data has provided the Town with information on pipe condition, the location of sags and offset joints, and the presence of potential blockages (roots, grease, and/or debris). DVDs and written logs of the inspections are prepared as part of this work, and the information is archived by the Town.

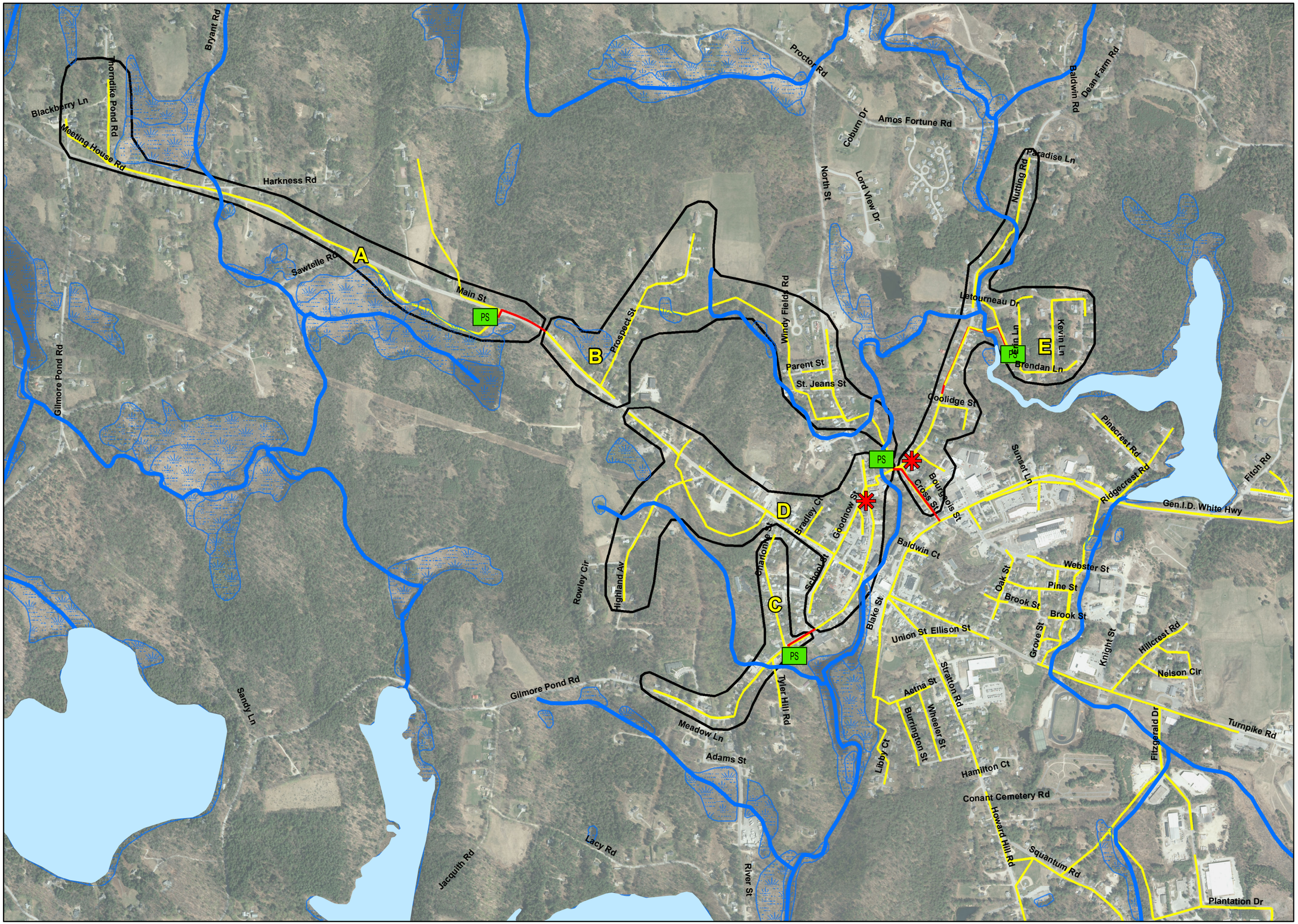

FIGURE 2-1
HISTORICAL I/I STUDY AREAS

LEGEND

- Streams and Rivers
- Wetlands (National Wetland Inventory)
- Named Waterbodies
- Sewer Mains
- Force Main
- Sewer Service Sub-Area
- PS Existing Pump Station
- Potential Temporary Flow Meter Location

LOCUS MAP

N

0 500 1,000
Feet
1:12,000

NOTES

1. Based on 2015 GRANIT 1-foot Color Orthophotography mosiac for New Hampshire

Wetland Resources Within Study Area 2011 I/I Study

Jaffrey, New Hampshire

June 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

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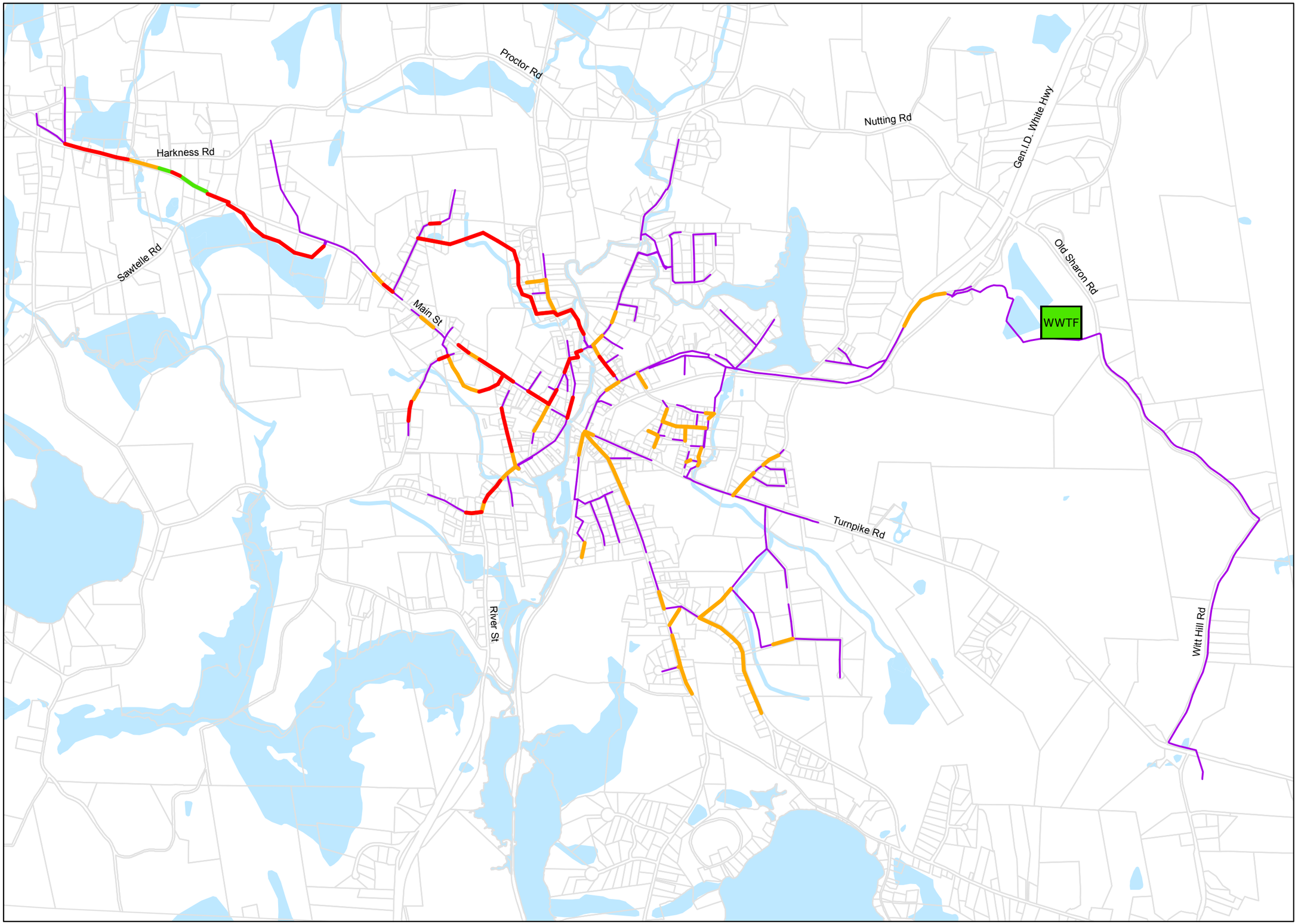

FIGURE 2-2
HISTORICAL CCTV INSPECTION LOCATIONS

Selected Roads

- CCTV Inspections 2011
- CCTV Inspections 2008
- CCTV Inspections 1997
- Sewer Main
- Parcels
- NH Waterbody
- Streams and Rivers

LOCUS MAP

N

0 500 1,000 1,500
Feet
1:18,000

NOTES

Jaffrey, New Hampshire

June 2016

Tighe&Bond
Consulting Engineers
Environmental Specialists

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2.6.4 Manhole Inspections

Inspections have recently been performed to determine the actual physical condition of manholes. Data from these inspections indicate active defects or signs of previous infiltration, which have the potential to become active sources during high groundwater periods or rain events. If the results of the preliminary manhole inspections show signs of leaking manholes or manholes in need of repair, bid documents have been historically developed for rehabilitation.

Approximately 200 Manholes were investigated as sources of infiltration in the 2011 I/I study. Only a few visible sources of infiltration from the manholes were observed during the inspections. Manhole inspections were also included in the 1984 Sewer System Evaluation Study and the 1997 evaluation study.

2.6.5 Manhole Inspection Procedures

Ideally, manhole inspections are conducted during periods of high groundwater so that sources of I/I associated with groundwater can be easily detected. The following information is gathered for each manhole utilizing NASSCo Manhole Assessment Certification Program (MACP) based procedures:

1. Manhole number
2. Street name and house number associated with the manhole
3. Cover characteristics, number of holes in cover, ponding potential
4. Depth of manhole from rim to invert
5. Physical condition of the manhole such as cracks in the walls, shelf, or invert
6. Structural condition of the manhole and potential for blockage
7. Active infiltration, if any, in gallons per minute (gpm)

2.6.6 Collection System Capacity History

The Town of Jaffrey's collection system has not, to-date, exceeded design capacity to convey dry weather wastewater flows. Existing capacity issues, if any, have been due to inflow and infiltration entering the collection system during wet weather periods. Through the efforts with ongoing CCTV and manhole inspections, the Town is working to reduce wet weather and inflow related capacity issues.

2.6.7 Sewer Connection Policy/Capacity Review

The Town employs a Sewer Use Ordinance (SUO) which details the policy for new connections to the sewer collection systems. In the SUO, two classes of building sewer permits are defined:

(a) for residential and commercial service and
(b) for service to establishments producing industrial wastes

The Town's sewer service connection application details the number of bedrooms associated with proposed residential connections to the collection system, and requires

plans to accompany the application for Wastewater Division personnel to review. Proposed new discharges from residential or commercial sources involving loadings exceeding 50 population equivalents (5,000 gpd), any new industrial discharge, or any alteration in either flow or waste characteristics require verification of the capacity of the receiving sewers prior to construction.

The property owner bears the responsibility of making the application to the Town, along with payment of associated fees. The property owner is also responsible for constructing the service from the dwelling to a service connection point at the property line. The Town maintains responsibility for the sewer mains and services outside of the property line.

Section 3 Risk-Based Prioritization & Asset Management

3.1 About Asset Management

Infrastructure Asset management is an integrated set of strategies aiming to optimize the operational and maintenance costs of utility assets while minimizing risk. The International Infrastructure Management Manual –now in its 2015 edition since its first release in 1996– continues to be the most widely accepted source of guidelines and practices in the international asset management industry. Its practices have been adopted and promoted by agencies such as the EPA. The approach presented here observes those guidelines and practices, which are organized in the following steps:

1. Determining the **current state** of the assets
    a. Creating an asset inventory
    b. Determining condition, performance and remaining useful life of the assets
    c. Determining remaining economic value
    d. Identifying data gaps
2. Defining the required **levels of service** (LOS)
    a. Determining desired level of service standards from customers
    b. Determining regulatory requirements
    c. Determining current status (actual performance versus desired LOS)
3. Identifying assets that are **critical** to sustained performance
    a. Determining failure modes
    b. Estimating probabilities of failure
    c. Identifying and quantifying consequences of failure
4. Identifying the best operations and maintenance (**O&M)** and capital improvement planning **(CIP)** investment strategies
5. Defining a favorable **long-term funding** strategy

This approach can be used by most utility owners for the initial phase of any asset management program because it allows for managing the complexity of the system over time while producing a capital plan that while not driven by asset data during the first years, is "in-tune" with asset management principles.

We have utilized an asset management approach with the goals of:

1) Defining the critical assets of Jaffrey's wastewater system facilities and collection system

2) Prioritizing recommendations based on risk

3) Comparing recommendations and needs relative to assets of either the collection system or the facilities

3.2 Collection System GIS and Data Gap Analysis

Jaffrey's sewer system is represented in GIS. For asset management purposes, the minimum data requirements for sewer lines are the following:

1. Sewer lines are represented in GIS as segments or individual lines between nodes (manholes, endpoints, junctions or facilities)
2. Unique asset identifiers (or asset IDs)
3. Material, diameter, and year of installation data
4. Condition information, if available is very valuable.

3.2.1 GIS Updates

Updates to the GIS made as part of this project included:

- Scanned and georeferenced 91 record plans. We created a feature class with outlines of record drawings, and attached scans to each feature, to make them available from the web application that we host for Jaffrey.
- Linked CCTV reports to sewer lines
- Reviewed record drawings against existing GIS for size, material, year of installation. Updated metadata as necessary.
- Spatially compared record plans to GPS fieldwork
- Compared attributes in GIS to sewer pipe spreadsheet
- Updated missing manhole IDs from original CAD, reviewed against main spreadsheet
- Added upstream and downstream manhole ID to sewer pipes feature class
- Added unique asset IDs to sewer pipes feature class
- Updated invert, rim and depth elevation of 105 manholes, using record drawing information
- Created wastewater treatment facility footprint by building/process feature class, and attached photos taken during the inspections
- Updated names of pump stations
- Added CCTV data from inspections as a table to the GIS with records assigned asset IDs to the corresponding pipes
- Created RISK Dataset with the following feature classes:
    - Jaffrey Boundary – From NH Granit website, clipped to Jaffrey's extent

- Critical Customers – from NH Granit website, clipped to Jaffrey's extent
- Emergency Medical Services– from NH Granit website, clipped to Jaffrey's extent
- Nursing Homes – from NH Granit website, clipped to Jaffrey's extent
- Rivers – from NH Granit website, clipped to Jaffrey's extent
- Roads – from NH Granit website, clipped to Jaffrey's extent
- Waterbodies – from NH Granit website, clipped to Jaffrey's extent
- Water supply wells – from Jaffrey's water supply system database
- 400 feet buffer from water supply well – created water supply wells feature class
- Wetlands – from NH Granit website, clipped to Jaffrey's extent
- Risk data for sewer lines. – This feature class contains all the information needed to analyze and visualize consequence factors, criticality, and likelihood of failures for the risk assessment. Details about the risk analysis are presented in section 3.3

3.2.2 Data Gap Analysis

Jaffrey's system in GIS has 19.91 miles of sewer lines, including both gravity sewers and force mains. The majority of the system is composed of vitrified clay pipe. Twenty-four percent of the system is of unknown material. The sewer pipe materials are summarized in Table 3-1 and Figures 3-1 and 3-2.

Table 3-1 Length of Pipe by Material

Material	Length (ft)	Percentage
Asbestos cement	4,867	5%
Cast iron	3,370	3%
Ductile iron	1,432	1%
Lined vitrified clay	2,946	3%
PVC	19,219	18%
Reinforced concrete	5,750	6%
UNKNOWN	**25,220**	**24%**
Vitrified clay	42,301	40%
Total	**105,104**	100%

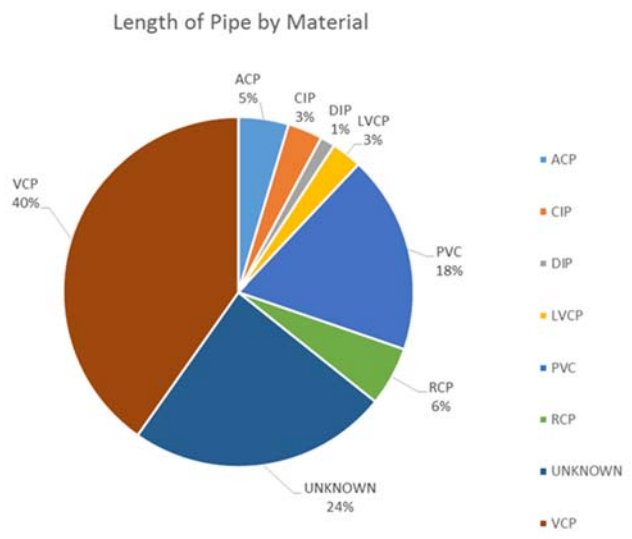


Figure 3-1 Percentage of Pipe by Material

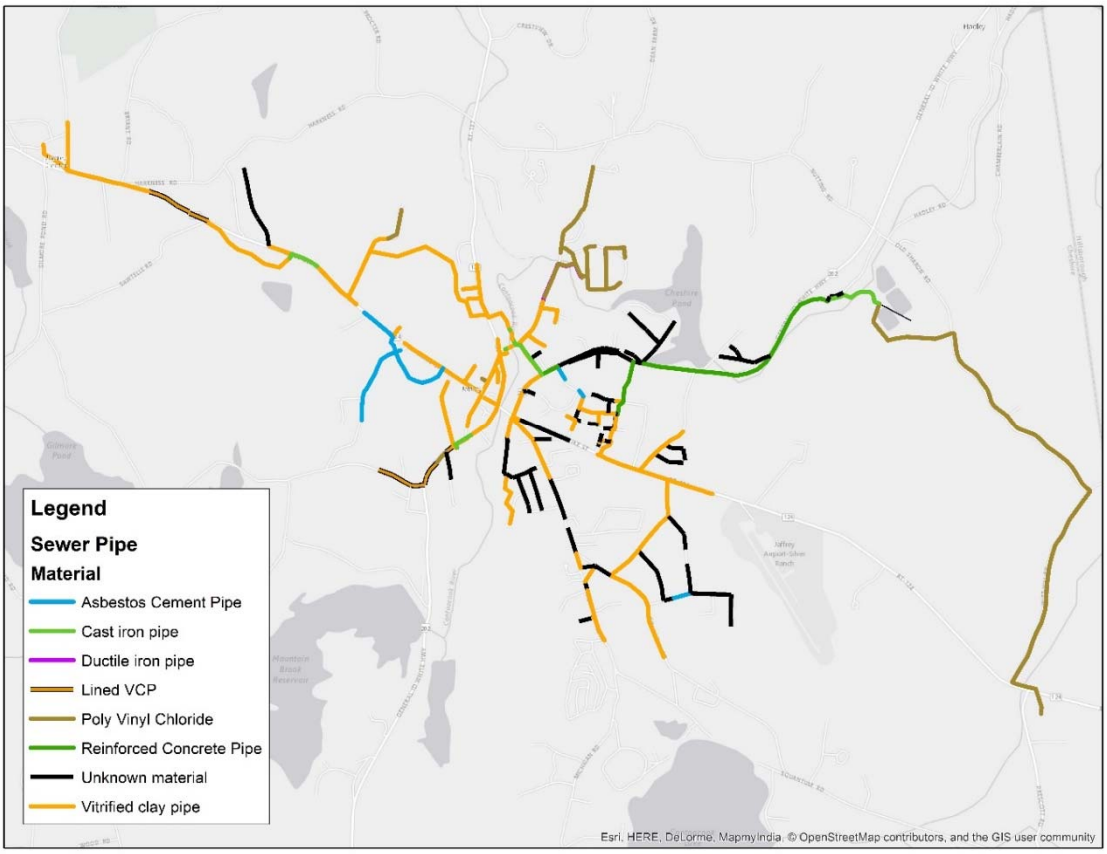


Figure 3-2 Map of Sewer Network Pipe Materials

Forty-six percent of the system is composed of 8-inch pipe. Also, most of the system was installed in 1964, 1970, and 1984-85. Pipe diameter is unknown for only two percent of the system. Year of installation is unknown for another two percent. Pipe diameter is summarized in Table 3-2, and year of installation is summarized in Figure 3-3. Figure 3-4 provides a graphic summary of sewer line materials and year of installation.

Table 3-2 Pipe Length by Diameter

Diameter	Length (ft.)	Percentage
4"	3,131	3%
6"	19,083	18%
8"	48,203	46%
10"	6,008	6%
12"	17,295	16%
15"	1,539	1%
18"	7,530	7%
Unknown	2,314	2%
Grand Total	**105,104**	100%

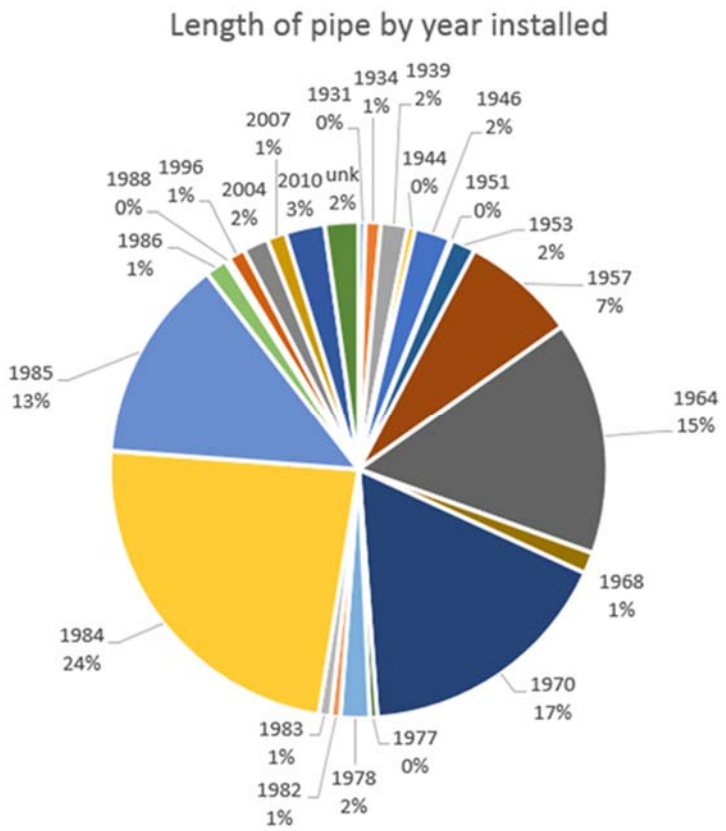


Figure 3-3 Percentage of Pipe by Year of Installation

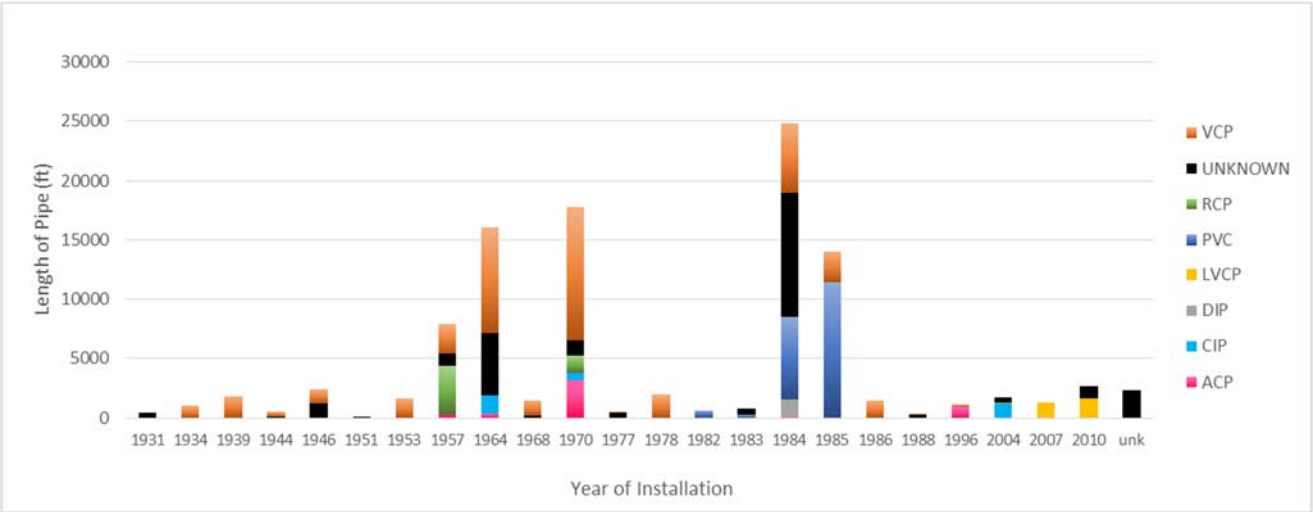


Figure 3-4 Length of Pipe by Material versus Year of Installation

Pipe condition information from CCTV inspections conducted in 2011 is documented in the GIS data for 14 percent of the system. Based on this information, most of the system seems to be in good condition except for a few pipes with structural defects of grade 5[1]. The worst Quick Structural Rating (QSR) score in the 2011 inspection data is 5400[1]. Figure 3-5 shows the QSR values developed from the 2011 inspections.

Twenty-nine percent of the system was inspected in 1997. We linked the inspection records, in PDF format, to the sewer lines features in the GIS database. Condition information from these inspections was not used in this analysis because QSR ratings were not derived from the data and because we didn't have information about improvements made to the system after the 1997 inspection.

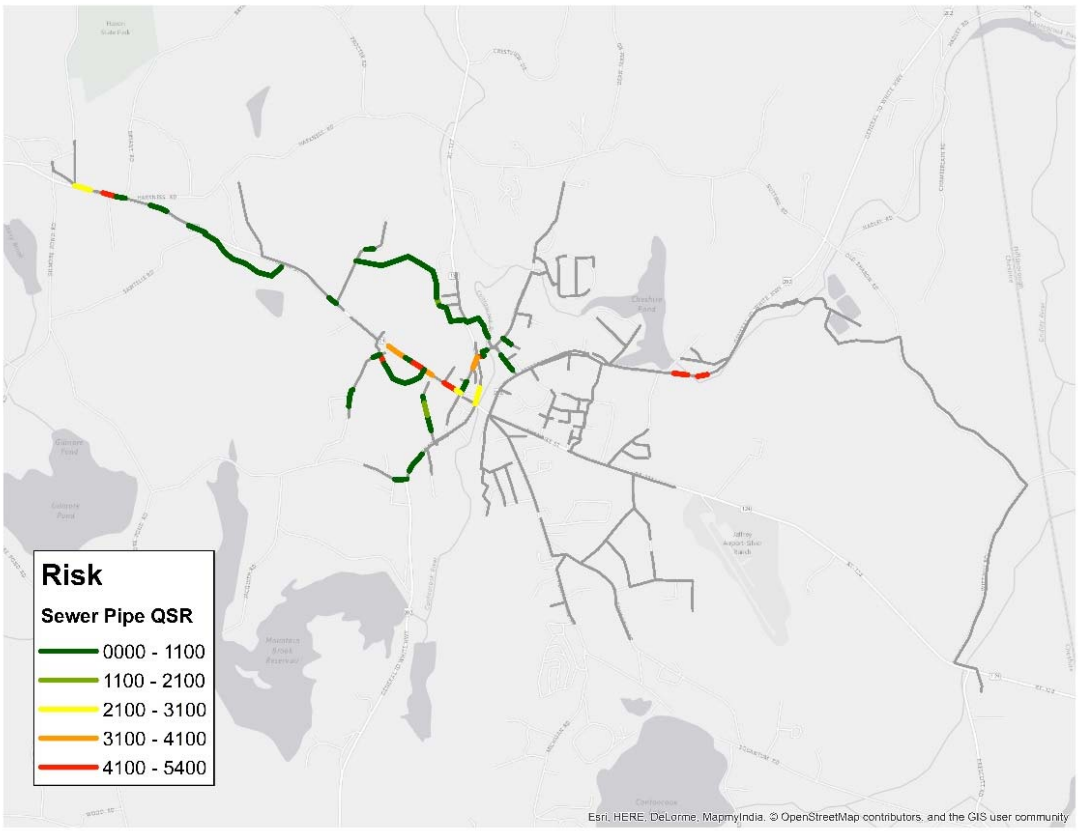


Figure 3-5 PACP Quick Structural Rating (QSR) Values (2011)

We created an updated QSR rating for those lines that were replaced, lined or had spot repairs after the inspections of 2011. We assigned an updated QSR of 0000 (no defects)

[1] **Quick Structural Rating (QSR) values**: QSR is a structural rating system developed as part of the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP). The QSR consists of four alphanumerical characters. The first one indicates the greatest severity grade of the structural defects found along the line (range 0-5); the second character indicates the number of defects of that severity; the third character indicates the second greatest level of severity found, and the last character corresponds to the number of defects of that severity. For example, a QSR of 5239 means that the pipe has 2 defects of severity 5, and 9 defects of severity 3. If there are >9 defects, letters are used, e.g. A=10, B=11, etc.

to those pipes. We also assigned an updated estimated service life to pipes that were replaced based on material and year of installation. To pipes that were lined, we assigned a remaining useful life of 50 years from the date they were lined. Estimated service life and age were not updated for those pipes that underwent spot repairs. Figure 3-6 shows the updated QSR values.

Figure 3-6 PACP Quick Structural Rating (QSR) Values after 2012 and 2014 Improvements

Figure 3-7 shows a plot of the QSR values versus year of installation. As indicated in the figure, no correlation between the QSR of the inspected pipes and their year of installation is evident.

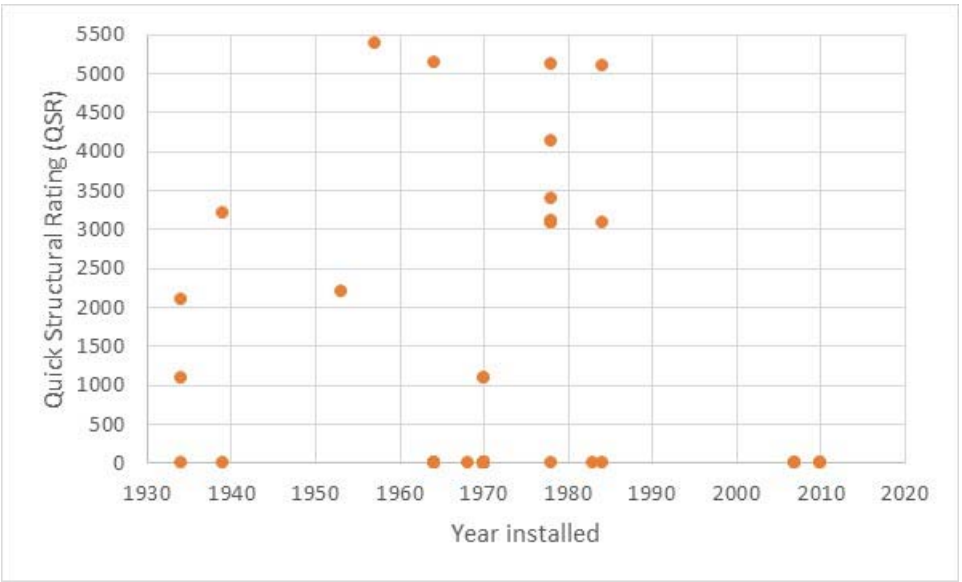


Figure 3-7 QSR versus Year of Installation

3.3 Risk Framework

In the context of asset management, risk is defined as the **Likelihood of failure** (LoF) of an asset times the severity and extent of the consequences of that failure (CoF). Risk applies to assets, and it is calculated as the product of those two terms.

Failure refers to the state of not meeting a desirable or intended objective. The likelihood of failure of an asset reflects the possibility of that asset not meeting its desired or intended objective.

Consequences of failure are direct negative outcomes resulting from the failure of an asset. Consequences represent what is important to prevent. In the framework of risk analysis the emphasis is on the negative: outcomes that should be avoided such as regulatory infractions, health and safety hazards, or economic losses. Three main consequence factors are what constitute the triple-bottom-line (TBL): social, environmental, and economic; however, they can be broken down into categories that contribute to those three factors such as health and safety, quality of life, operational cost, regulatory environmental compliance, etc.

The risk model used in this project uses a rating system between 1 and 4 for both Likelihood of Failure and Consequence of Failure. Figure 3-8 depicts the model's risk space, defined by likelihood of failure and consequence of failure rating levels.

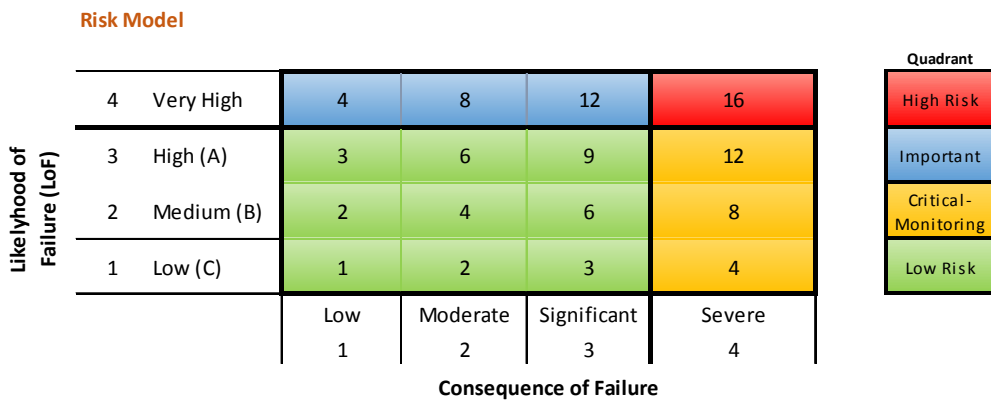


Figure 3-8 Risk Space

3.3.1 Likelihood of Failure

For all the assets inside the facilities, we used codes to rate the immediacy of the recommended repairs into 4 categories: Immediate, A, B, and C. For the purposes of prioritizing recommendations based on risk, we assigned each of these categories a numerical value, which represents the likelihood of failure under a physical integrity failure mode, using a scale from 1 to 4. These likelihood of failure categories are summarized in Table 3-3.

Table 3-3 Likelihood of Failure for Facility Assets

Category	LoF	LoF Rating
Immediate	Very High	4
A	High	3
B	Intermediate	2
C	Low	1

Likelihood of failure of the sewer system pipes was based on estimated remaining useful life of the pipe and its condition. Condition information was available for 14 percent of the system (percentage by length). We used NASSCO guidelines to derive the NASSCO structural condition index, which ranges between 1 and 6 and is a function of the QSR[2]. That rating was then scaled to span the 1 to 4 scale used in our risk model. The likelihood of failure ratings based on structural condition are summarized in Table 3-4.

[2] The SCI is calculated from the QSR for most cases by dividing the first two characters of the QRS by 10 (e.g. QSR of 5421 means SCI is 5.4).

Table 3-4 Likelihood of Failure Ratings Based on Structural Condition Index

PACP QSR	NASSCO Score	LoF as % (0-1)	LoF as 1-4 range
N/A (not inspected)	0	UNKNOWN	UNKNOWN
0000 (inspected with no defects	1	0	1
Number of occurrences of highest defect grade is less than 9 (example 5200)	[First 2 digits]/10 Range: 1 to 6 (example 5.2)	Range: 0 to 100	Range: 1 to 4
Number of occurrences of highest defect grade is greater than 9 (example 5H22)	[First Digit] + 1 (example, 6)	Range: 0 to 100	Range: 1 to 4

Pipes were also assigned a likelihood of failure related to their remaining useful life. Each pipe was assigned an estimated service life (ESL) value in years based on material. These ESLs were determined based on values from the literature with input from the Town. The ESL values are provided in Table 3-5.

Year of installation data was available for most of the system from record drawings. The remaining useful life in years was calculated as the difference between the ESL of each pipe and its age. Likelihood of failure on a 1 to 4 scale was calculated from remaining useful life expressed as percentage assuming that an asset with 100% of remaining useful life would have a likelihood of failure score of 1 and an asset with remaining useful life of 0% would have a likelihood of failure score of 4. Figure 3-9 is a map of the sewer network showing remaining life in years.

The final likelihood of failure for sewer lines was calculated as the greater of the likelihood of failure estimated from the condition information and the likelihood of failure estimated from the remaining useful life. The likelihood of failure values are mapped in Figure 3-10.

Table 3-5 Estimated Service Life for Pipe Materials

Material	ESL (years)
Asbestos cement	50
Cast iron	115
Ductile iron	100
PVC	100
Vitreous clay	75
Lined vitreous clay	100
Reinforced concrete	50
UNKNOWN	75

No correlation between the likelihood of failure score from condition information and the likelihood of failure score from age is evident. To be able to assess the uncertainty associated with the lack of condition information on the rest of the system, we set up the model to use the maximum likelihood of failure score of the two, and set up the condition of those pipes with no inspection data as an adjustable parameter.

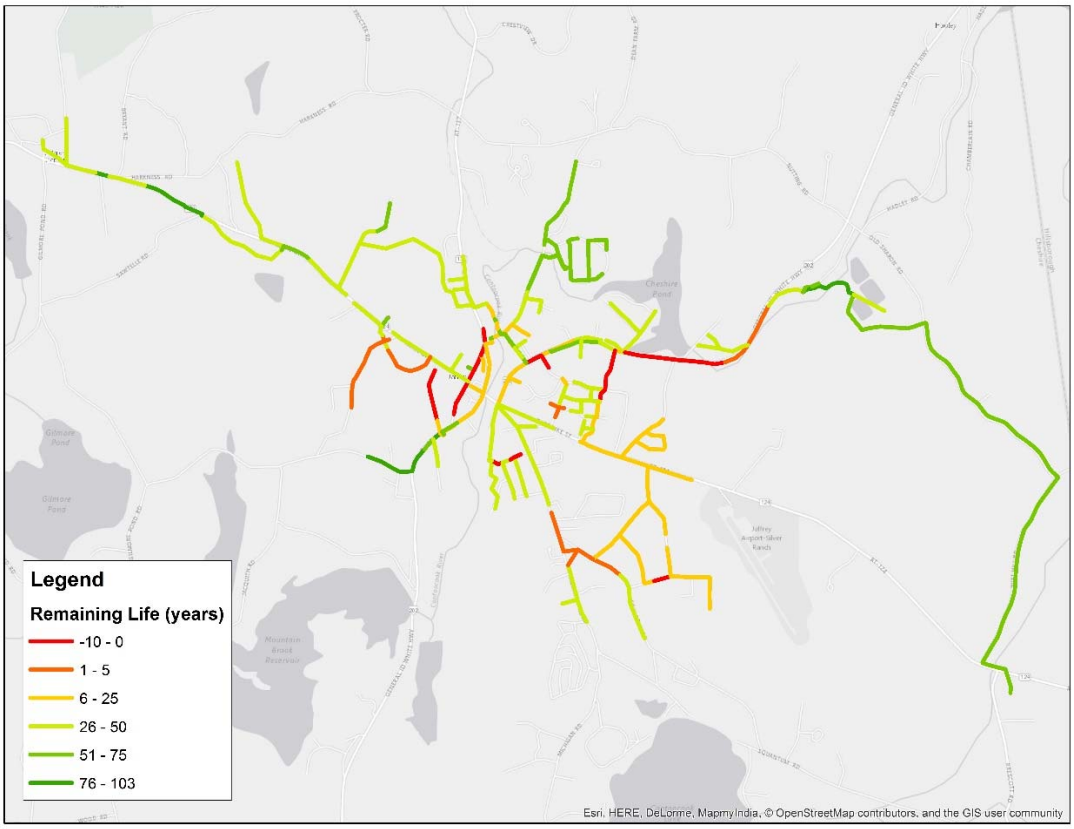


Figure 3-9 Remaining Life in Years of Sewer Network

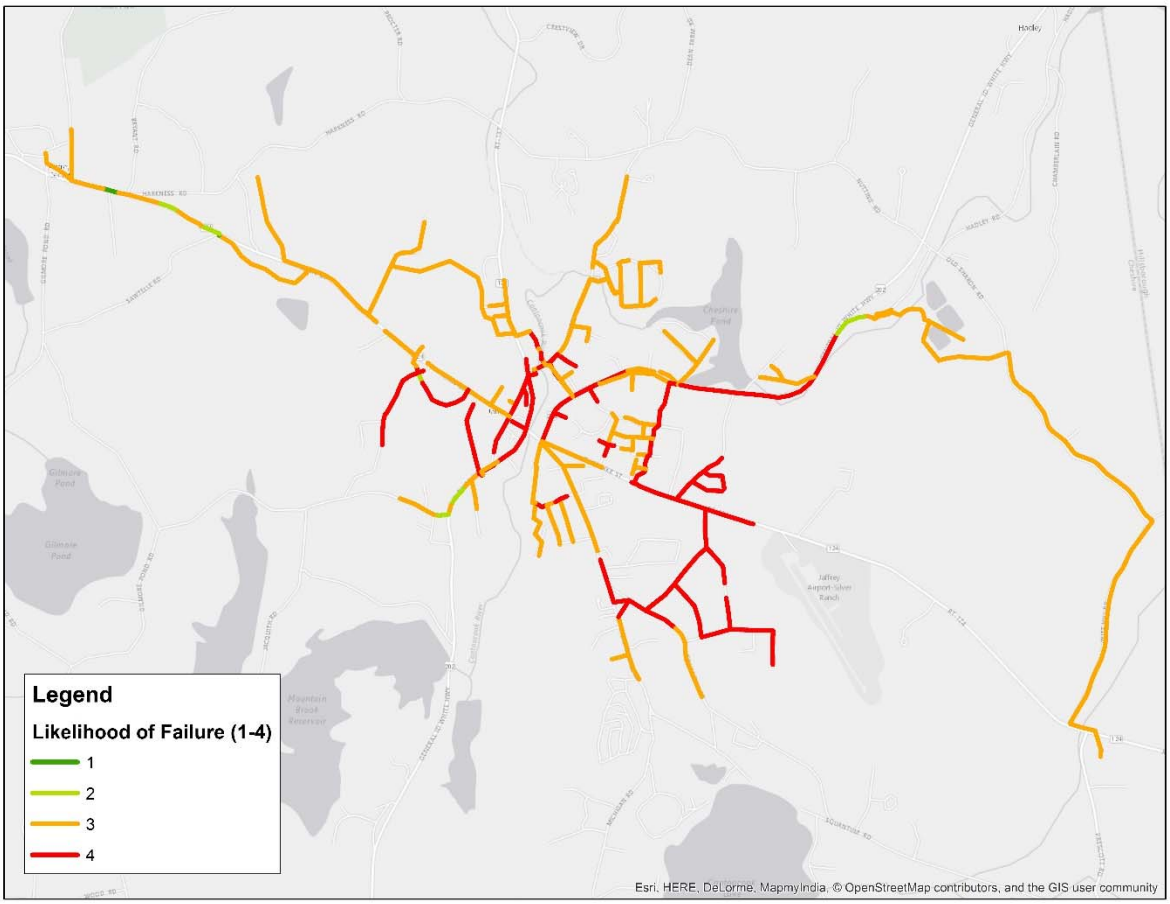


Figure 3-10 Likelihood of Failure Ratings of the Sewer Network

3.3.2 Consequence Factors

Three consequence factors were considered for both the facilities and the collection system: impacts to health and safety, impacts to operations and costs, and impacts to the environment. For the facilities, environmental impacts were interpreted as regulatory compliance incidents. These ratings range from 1 (minimal to no impacts) to 4 (severe impacts). For the facilities, we assigned preliminary consequence rating scores to assets under those three categories, based on our understanding of the system. These ratings were reviewed with the Town and are summarized in Table 3-6.

The collection system was analyzed using GIS, to assign consequence ratings to each pipe segment or asset. We used the following data sets for the analysis:

- Roads (i.e., the classification of the road in which the sewer main is installed: I to VI, from state roads to unmaintained, private roads)
- Network rank (rank of the segment, ranging from 1- 4)
- Average depth of pipe
- Proximity to hydrologic features
- Proximity to wellhead protection area

Table 3-6 Consequence Factor Ratings for Facilities

Category	Rating	Health & Safety	Operations/Economic	Environmental & Regulatory Compliance
Severe	4	Severe impact to staff, or public	Major Disruption - Failure would result in inability to operate the facility	Multiple or ongoing non-compliance
Significant	3	Action recommended - safety concern/risk of fire	Moderate Disruption - Process disruption or short downtime of the facility	Major non-compliance (1 time)
Moderate	2	Some damage might occur from failure - chemical spill or other	Minor disruption - once identified, repair can be made with facility online	Minor non-compliance
Low	1	Minimal to no consequence	Minimal to no consequence	In compliance

The rating system under each of these categories for each pipe is summarized in Table 3-7 below.

Table 3-7 Categories Used to Calculate Consequence Factors for Sewer Pipes

Category	Rating	Roads	Network	Depth	Proximity to hydrologic features	Proximity to Wellhead Protection Area
		Pipe failures on major roads are more disruptive than failures on local roads	Represents number of users affected by order within network	Deeper pipes are more expensive to repair due to the cost of the different repair methodology	Represents environmental risks	Failure near or within wellhead protection area is a risk to public health
Severe	4	Pipe under/along Road Classes I and II (State Roads)	Order 4 or more (collects 2 or more branches of order 3)	>18 feet	<100 ft	Within 400 ft of water supply well
Significant	3	Pipe under/along Road Classes III and IV (State Roads)	Order 3 (collects 2 or more branches of order 2)	(10-18] feet	100-200 ft	Within Wellhead Protection Area
Moderate	2	Pipe under/along Road Class V (Local Road)	Order 2 (collects 2 or more branches of order 1)	(10-18] feet	[200 -400 ft) of a feature	Beyond Wellhead Protection Area
Low	1	Pipe under/along Road Class VI (Unmaintained, Private)	Order 1	<10 feet	Doesn't cross any features and it's >400 ft. from a hydrologic feature	Beyond Wellhead Protection Area

The ratings under these categories were multiplied by a significance factor to calculate the ratings of each of the consequence factors, using a mathematical expression that is the sum of the terms (Categories) times their corresponding factors, divided by the maximum of the factors:

$$CoF_j = \frac{\sum_{i=1}^{5} a_i R_i}{Sum(a_i)}$$

Where:

CoF_j: Each one of the three consequence factors (j: health and safety, operations/economic, and environmental)

a_i: Coefficient of significance for term "i" (i: roads, network, depth, proximity to hydrologic features, proximity to wellhead protection area)

R_i: Rating for each pipe under "i" category

The coefficients of significance (*a*) are variables of the risk model. Table 3-8 shows the values of these coefficients used in the model.

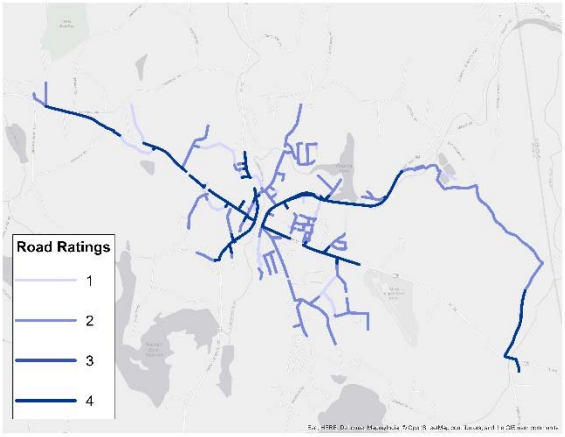
TABLE 3-8 Coefficients of Significance Used to Calculate Consequence Factors for Sewer Pipes

Consequence Factor / Category	Roads	Network	Depth	Hydrology	Wellhead
Health & Safety	1	2	0	0	4
Operations/Economic	1	2	4	0	0
Environmental	0	1	0	4	0

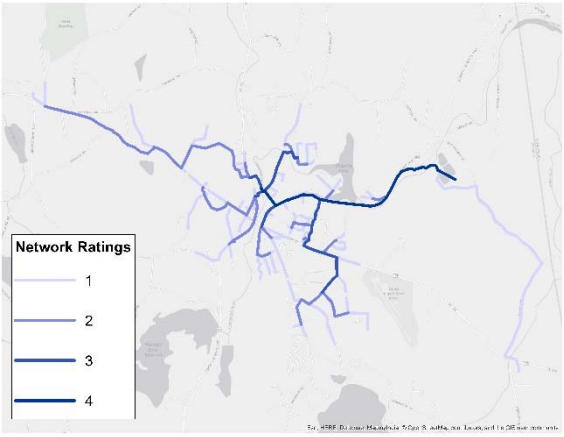
Therefore, the health & safety consequence factor is calculated as:

Health & Safety = (1 x Roads Rating + 2 x Network Rating + 4 x Proximity to Wellhead rating)/7

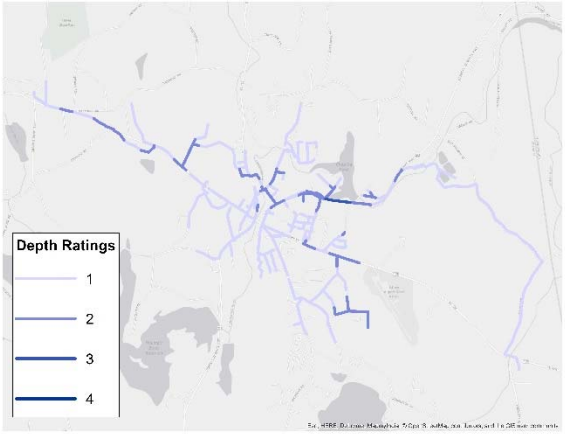
The final consequence factor (or criticality) was calculated by applying weights to each consequence factor category. This was done for both the facilities assets and the collection systems. These weights represent the priorities for the organization. We used weighting factors of 2 for health and safety, 1 for operations/economic, and 3 for environmental impacts/regulatory compliance. The resulting maps from the consequence category ratings analysis are presented below in Figure 3-11. The consequence of failure ratings maps are presented in Figure 3-12. Criticality scores are presented in Figure 3-13.



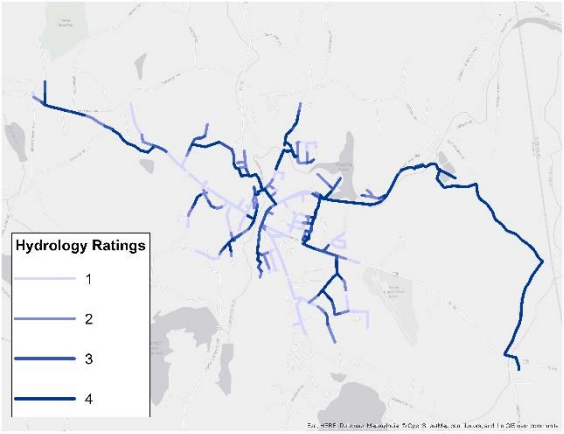
Road ratings



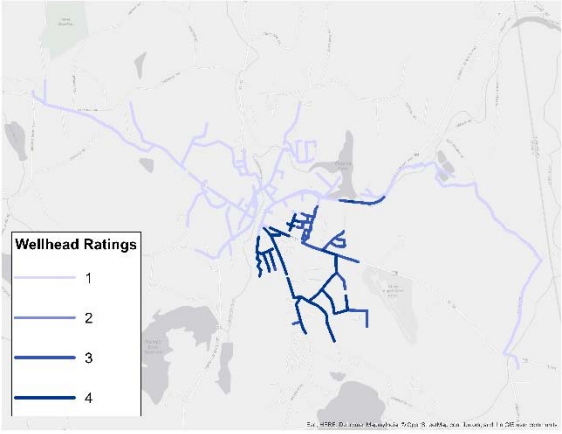
Network ratings



Depth rating



Proximity to hydrologic features ratings



Proximity to wellhead protection areas ratings

Figure 3-11 Consequence Category Ratings Maps

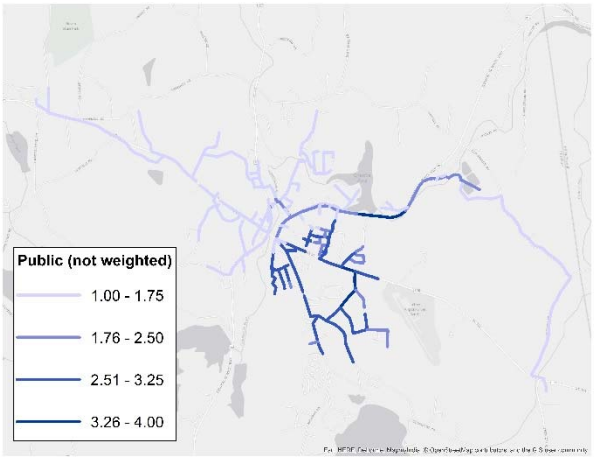
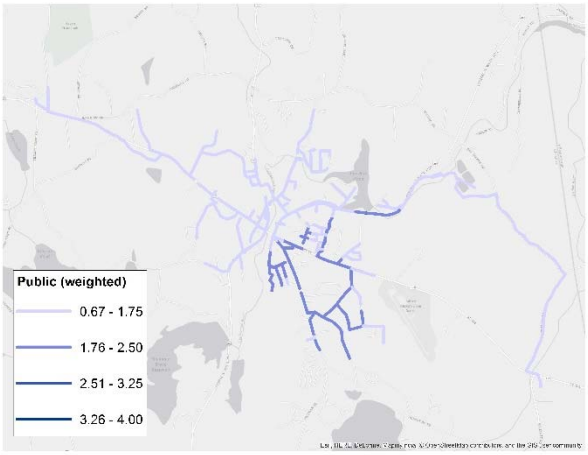
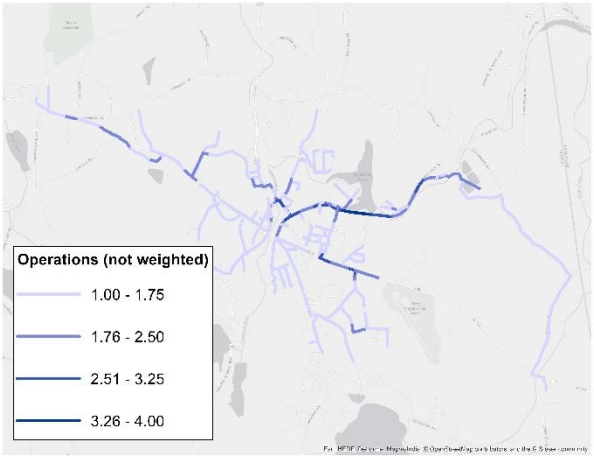
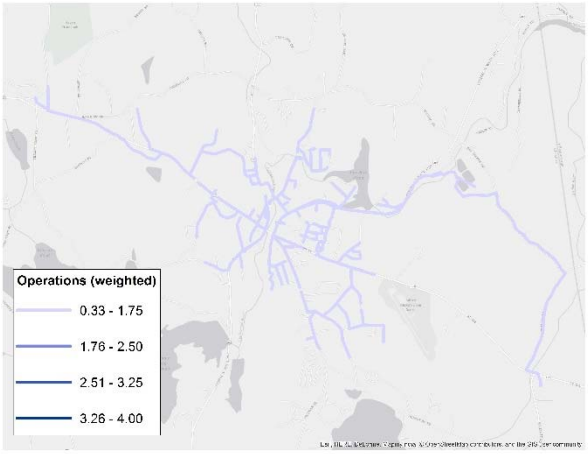
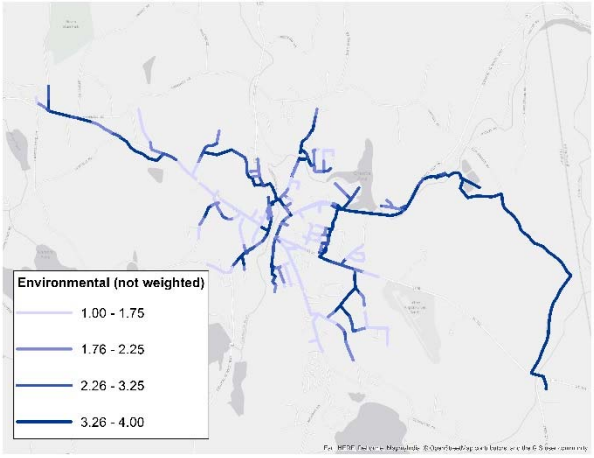
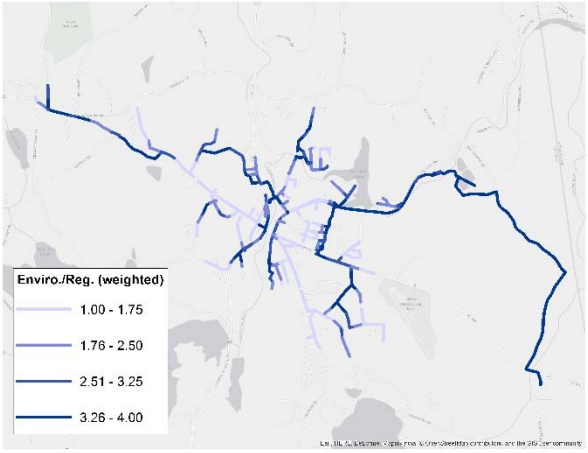
Unweighted Consequence Factors	Weighted Consequence Factors
 Health & Safety ratings	 Health & Safety ratings (weight = 2)
 Operations/Economic ratings	 Operations/Economic ratings (weight = 1)
 Environmental/Reg. compliance ratings	 Environmental/Reg. compliance ratings (weight = 3)

Figure 3-12 Consequence of Failure Ratings Maps

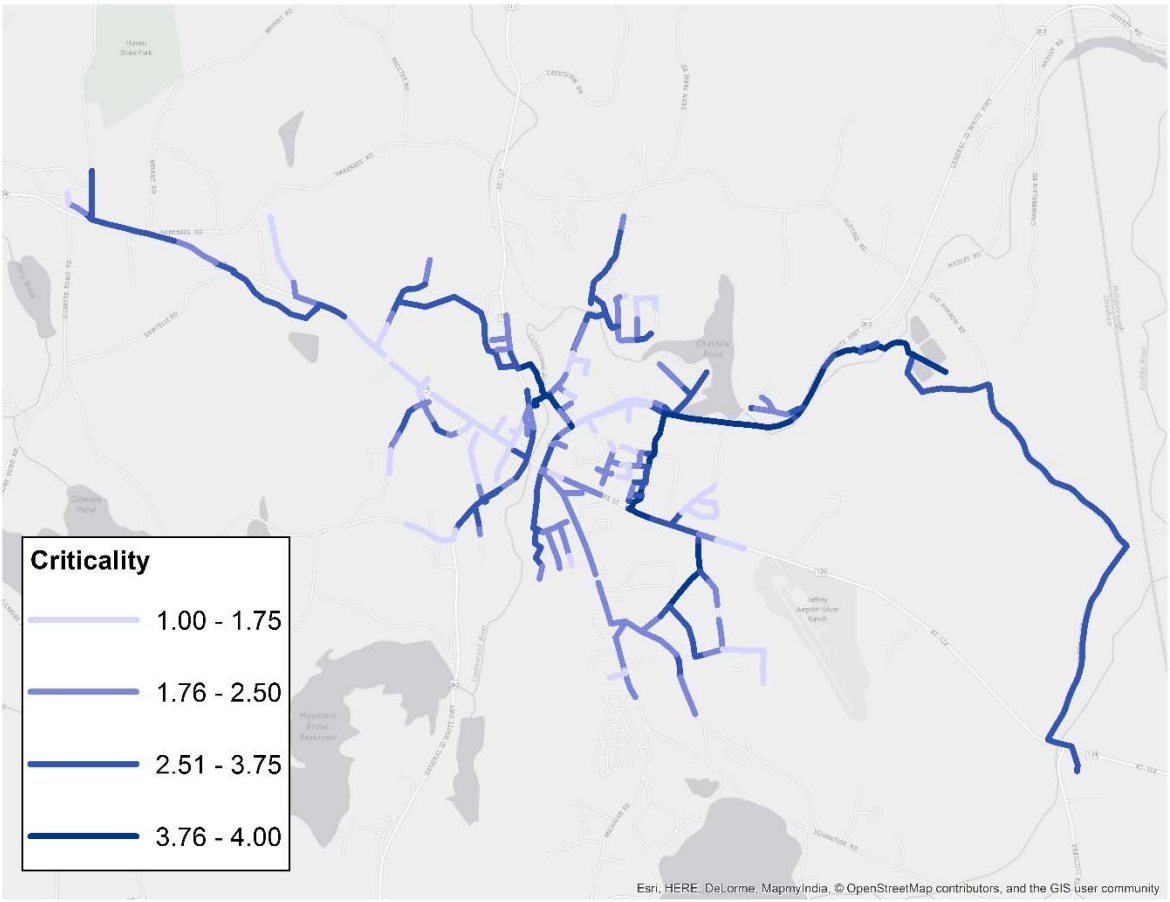


Figure 3-13 Criticality Scores

3.3.3 Risk Prioritization

With probabilities of failure and consequence factors calculated, the next step is to calculate the risk factors, by multiplying the likelihood of failure times the consequence (or criticality score). With ratings for criticality ranging between 1 and 4 and ratings for likelihood of failure ranging between 1 and 4, the risk scoring ranges between 1 and 16, as displayed in Figure 3-14 below.

The next step was to decide where to "draw the lines" with respect to criticality and likelihood limits. These threshold lines define the quadrants of the risk space and represent the maximum acceptable limits for the Town. The Town decided to use a criticality threshold value of 4. That means that assets with consequence scores smaller than 4 will be considered not critical. This value is called the criticality threshold. Similarly, a threshold for probability was accepted at the value of 4. This relates to the level of service expected from the assets. The higher the number the lower the level of service that is expected. A "fix it when in breaks" strategy accepts breakages and service interruptions. Based on those two thresholds, the following quadrants in the risk space are defined: High Risk, Critical/Monitoring, Important, and Low Risk.

Risk Model

Likelyhood of Failure (LoF)		Low 1	Moderate 2	Significant 3	Severe 4
4	Very High	4	8	12	16
3	High (A)	3	6	9	12
2	Medium (B)	2	4	6	8
1	Low (C)	1	2	3	4

Consequence of Failure

Quadrant
High Risk
Important
Critical-Monitoring
Low Risk

Figure 3-14 WWTF and Pump Station Asset Risk Quadrants

Risk-based prioritization consists of identifying the assets that fall into the "High Risk" quadrant as first order of priority. These assets are critical (consequence of failure and likelihood of failure are both greater than the respective thresholds). With threshold values of 4 for criticality and 4 for likelihood of failure, only assets with a risk score of 16 will be considered critical.

The next group of assets in the priority list are the ones that fall into the "Important" quadrant. These assets have a probability of failure above the threshold, although the consequences of their failure are tolerable since their criticality is smaller than the threshold.

Assets that fall into the Critical/Monitoring quadrant have high criticality, but their failure probability is below the threshold. As these assets age, their probability of failure will increase. There is danger of these assets moving into the high risk quadrant over time. For that reason these assets need to be monitored and maintained over time, as a way of mitigating the risks associated with their failure.

The rest of the assets fall into the low risk quadrant. A map showing the risk scores of the sewer network is presented in Figure 3-15. Pipe risk distribution in terms of length of pipe into each of the risk model quadrants is presented below in Table 3-9. The pipe risk distribution; i.e., likelihood of failure plotted versus consequence of failure for each pipe is presented in Figure 3-16.

A map showing the sewer network color coded to show risk model quadrant is presented in Figure 3-17.

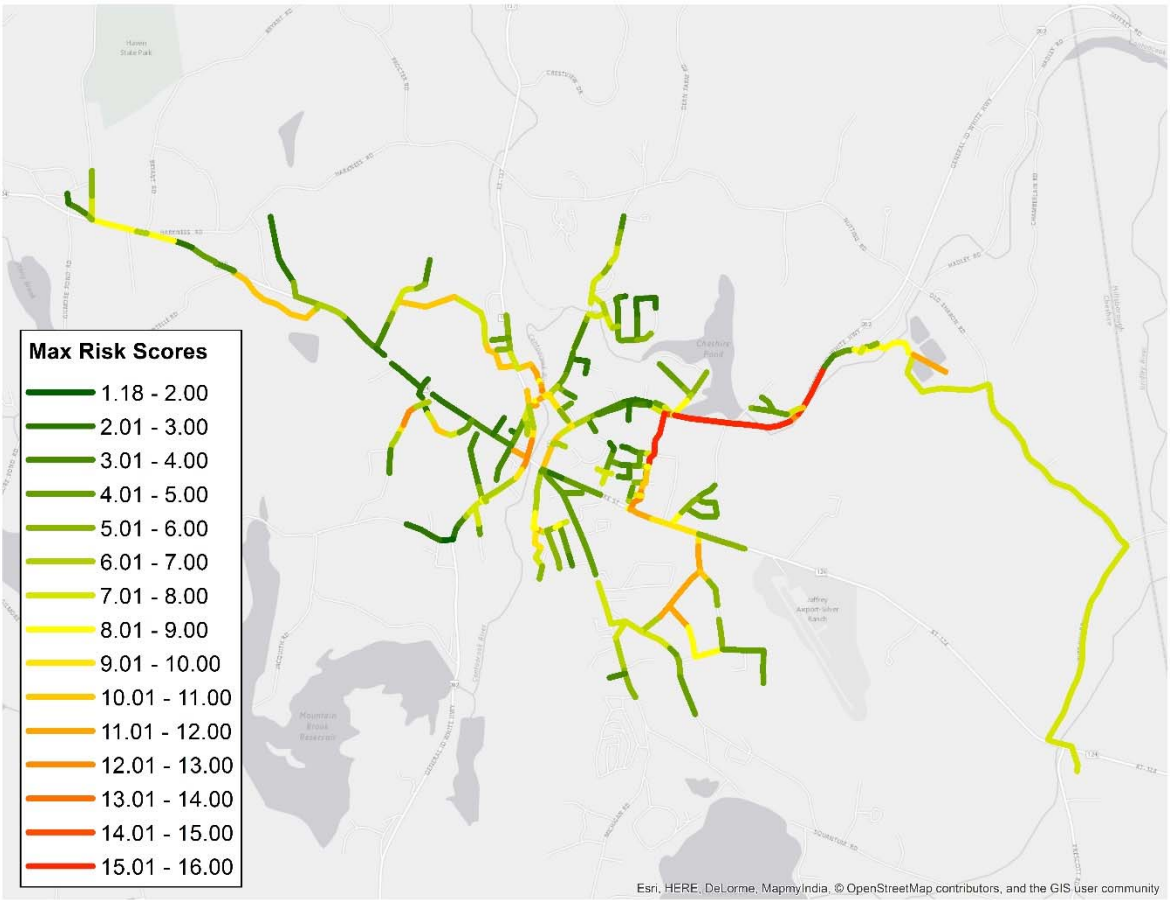


Figure 3-15 Collection System Risk Scores

Table 3-9 Risk Distribution

Risk Quadrant	Linear feet of pipe (ft)	Percentage
High Risk	1,516	1.4%
Important	5,405	5%
Critical/Monitoring	5,355	5.1%
Low Risk	92,828	88%
Total	**105,104**	**100%**

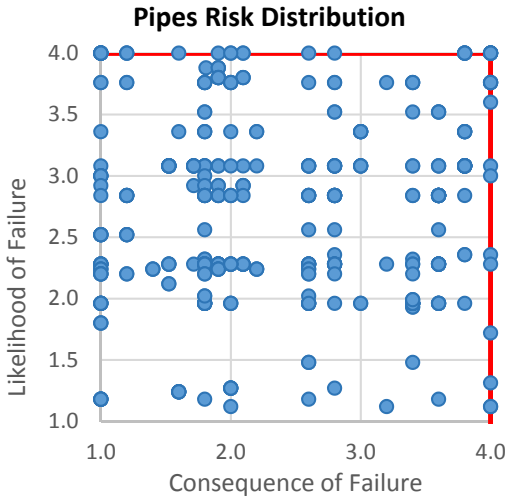


Figure 3-16 Risk Distribution

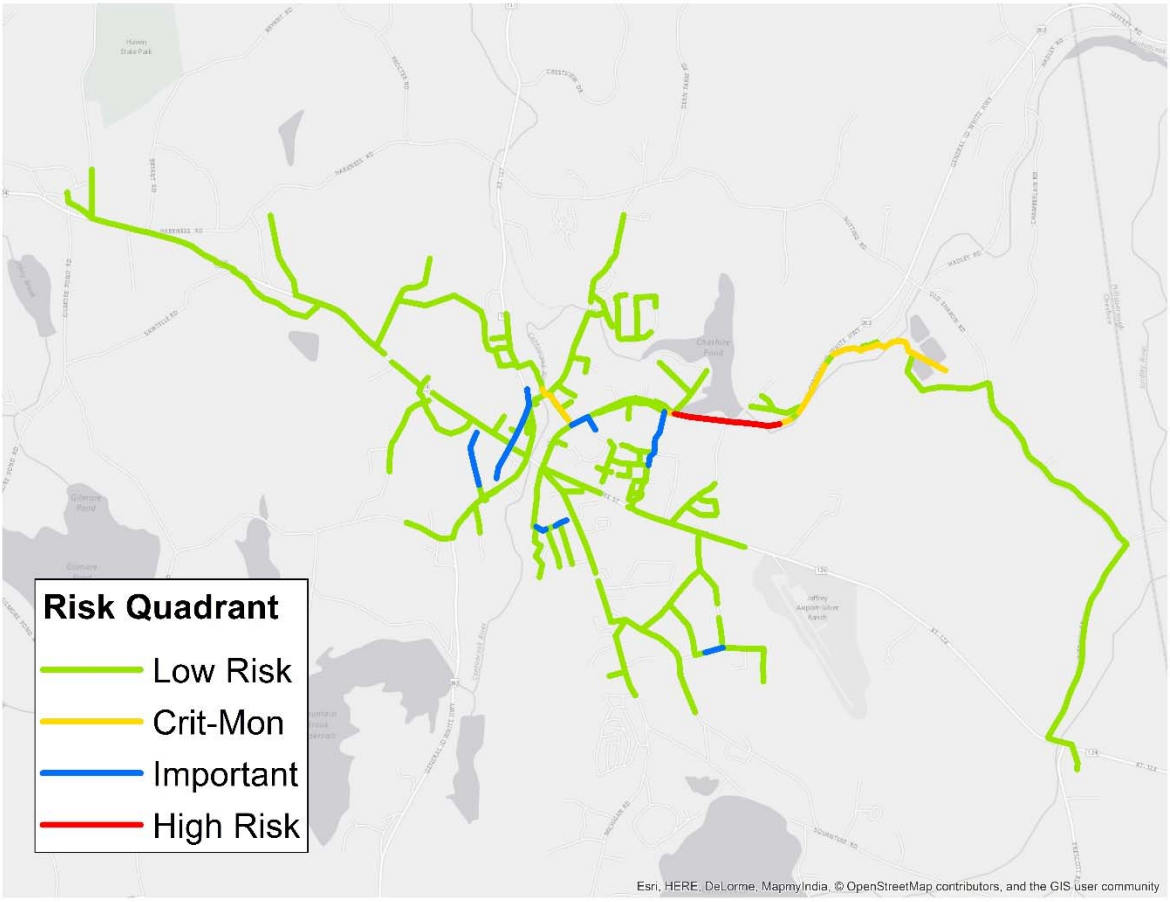


Figure 3-17 Sewer System by Risk Quadrant Map

The list of assets with all the ratings and risk scores is presented in Appendix A.

3.3.4 Cost Analysis

We added a cost analysis component to the risk model to forecast potential future needs for the system. To do so, we estimated replacement costs for each pipe segment using linear foot costs of installation of PVC pipe. We also estimated lining costs using linear foot costs from industry values. Table 3-10 shows the unit costs. A preliminary renewal cost for each pipe segment was calculated using lining costs, unless the pipe had been lined previously based on post-2011 inspection system upgrade information.

Table 3-10 Unit Costs

Diameter	Replacement Cost ($/ft)	Lining Cost ($/ft)
4"	$133	$25
6"	$141	$30
8"	$154	$35
10"	$169	$40
12"	$181	$50
15"	$208	$60
18"	$255	$65

For these cases we assumed the pipe will need to be replaced and we used the replacement cost.

Table 3-11 below shows the risk quadrant distribution of renewal costs for the sewer system. Note that the numbers represent estimated costs *if* all the assets under each category were to be replaced or lined.

Table 3-11 Risk Distribution of Sewer System Replacement and Maintenance Costs

Risk Quadrant	Length of pipe (ft)	Renewal Costs[1]
High Risk	1,516	**$ 163,000**
Important	5,405	**$ 371,700**
Critical/Monitoring	5,335	$ 675,300
Low Risk	92,828	$ 5,087,100
Total	105,104	$ 6,297,100
High Risk + Important	**6,921**	**$ 534,700**

[1]Budgetary cost estimates based on unit costs. Number of digits is not intended to indicate the precision of the estimates but rather to avoid confusion in reconciling estimates with lengths of pipe and unit costs.

With the risk distribution shown in Table 3-11, the expected expenditures to consider would be the renewal costs for the assets that fall into the High Risk and Important risk quadrants, which add up to $534,700. We also recommend investing in the inspection of the 5,335 feet of pipe that fall into the critical/monitoring category. We estimated the costs of the inspection of those assets as five percent of their renewal cost, which is approximately $34,000. A summary of the distribution of estimated pipe renewal costs by risk quadrant is presented below in Figure 3-18.

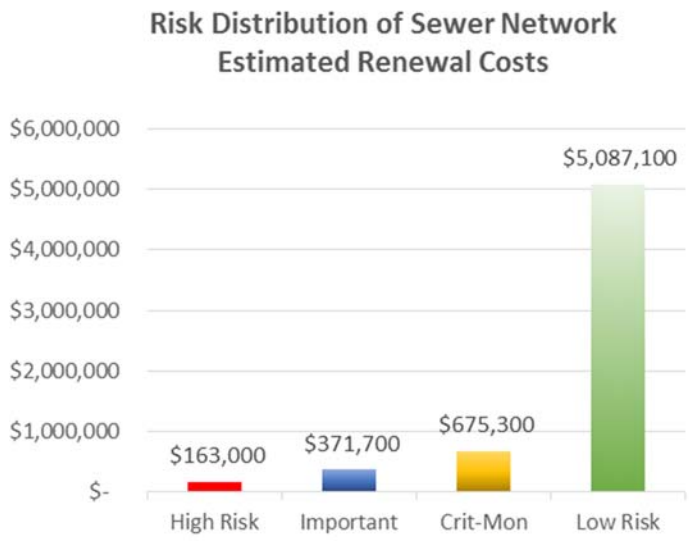


Figure 3-18 Distribution of Estimated Pipe Renewal Costs by Risk Quadrant

Section 4
Summary of Recommended Improvements

Overall, the Town of Jaffrey's wastewater pumping stations and wastewater treatment facility are in good to fair condition. The age and time passed since the most recent upgrade for each of the pump stations and WWTF varies. A majority of the equipment has useful life remaining and will not need replacement for many years if properly operated and maintained, while other assets have exceeded their life expectancy or are damaged and in need of replacement.

Field observations and suggestions for improvements are identified for each pump station and the WWTF in Section 2, and the risk based method used to prioritize these recommended improvements is presented in Section 3. A comprehensive list of improvements is included in tabular form in the following subsections. Recommended improvements are made in each of the following categories for each pump station:

- Process/Mechanical
- Instrumentation and Controls
- Structural/Architectural
- Electrical/Standby Power
- HVAC
- Civil/Security

Some recommendations for the equipment/facility systems are categorized into four groups based on their risk scores as described in Section 3: High Risk, Important, Critical Monitoring, and Low Risk. Within each risk category there are assets that should be replaced or addressed sooner than others in the same category, particularly those assets that have issues associated with safety, environmental protection, electrical code compliance, and general equipment and support system condition.

Budgetary cost estimates for each item are developed for consideration in the Town's capital planning budgets. Budgetary costs include equipment costs, demolition/removal of existing equipment (if applicable), allowances for contractor markup, installation, general conditions, and engineering and contingency. An engineering and contingency allowance of 40% is used in the development of the total capital costs. The budgetary costs are based on the April 2016 ENR 20-City National Average Construction Cost Index of 10,279.94.

The conceptual level budgetary cost estimates are based on Class 5 level construction cost estimates, as defined by the Association for the Advancement of Cost Engineering (AACE) International Recommended Practices and Standards. According to these standards, the estimate class designators are labeled Class 1, 2, 3, 4, and 5, where a Class 5 estimate is based on the lowest level of project definition and a Class 1 estimate is closest to full project definition and maturity. The end usage for a Class 5 estimate is project screening or feasibility purposes. The expected accuracy range of a Class 5 estimate is between

+100% to -50%. The level of project definition for a Class 5 estimate is between 0% and 2%.

Note that linear foot and square foot quantities were not determined for some process and structural related repair items (piping, concrete repairs), and so lump sum allowances for these items are included. A more detailed cost estimate is recommended for these items prior to construction.

Comprehensive tables listing recommended improvements, estimated budgetary costs and prioritizations are presented in Tables 4-1 through 4-5 in Sections 4.1 and 4.2.

4.1 Pumping Stations

Specific recommendations for improvements are identified for each station, and comprehensive lists of improvements are included in this section for each pump station. The following is a summary of general recommendations for all of the wastewater pumping stations:

- All the wastewater pumping stations should have the ability to bypass the existing pumping equipment in an emergency. Bypass pumping connections have been recommended for stations where they presently do not exist.
- To increase security and safety at the pumping stations, door contacts for alarms and an operator "panic button" should be installed where they currently do not exist. In wet well/drywell stations where it is not present, gas detection equipment should be installed.
- Wet well cleaning should be continued on an annual basis or more frequently, as needed, to remove grit and grease.
- Prior to any pump rebuilds or replacement, the Town should consider performance testing to characterize the current operation of each pump relative to its design curve, which will indicate whether significant efficiency has been lost, and confirm the need for rebuild or replacement.
- The Town should conduct regular preventative pumping station maintenance and annual maintenance of the generators.
- As funding is available, the Town should consider upgrading the SCADA system to monitor flow, performance and safety characteristics at the pump stations. This will provide for real-time process monitoring and control.

Hadley Road Pump Station

The Hadley Road Pump Station was upgraded in 2004 and is in good condition overall. During the site investigation the following assets were identified as needing immediate attention and are located in the *Important* risk quadrant:

- The mechanical screenings removal system is not functioning, which is causing downstream ragging issues at the WWTF. This system should be replaced as soon as possible with a mechanically cleaned bar screen and washer compactor.
- There is a damaged electrical receptacle behind the fuel day tank posing a safety risk. This receptacle needs to be replaced.
- There are no emergency lighting or exit signs in the pump station, which poses a safety risk. Emergency lighting and exit signs need to be installed.
- There is no combustible gas detection system installed in the wet well, which poses a health risk. A gas detection system should be installed in the wet well.

Additional recommendations are also made for the facility. Table 4-1 summarizes the estimated improvement costs at the Hadley Road Pump Station organized by asset type.

Table 4-1 Hadley Road Pump Station Improvement Costs by Category and Risk

Hadley Road Pump Station	Risk Level		
	Low Risk	Important	System Total
Civil / Site	$33,700		$33,700
Electrical / Emergency Power	$18,200	$17,200	$35,400
HVAC / Plumbing	$60,800		$60,800
Instrumentation & Controls	$7,800		$7,800
Process / Mechanical	$208,300	$442,000	$650,300
Structural/Architectural	$68,500		$68,500
All Assets Total	**$397,300**	**$459,200**	**$856,500**

Appendix A summarizes all of the recommended Hadley Road Pump Station improvements. Recommendations are organized by category and from greatest to lowest risk score.

Erin Lane Pump Station

The Erin Lane Pump Station was constructed in 1984. Much of the equipment is original to the pump station and is in good to fair condition overall. During the site investigation the following assets were identified as needing immediate attention and are located in the *Important* risk quadrant:

- There is no emergency lighting in the pump station, which poses a safety risk. Emergency lighting needs to be installed.
- The safety harness and cable is not long enough to reach to the bottom of the pump chamber, which poses a safety risk. An appropriately sized cable should be installed.
- The fire extinguisher is missing from the pump station and should be replaced.
- The electrical receptacles are not GFCI type which poses a safety risk. The receptacles should be replaced with GFCI type.

Additional recommendations are also made for the facility. Table 4-2 summarizes the estimated improvement costs at the Erin Lane Pump Station organized by asset.

Appendix A summarizes all of the recommended Erin Lane Pump Station improvements. Recommendations are organized by category and from greatest to lowest risk score.

Table 4-2 Erin Lane Pump Station Improvement Costs by Category and Risk

Erin Lane Pump Station	Risk Level		
	Low Risk	Important	System Total
Civil / Site	$17,400	$29,100	$46,500
Electrical / Emergency Power	$48,100	$900	$49,000
HVAC / Plumbing	$24,700		$24,700
Instrumentation & Controls	$33,600		$33,600
Process / Mechanical	$31,000		$31,000
Structural/Architectural	$9,300		$9,300
All Assets Total	**$164,100**	**$30,000**	**$194,100**

Cross Street Pump Station

The Cross Street Pump Station was constructed in 1993. Much of the equipment is original to the pump station and is in fair to poor condition overall. During the site investigation the following assets were identified as needing immediate attention and are located in the *Important* risk quadrant:

- All conduit and wiring in the pump station has been heated to the point of softening and significant deformation throughout the facility. The deformed conduit and all of the wire in the pump station needs to be replaced as it is currently unsafe and unreliable. Where conduits have become disconnected, but are not damaged, they should be reconnected to avoid tearing and disconnecting of the wiring.
- The panelboard and breakers are unreliable due to overheating problems in the pump station. The panelboard and breakers should be replaced in order to prevent health and safety and operational problems.
- The air exhaust fan and louver system as well as the cooling air inlet louver is not functioning properly, which has caused significant heat damage to equipment in the pump station while the propane-fueled backup motor is running. The pump station ventilation system needs to be upgraded in order to prevent further equipment and electrical damage.
- An electrical box cover located on the wall below the backup motor exhaust is loose, which is a potential safety issue. The cover needs to be properly fastened to the box.
- There is no emergency lighting in the pump station, which poses a safety risk. Emergency lighting needs to be installed.

Additional recommendations were also made for the facility. Table 4-3 summarizes the estimated installed improvement costs at the Erin Lane Pump Station organized by asset type.

Table 4-3 Cross Street Pump Station Improvement Costs by Category and Risk

Cross Street Pump Station	Risk Level		System Total
	Low Risk	Important	
Civil / Site	$15,000	$26,000	$41,000
Electrical / Emergency Power	$4,400	$29,000	$33,400
HVAC / Plumbing	$7,500	$11,600	$19,100
Instrumentation & Controls	$37,300		$37,300
Process / Mechanical	$156,100		$156,100
Structural/Architectural	$21,500		$21,500
All Assets Total	**$241,800**	**$66,600**	**$308,400**

Appendix A summarizes all of the recommended Cross Street Pump Station improvements. Recommendations are organized by category and from greatest to lowest risk score

Jaffrey Center Pump Station

The Jaffrey Center Pump Station was originally constructed in 1970 and upgraded in 1993. Much of the equipment is original to the pump station and is in good to fair condition overall. During the site investigation the following assets were identified as needing immediate attention and are located in the *Important* risk quadrant:

- The floor drain in the catchment area and a conduit do not have appropriate explosion proof gas seals to isolate the pump room from wet well gases.
- The fire extinguisher is missing from the pump station and should be replaced
- Wiring is exposed protruding from abandoned conduit causing a safety risk. Additionally, an electrical box is open due to missing screws. The abandoned wiring and conduit should be removed and the electrical box cover properly fastened.
- The float switch cable is currently tie wrapped to the exterior of the conduits. The cable should be run through a PVC conduit in order to reduce operational risk.
- There is no emergency lighting or exit signs in the pump station, which poses a safety risk. Emergency lighting and exit signs need to be installed.

Additional recommendations were also made for the facility. Table 4-4 summarizes the estimated improvement costs at the Jaffrey Center Pump Station organized by asset type.

Appendix A summarizes all of the recommended Jaffrey Center Pump Station improvements. Recommendations are organized by category and from greatest to lowest risk score.

Table 4-4 Jaffrey Center Pump Station Improvement Costs by Category and Risk

Jaffrey Center Pump Station	Risk Level		
	Low Risk	Important	System Total
Civil / Site	$23,400	$21,100	$44,500
Electrical / Emergency Power	$10,000	$2,000	$12,000
HVAC / Plumbing	$2,800		$2,800
Instrumentation & Controls	$33,000		$33,000
Process / Mechanical	$27,300		$27,300
Structural/Architectural	$16,000		$16,000
All Assets Total	**$112,500**	**$23,100**	**$135,600**

4.2 Wastewater Treatment Facility

The Jaffrey WWTF upgrade project commenced in 2007 with final record drawings completed in 2010. Overall the facility and equipment is in good condition. We identified specific recommendations for process, instrumentation and controls, and electrical systems improvements at the WWTF. A comprehensive list of recommended improvements at the WWTF is included in this section. The following list highlights assets that we recommended for immediate attention. These assets are located in the *Important* risk quadrant:

- The wash-off station is not properly located in relation to the ferric storage area which is a safety and health risk. The Wash-off station should be located within the spill containment area, or a clear unobstructed path to wash-off station should be created.
- Four of the disconnect switches do not have sufficient electrical working space around them as required by the NEC. Until sufficient working space is provided, the disconnect switches should not be worked on while live, instead power should be turned off at the source prior to opening.
- In the electrical room along the west side wall there is no emergency light, which is a code violation. A double-headed emergency light needs to be installed.
- The Clarifier No. 1 exhaust fan/light switch is not working, which creates a potential health and safety hazard to staff entering the enclosed clarifier area. We recommend fixing or replacing this switch.

Table 4-5 summarizes the estimated improvement costs at the WWTF organized by asset type.

Appendix A includes a listing of all of the recommended WWTF improvements. Recommendations are organized by unit process, category and from greatest to lowest risk score

Table 4-5 WWTF Improvement Costs by Process and Risk

WWTF	Risk Level		System Total
	Low Risk	Important	
Civil / Site	$7,300		$7,300
Electrical / Emergency Power	$66,700	$600	$67,300
HVAC / Plumbing	$25,000		$25,000
Instrumentation & Controls	$82,400		$82,400
Process / Mechanical	$3,157,000	$11,000	$3,168,000
Structural/Architectural	$52,100	$350,000	$402,100
All Assets Total	**$3,390,500**	**$361,600**	**$3,752,100**

4.3 Collection System

With 93 percent of the system falling below the probability of failure threshold (at the value of 4), the sewer network could be considered to be in fairly good shape. However, the lack of recent inspection information for the majority of the system adds uncertainty to that assessment.

Independently of the risk quadrant, risk scores of the network assets range between 1.18 and 16. The distribution is shown in Figure 4-1.

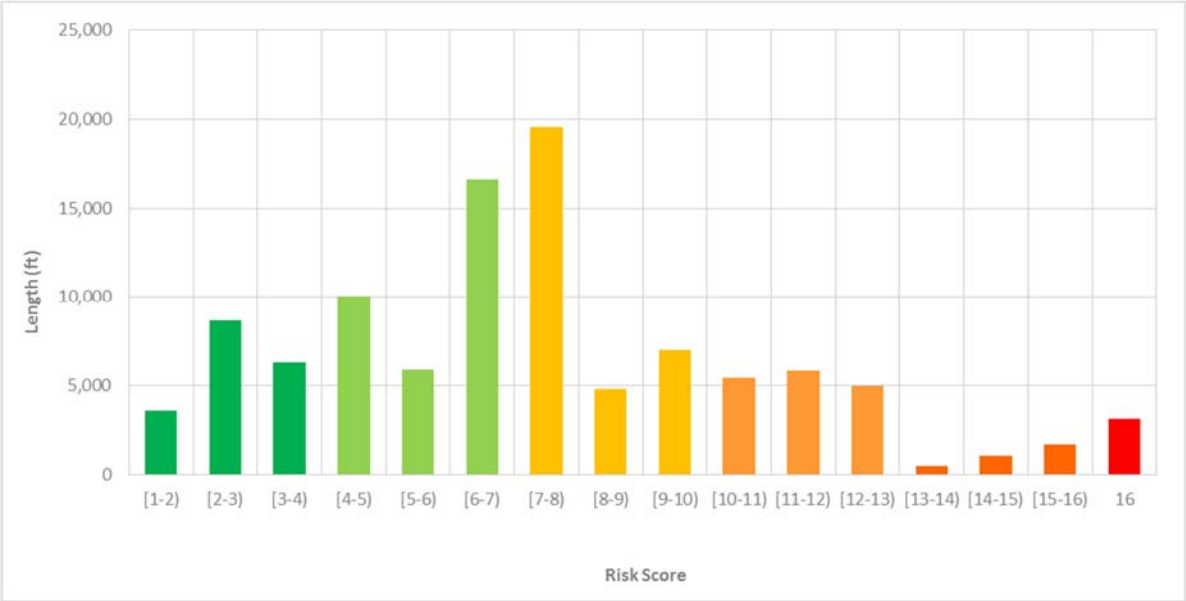


Figure 4-1 Pipe Risk Score Distribution

The highest collection system risk scores reached the maximum value of 16, giving those assets the highest priority. In comparison, all facility asset risk scores were less than 16 (not in the High Risk quadrant).

Assets with highest risk score, which fall within the High Risk quadrant, consist of approximately 1,750 feet of 18 inch RCP sewer line segments installed in 1957. Collection system risk scores are shown in Figures 4-2.

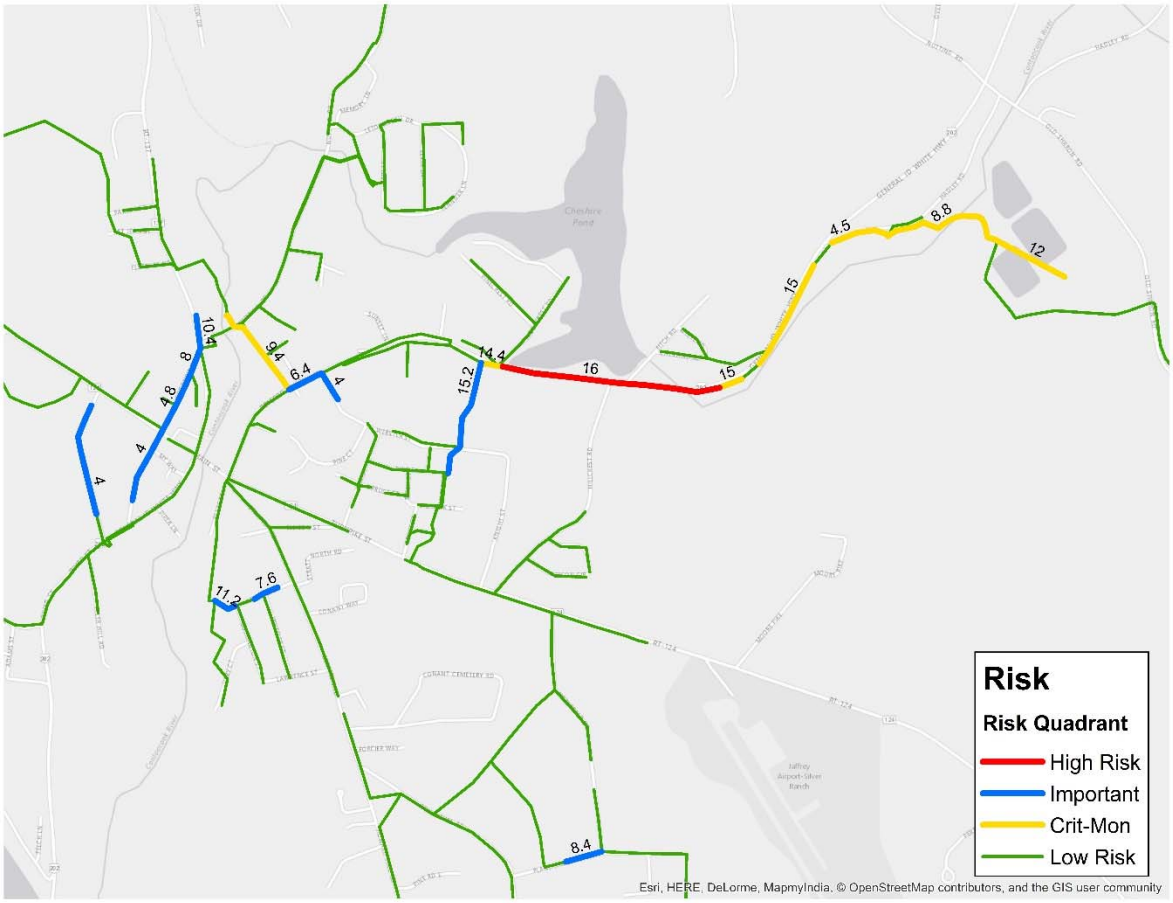


Figure 4-2 Risk Scores Map

We recommend that the Town continue to evaluate the current condition of the sewer system, particularly in areas where it has not been inspected in the past five years. These inspections should begin with assets with high risk scores. The Town may want to develop a long-term inspection program that includes a cyclical inspection of sewer lines where critical lines are inspected every 5-10 years and non-critical lines are inspected every 10-15 years.

With this project, the Town has improved its asset management practices. We offer the following recommendations with respect to wastewater system asset management:

- Develop levels of service. Levels of service are key to objectively quantifying the service that the Town provides to its customers and justifying the need for rate increases.

- Develop a system to track pipe breakage history and improvements to each asset, in a way that the information can be easily extracted at the asset level.
- Fine-tune the risk model by adding other important failure modes such as capacity and I/I.
- Expand the risk model to other asset types such as manholes and service lines.

4.4 Next Step Projects

Table 4-6 presents a list of projects comprising the highest priority recommended improvements, consisting of projects in the High Risk, Critical Monitoring, and Important risk quadrants. These projects include upgrades to the collection system, pumping stations, and WWTF.

TABLE 4-6 Recommended Projects

Project	Project Description	Risk Quadrant[1]	Risk Score[2]	Cost[3]
Sewer Renewal 1	Line approximately 2200 feet of gravity sewer along Peterborough St.	High Risk	12.8	$240,000
Sewer Renewal 2	Line approximately 1,900 feet of gravity sewer along Aetna St, Plantation Dr, and on the cross-country rub from Peterborough St to Webster St.	Important	12.0	$158,000
WWTF General Improvements	Install safety shower and misc. electrical improvements	Important	10.4	$12,000
Jaffrey Center & Erin PS Improvements	Miscellaneous electrical and safety improvements	Important	10.2	$7,000
Hadley Rd. PS Improvements	Install new mechanically cleaned bar rack and washer compactor to replace existing auger monster.	Important	9.3	$460,000
Cross St. PS Improvements	Replace existing electrical and HVAC equipment. Install new emergency generator.	Important	9.3	$41,000
Emergency Bypasses	Install bypass connections at Cross St, Jaffrey Center, and Erin Lane Pump Stations.	Important	8.0	$73,000
CCTV Project	Inspect approximately 3,500 feet of gravity sewer - Peterborough Street to the WWTP	Critical Monitoring	6.0	$6,000
Sewer Renewal 3	Line approximately 3,500 feet of gravity sewer along Charlonne St, School St, and Goodnow St.	Important	5.0	$214,000
WWTF Adminstration Building Improvements	Construct a new two bay garage, replace existing roof, and make additional upgrades including structural repairs, making restroom ADA compliant, and improving fire alarm system.	Important	4.6	$396,000
Total				$1,607,000

[1]Highest risk quadrant of project components

[2]Average for project components

[3]Conceptual cost estimate for project including engineering where appropriate and 20% contingency.

We note that total amount of the facilities projects listed in Table 4-6 does not correspond exactly to the sum of items in the "Important" category listed in Tables 4-1 through 4-5. The reason for this is that a few items in the "Low Risk" category were included in the proposed projects because of savings that would result from addressing them at the same time as an associated "Important" item. For example, replacing the roof on the WWTF administration building is "Low Risk" but is included in the existing administration building upgrades project to take advantage of the economy of scale that will be realized by doing this work at the same time as the roof on the proposed administration building garage addition.

Figure 4-3 shows the four collection system projects included in Table 4-6 and also the force main inspection project that the Town may wish to consider in the future. A detailed listing of the project components is included in Appendix A.

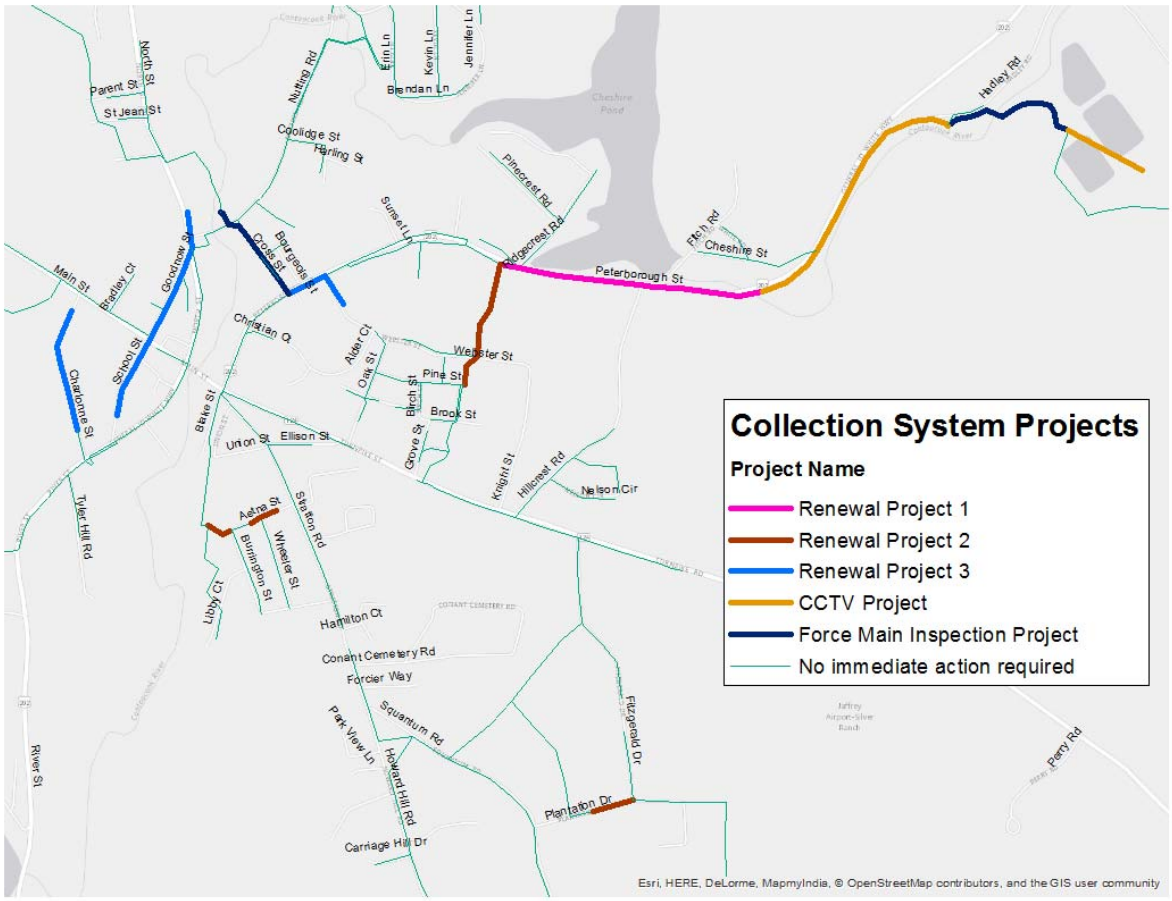


Figure 4-3 Recommended Collection System Projects

Table 4-7 summarizes replacement or rehabilitation costs for assets in the Low Risk quadrant based on remaining service life. This table provides an estimate of recommended capital spending over the 20-year planning period.

TABLE 4-7
Replacement or Rehabilitation Costs[1] - Low Risk Quadrant Assets

Remaining Life Class	Pump Station and WWTF Assets	Collection System Assets	Total
Assets with remaining service life ≤5 years	$521,500	$337,700	$859,200
Assets with remaining service life 6-10 years	$1,720,800		$1,720,800
Assets with remaining service life >10 years	$2,902,300	$5,347,900	$8,250,200

[1]Conceptual cost estimate for improvements including engineering where appropriate and 20% contingency

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Appendix A
Asset Condition Summary Tables

Table A-1 Collection System Assets Sorted by Pipe ID

Table A-2 Facility Assets Sorted by Asset ID

Table A-3 Collection System Assets Sorted by Recommended Projects and Remaining Life

Table A-4 Facility Assets Sorted by Recommended Projects and Remaining Life

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-000	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	196.6	2	2	1	1	2	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.96	Low Risk	$ 9,000	>10
P-001	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	184.7	2	2	1	1	1	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.20	Low Risk	$ 9,000	>10
P-002	FORCE	PVC	PRESSURIZEI	6	1985	6'' PVC 1985	Unk	7646.3	2	1	1	1	4	1			UNK			1	100	69	1.93	1.93	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.56	Low Risk	$ 275,000	>10
P-003	COLLECTOR	VCP	GRAVITY	8	1939	8'' VCP 1939	5.7	262.5	4	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.00	0.95	0.48	1.00	1.00	4.00	Important	$ 13,000	Sewer Renewal 3
P-004	COLLECTOR	VCP	GRAVITY	12	1978	12'' VCP 1978	5.7	295.2	4	2	2	1	1	1	4131-2100	11/18/2011	4.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.71	1.71	1.20	1.14	0.57	1.20	1.20	2.59	Low Risk	$ 53,000	>10
P-005	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	4.3	304.4	4	2	2	1	2	1			UNK			1	75	29	2.84	2.84	1.71	1.71	2.00	1.14	0.57	2.00	2.00	5.68	Low Risk	$ 15,000	>10
P-006	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	8.8	289.6	4	2	2	2	4	1	1100-4111	11/22/2011	1.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.71	2.29	3.60	1.14	0.76	3.60	3.60	7.78	Low Risk	$ 52,000	>10
P-007	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	Unk	106.5	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 5,100	>10
P-008	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.6	380.5	4	2	2	1	2	1			UNK			1	75	23	3.08	3.08	1.71	1.71	2.00	1.14	0.57	2.00	2.00	6.16	Low Risk	$ 18,000	>10
P-009	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.5	288.5	4	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	3.60	1.14	0.76	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-009	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.5	288.5	4	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	3.60	1.14	0.76	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-010	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	6.3	142.3	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 6,800	>10
P-011	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	8.3	298.2	1	2	2	2	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-012	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.1	275.7	1	2	2	1	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 20,000	>10
P-013	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	8.7	286.8	1	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-014	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.9	225.0	1	2	2	1	4	1	0000-2H00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 16,000	>10
P-015	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.1	313.7	1	2	2	1	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 23,000	>10
P-016	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.7	251.1	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 12,000	>10
P-017	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.6	129.4	4	2	1	1	2	1	0000-0000	11/30/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	1.80	0.95	0.48	1.80	1.80	2.12	Low Risk	$ 6,200	>10
P-018	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.4	174.6	4	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.18	Low Risk	$ 8,000	>10
P-019	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.6	91.9	2	2	1	1	1	1	0000-0000	11/29/2011	1.0			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 4,400	>10
P-020	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.5	169.3	4	2	1	1	1	1	0000-0000	11/29/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.18	Low Risk	$ 8,000	>10
P-021	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.5	195.9	2	2	1	1	3	1			UNK			1	50	4	3.76	3.76	1.14	1.14	2.60	0.76	0.38	2.60	2.60	9.78	Low Risk	$ 9,000	≤5
P-022	COLLECTOR	ACP	GRAVITY	8	1996	8'' ACP 1996	3.8	204.8	4	2	1	1	1	1			UNK			1	50	30	2.20	2.20	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.20	Low Risk	$ 10,000	>10
P-023	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	10.8	215.1	2	2	1	2	3	1			UNK			1	75	29	2.84	2.84	1.14	1.71	2.60	0.76	0.57	2.60	2.60	7.38	Low Risk	$ 15,000	>10
P-024	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	10.8	246.9	2	2	2	2	4	1	0000-0000	11/21/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.43	2.00	3.60	0.95	0.67	3.60	3.60	7.78	Low Risk	$ 45,000	>10
P-025	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	4.5	243.0	2	2	1	1	1	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.00	0.76	0.38	1.00	1.00	3.76	Low Risk	$ 12,000	≤5
P-026	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.5	173.4	2	2	1	1	2	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 8,000	≤5
P-027	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.8	50.8	2	2	1	1	2	1	0000-0000	04/29/2015	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 2,400	≤5
P-028	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.0	120.8	2	2	1	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 5,800	≤5
P-029	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.3	200.1	2	2	1	1	1	1	0000-4100	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.00	0.76	0.38	1.00	1.00	3.76	Low Risk	$ 10,000	≤5
P-030	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	5.0	211.2	4	2	2	1	1	1			UNK			1	75	29	2.84	2.84	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.41	Low Risk	$ 15,000	>10
P-031	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	9.5	94.7	4	2	1	2	3	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.60	0.95	0.67	2.60	2.60	7.38	Low Risk	$ 4,500	>10
P-032	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	2.6	299.2	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 14,000	>10
P-033	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.5	267.9	1	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 19,000	>10
P-034	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	11.3	245.1	2	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.20	0.95	0.67	1.20	1.20	3.41	Low Risk	$ 18,000	>10
P-035	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	11.3	190.8	4	2	2	2	1	1	0000-0000	11/25/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	1.20	1.14	0.76	1.20	1.20	3.41	Low Risk	$ 14,000	>10
P-036	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	11.3	207.4	4	2	1	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.84	Low Risk	$ 10,000	>10
P-037	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.2	243.0	4	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.71	2.29	1.20	1.14	0.76	1.20	1.20	3.41	Low Risk	$ 17,000	>10
P-038	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.1	210.5	4	2	2	1	1	1			UNK			1	75	29	2.84	2.84	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.41	Low Risk	$ 15,000	>10
P-039	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	10.8	247.7	2	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.80	0.95	0.67	2.80	2.80	7.95	Low Risk	$ 18,000	>10
P-040	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	11.0	241.4	2	2	2	2	2	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.00	0.95	0.67	2.00	2.00	5.68	Low Risk	$ 17,000	>10
P-041	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	11.2	250.0	2	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.20	0.95	0.67	1.20	1.20	3.41	Low Risk	$ 18,000	>10
P-042	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	207.9	4	2	1	1	1	1	3121-2100	11/17/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-043	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.0	156.7	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 8,000	≤5
P-044	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	5.5	202.9	2	2	2	1	2	1	5100-0000	11/17/2011	5.1	CIPPL	Oct-12	1	50	46	1.24	1.24	1.43	1.43	2.00	0.95	0.48	2.00	2.00	2.48	Low Risk	$ 37,000	>10
P-045	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	205.4	4	2	1	1	1	1	0000-5112	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-045	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	205.4	4	2	1	1	1	1	0000-5112	11/18/2011	1.0			1	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-046	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.4	173.2	1	2	2	1	2	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 12,000	≤5
P-047	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.8	294.3	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 14,000	>10
P-048	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.5	186.9	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 9,000	≤5
P-049	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.3	138.2	1	2	2	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 10,000	≤5
P-050	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.2	138.9	1	2	2	1	3	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.80	0.86	0.43	2.80	2.80	10.53	Low Risk	$ 10,000	≤5
P-051	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.2	217.4	1	2	2	1	3	1	0000-4100	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.80	0.86	0.43	2.80	2.80	10.53	Low Risk	$ 16,000	≤5
P-052	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.8	144.5	1	2	2	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 10,000	≤5
P-053	COLLECTOR	VCP	GRAVITY	8	1939	8'' VCP 1939	5.5	245.2	2	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 12,000	Sewer Renewal 3
P-054	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.5	324.9	2	2	1	1	1	1	0000-0000	11/25/2011	1.0			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 19,000	Sewer Renewal 3
P-055	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.0	249.0	4	2	1	1	2	1			UNK			1	75	23	3.08	3.08	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.54	Low Risk	$ 15,000	>10
P-056	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	6.6	180.3	4	2	2	1	4	1			UNK			1	100	94	1.18	1.18	1.71	1.71	3.60	1.14	0.57	3.60	3.60	4.25	Low Risk	$ 9,000	>10
P-057	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.7	206.8	4	2	1	1	3	1	0000-0000	11/30/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	2.60	0.95	0.48	2.60	2.60	3.07	Low Risk	$ 10,000	>10
P-058	COLLECTOR	PVC	GRAVITY	10	1983	10'' PVC 1983	5.7	107.4	4	2	1	1	4	1	0000-0000	11/30/2011	1.0			1	100	67	1.99	1.99	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.77	Low Risk	$ 6,400	>10
P-059	COLLECTOR	PVC	GRAVITY	10	1983	10'' PVC 1983	6.1	159.7	4	2	1	1	4	1			UNK			1	100	67	1.99	1.99	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.77	Low Risk	$ 10,000	>10
P-060	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.6	22.7	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 1,100	>10
P-062	COLLECTOR	VCP	GRAVITY	6	1939	6'' VCP 1939	5.1	213.1	2	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 8,000	Sewer Renewal 3
P-063	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.6	316.9	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 15,000	>10
P-064	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.6	21.4	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 1,300	>10
P-065	COLLECTOR	VCP	GRAVITY	8	1964	8'' 1964	6.6	62.9	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 3,000	>10
P-066	COLLECTOR	VCP	GRAVITY	12	1978	12'' VCP 1978	5.7	292.1	4	2	2	1	1	1			UNK			1	75	37	2.52	2.52	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.02	Low Risk	$ 21,000	>10
P-067	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	49.9	4	2	1	1	1	1	3100-1300	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 2,400	>10
P-068	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	215.9	4	2	1	1	1	1	5131-3121	11/18/2011	5.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.16	Low Risk	$ 33,000	>10
P-069	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.0	148.2	2	2	1	1	1	1	1100-0000	11/25/2011	1.1			1.06	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 9,000	Sewer Renewal 3
P-070	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	4.5	166.1	2	2	1	1	1	1			UNK			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 10,000	Sewer Renewal 3
P-071	COLLECTOR	VCP	GRAVITY	12	1978	12'' VCP 1978	4.6	200.8	4	2	2	1	1	1	3112-1A00	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.02	Low Risk	$ 14,000	>10
P-072	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.6	181.0	4	2	2	1	1	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.71	1.71	1.20	1.14	0.57	1.20	1.20	4.51	Low Risk	$ 13,000	≤5
P-073	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1984	5.7	380.7	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 18,000	>10
P-074	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.2	277.1	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 20,000	>10
P-075	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	Unk	87.4	1	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.80	Low Risk	$ 4,200	>10
P-076	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	4.0	88.0	4	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.80	Low Risk	$ 4,200	>10
P-077	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	162.1	2	2	1	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 8,000	≤5
P-078	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	120.1	1	2	2	1	2	1			UNK			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 5,800	≤5
P-079	COLLECTOR	ACP	GRAVITY	8	1996	8'' ACP 1996	4.8	88.1	1	2	2	1	1	1			UNK			1	50	30	2.20	2.20	1.29	1.29	1.20	0.86	0.43	1.20	1.20	2.64	Low Risk	$ 4,200	>10
P-080	COLLECTOR	ACP	GRAVITY	8	1996	8'' ACP 1996	4.0	115.3

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-086	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	4.6	293.4	1	2	2	1	4	1	0000-0000	11/21/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.78	Low Risk	$ 53,000	>10
P-087	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	4.5	166.4	2	2	1	1	3	1	0000-4200	11/25/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.62	Low Risk	$ 30,000	>10
P-088	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.7	108.3	2	2	1	1	3	1			UNK			1	75	29	2.84	2.84	1.14	1.14	2.60	0.76	0.38	2.60	2.60	7.38	Low Risk	$ 8,000	>10
P-089	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	5.5	210.2	1	2	2	1	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 15,000	>10
P-090	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	6.3	195.3	1	2	2	1	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 14,000	>10
P-091	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.0	179.8	2	2	2	1	4	1	2100-2100	11/22/2011	2.1			1.66	75	29	2.84	2.84	1.43	1.43	3.60	0.95	0.48	3.60	3.60	10.22	Low Risk	$ 13,000	>10
P-092	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.6	150.3	2	2	2	1	4	1	0000-2100	11/22/2011	1.0			1	75	29	2.84	2.84	1.43	1.43	3.60	0.95	0.48	3.60	3.60	10.22	Low Risk	$ 11,000	>10
P-093	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	8.2	290.7	1	2	2	2	4	1	0000-1100	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-094	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	Unk	141.8	2	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.11	Low Risk	$ 6,800	>10
P-095	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.1	132.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 10,000	>10
P-096	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.2	317.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 23,000	>10
P-097	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	4.3	72.8	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 3,500	>10
P-098	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	4.3	357.7	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 17,000	>10
P-099	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	7.0	317.0	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 23,000	>10
P-100	COLLECTOR	VCP	GRAVITY	6	1984	6'' VCP 1984	4.3	221.5	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 8,000	>10
P-101	COLLECTOR	VCP	GRAVITY	6	1984	6'' VCP 1984	4.3	98.2	4	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.80	0.95	0.48	1.80	1.80	4.10	Low Risk	$ 3,500	>10
P-102	COLLECTOR	LVCP	GRAVITY	10	2007	10'' LVCP 2007	3.5	218.4	4	2	2	1	2	1	0000-0000	11/25/2011	1.0			1	100	91	1.27	1.27	1.71	1.71	2.00	1.14	0.57	2.00	2.00	2.54	Low Risk	$ 13,000	>10
P-103	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1984	9.8	287.4	4	2	2	2	4	1	5100-0000	12/20/2011	5.1	Replace 8'' VCP for 8'' PVC	Oct-12	1	75	46	2.16	2.16	1.71	2.29	3.60	1.14	0.76	3.60	3.60	7.78	Low Risk	$ 14,000	>10
P-104	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	5.5	332.4	4	2	2	1	4	1	3100-1100	11/25/2011	3.1			2.26	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 16,000	>10
P-105	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	7.7	268.6	4	2	2	1	4	1			UNK			1	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 13,000	>10
P-106	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	450.6	2	2	1	1	4	1			UNK			1	75	45	2.20	2.20	1.14	1.14	3.40	0.76	0.38	3.40	3.40	7.48	Low Risk	$ 22,000	>10
P-107	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.2	296.2	2	2	1	1	3	1			UNK			1	75	45	2.20	2.20	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.72	Low Risk	$ 14,000	>10
P-108	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1942	5.2	184.6	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 9,000	>10
P-109	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	181.0	2	2	1	1	3	1			UNK			1	75	45	2.20	2.20	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.72	Low Risk	$ 9,000	>10
P-110	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	176.3	2	2	1	1	2	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.96	Low Risk	$ 8,000	>10
P-111	COLLECTOR	VCP	GRAVITY	10	1984	10'' VCP 2007	3.5	545.4	4	2	2	1	4	1			UNK			1	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 33,000	>10
P-112	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	9.8	187.7	4	2	2	2	3	1	0000-4131	12/20/2011	1.0			1	75	43	2.28	2.28	1.71	2.29	2.80	1.14	0.76	2.80	2.80	6.38	Low Risk	$ 9,000	>10
P-113	COLLECTOR	LVCP	GRAVITY	10	2007	10'' LVCP 2007	8.8	244.6	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 15,000	>10
P-114	COLLECTOR	LVCP	GRAVITY	10	2007	10'' LVCP 2007	8.8	273.7	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 16,000	>10
P-115	COLLECTOR	LVCP	GRAVITY	8	2007	8'' LVCP 2007	6.2	142.5	4	2	2	1	2	1	0000-0000	12/20/2011	1.0			1	100	91	1.27	1.27	1.71	1.71	2.00	1.14	0.57	2.00	2.00	2.54	Low Risk	$ 6,800	>10
P-116	COLLECTOR	VCP	GRAVITY	12	1984	12'' VCP 2007	9.5	34.6	4	2	2	2	3	1			UNK	Replace 12'' VCP for 12'' PVC	Oct-12	1	75	46	2.16	2.16	1.71	2.29	2.80	1.14	0.76	2.80	2.80	6.05	Low Risk	$ 2,500	>10
P-117	COLLECTOR	LVCP	GRAVITY	12	2007	12'' LVCP 2007	9.5	378.2	4	2	2	2	3	1	0000-0000	12/20/2011	1.0			1	100	91	1.27	1.27	1.71	2.29	2.80	1.14	0.76	2.80	2.80	3.56	Low Risk	$ 27,000	>10
P-118	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	310.2	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 15,000	>10
P-119	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	11.3	114.2	4	2	4	2	4	4			UNK			1	50	-9	4.00	4.00	4.00	2.86	4.00	2.67	0.95	4.00	4.00	16.00	High Risk	$ 12,000	Sewer Renewal 1
P-120	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	10.7	297.8	4	2	3	2	3	4			UNK			1	75	23	3.08	3.08	3.71	2.57	3.00	2.48	0.86	3.00	3.00	9.24	Low Risk	$ 27,000	>10
P-121	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	3.9	286.7	1	2	1	1	4	4			UNK			1	75	29	2.84	2.84	2.71	1.00	3.40	1.81	0.33	3.40	3.40	9.66	Low Risk	$ 14,000	>10
P-122	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' VCP 1984	5.4	345.3	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 12,000	>10
P-123	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8'' VCP 1970	5.5	169.8	2	2	2	1	2	4			UNK			1	75	29	2.84	2.84	3.14	1.43	2.00	2.10	0.48	2.00	2.10	5.95	Low Risk	$ 8,000	>10
P-124	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' VCP 1931	3.5	143.9	1	2	2	1	3	4			UNK			1	75	-10	4.00	4.00	3.00	1.29	2.80	2.00	0.43	2.80	2.80	11.20	Important	$ 6,900	Sewer Renewal 2
P-125	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' VCP 1984	5.6	217.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-126	COLLECTOR	UNKNOWN	GRAVITY	8	1968	8'' VCP 1968	4.2	176.6	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 8,000	>10
P-127	COLLECTOR	VCP	GRAVITY	8	1946	8'' VCP 1946	4.2	309.8	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 15,000	≤5
P-128	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' VCP 1946	4.0	286.2	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 14,000	≤5
P-129	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	4.9	202.2	2	2	1	1	3	4			UNK			1	75	29	2.84	2.84	2.86	1.14	2.60	1.90	0.38	2.60	2.60	7.38	Low Risk	$ 10,000	>10
P-130	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	4.4	222.8	1	2	1	1	3	4			UNK			1	75	29	2.84	2.84	2.71	1.00	2.60	1.81	0.33	2.60	2.60	7.38	Low Risk	$ 11,000	>10
P-131	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	3.9	145.1	1	2	1	1	4	4			UNK			1	75	29	2.84	2.84	2.71	1.00	3.40	1.81	0.33	3.40	3.40	9.66	Low Risk	$ 7,000	>10
P-132	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	5.4	248.3	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 12,000	>10
P-133	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8'' 1970	5.4	21.2	1	2	2	1	2	4			UNK			1	75	29	2.84	2.84	3.00	1.29	2.00	2.00	0.43	2.00	2.00	5.68	Low Risk	$ 1,000	>10
P-134	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.4	69.9	1	2	2	1	2	4			UNK			1	75	-10	4.00	4.00	3.00	1.29	2.00	2.00	0.43	2.00	2.00	8.00	Important	$ 3,400	Sewer Renewal 2
P-135	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8'' 1970	7.5	163.7	2	2	1	1	1	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.41	Low Risk	$ 8,000	>10
P-136	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8'' 1970	6.7	344.7	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 17,000	>10
P-137	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8'' 1970	6.1	252.2	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 12,000	>10
P-138	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	5.2	317.3	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 15,000	≤5
P-139	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	4.9	205.8	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 10,000	≤5
P-140	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	4.0	293.0	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 14,000	≤5
P-141	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	5.2	310.8	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 19,000	>10
P-142	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.7	194.7	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 9,000	>10
P-143	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.2	202.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-144	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	5.0	206.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 12,000	>10
P-145	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	6.1	148.7	2	2	1	1	3	4			UNK			1	75	44	2.24	2.24	2.86	1.14	2.60	1.90	0.38	2.60	2.60	5.82	Low Risk	$ 7,100	>10
P-146	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	Unk	37.6	2	2	2	1	3	4			UNK			1	75	23	3.08	3.08	3.14	1.43	2.80	2.10	0.48	2.80	2.80	8.62	Low Risk	$ 1,800	>10
P-147	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	8.0	199.1	2	2	2	2	3	4			UNK			1	75	23	3.08	3.08	3.14	2.00	2.80	2.10	0.67	2.80	2.80	8.62	Low Risk	$ 10,000	>10
P-148	COLLECTOR	VCP	GRAVITY	8	1968	8'' 1968	4.5	184.1	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 9,000	>10
P-149	COLLECTOR	VCP	GRAVITY	8	1968	8'' 1968	5.9	209.5	2	2	1	1	1	4			UNK			1	75	27	2.92	2.92	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.56	Low Risk	$ 10,000	>10
P-150	COLLECTOR	VCP	GRAVITY	8	1968	8'' 1968	5.6	281.6	2	2	1	1	1	4			UNK			1	75	27	2.92	2.92	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.56	Low Risk	$ 14,000	>10
P-151	COLLECTOR	VCP	GRAVITY	8	1968	8'' 1968	4.9	289.0	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 14,000	>10
P-152	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	6.1	297.8	2	2	1	1	3	4			UNK			1	75	44	2.24	2.24	2.86	1.14	2.60	1.90	0.38	2.60	2.60	5.82	Low Risk	$ 14,000	>10
P-153	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	5.2	326.4	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 16,000	>10
P-154	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	4.3	296.8	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 14,000	>10
P-155	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	3.4	141.1	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 6,800	>10
P-156	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	5.3	247.3	2	2	1	1	2	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.80	1.90	0.38	1.80	1.90	7.24	Low Risk	$ 12,000	≤5
P-157	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.9	284.1	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 20,000	>10
P-158	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.0	291.9	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 14,000	>10
P-159	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	5.0	393.3	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 19,000	≤5
P-160	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.9	469.6	2	2	2	1	2	4			UNK			1	75	23	3.08	3.08	3.14	1.43	2.00	2.10	0.48	2.00	2.10	6.45	Low Risk	$ 23,000	>10
P-161	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	4.5	55.4	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 2,700	≤5
P-162	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	5.0	355.4	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 17,000	≤5
P-163	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.8	254.0	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 15,000	>10
P-164	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.9	383.8	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 28,000	>10
P-165	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	5.7	163.6	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 8,000	>10
P-166	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.1	260.2	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 12,000	>10
P-167	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.1	295.6	1	2	2	1	3	4			UNK			1	75	23	3.08	3.08	3.00	1.29	2.80	2.00	0.43	2.80	2.80	8.62	Low Risk	$ 14,000	>10
P-168	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	9.5	246.5	1	2	2	2	3	4			UNK			1	75	23	3.08	3.08	3.00	1.86	2.80	2.00	0.62	2.80	2.80	8.62	Low Risk	$ 12,000	>10

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors											
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-169	COLLECTOR	ACP	GRAVITY	8	1964	8'' 1964	11.8	344.7	2	2	2	2	2	4			UNK			1	50	-2	4.00	4.00	3.14	2.00	2.00	2.10	0.67	2.00	2.10	8.38	Important	$ 17,000	Sewer Renewal 2
P-170	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	286.5	2	2	1	2	1	4			UNK			1	75	23	3.08	3.08	2.86	1.71	1.00	1.90	0.57	1.00	1.90	5.87	Low Risk	$ 14,000	>10
P-171	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	10.4	288.8	2	2	1	2	1	4			UNK			1	75	23	3.08	3.08	2.86	1.71	1.00	1.90	0.57	1.00	1.90	5.87	Low Risk	$ 14,000	>10
P-172	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.4	221.5	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 16,000	>10
P-173	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	10.7	225.0	4	2	3	2	3	4			UNK			1	75	23	3.08	3.08	3.71	2.57	3.00	2.48	0.86	3.00	3.00	9.24	Low Risk	$ 16,000	>10
P-174	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.3	195.2	2	2	3	2	4	4			UNK			1	75	23	3.08	3.08	3.43	2.29	3.80	2.29	0.76	3.80	3.80	11.70	Low Risk	$ 14,000	>10
P-175	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	5.9	189.3	2	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.43	1.71	3.80	2.29	0.57	3.80	3.80	11.70	Low Risk	$ 14,000	>10
P-176	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	276.1	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 13,000	>10
P-177	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	4.9	571.6	4	2	1	1	1	1			UNK			1	75	16	3.36	3.36	1.43	1.43	1.00	0.95	0.48	1.00	1.00	3.36	Low Risk	$ 27,000	>10
P-178	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	7.0	235.6	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 25,000	>10
P-179	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	7.7	242.3	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 15,000	>10
P-180	COLLECTOR	VCP	GRAVITY	6	1939	6'' VCP 1939	4.8	303.7	4	2	1	1	3	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	2.60	0.95	0.48	2.60	2.60	10.40	Important	$ 11,000	Sewer Renewal 3
P-181	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	4.8	143.1	4	2	3	1	4	1	5141-1400	11/30/2011	5.1	CIPPL	Oct-12	1	75	46	2.16	2.16	2.00	2.00	3.80	1.33	0.67	3.80	3.80	8.21	Low Risk	$ 30,000	>10
P-182	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.5	150.2	2	2	2	1	3	1	0000-0000	11/29/2011	1.0			1	75	23	3.08	3.08	1.43	1.43	2.80	0.95	0.48	2.80	2.80	8.62	Low Risk	$ 7,200	>10
P-183	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	Unk	257.0	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 6,200	>10
P-185	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	7.3	152.4	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 11,000	>10
P-186	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	150.2	2	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.05	Low Risk	$ 7,200	>10
P-187	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.6	144.9	2	2	1	1	1	4			UNK			1	75	-10	4.00	4.00	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.62	Important	$ 7,000	Sewer Renewal 2
P-188	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.6	206.7	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 7,400	>10
P-189	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.6	271.6	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-190	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	4.8	206.6	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 7,400	>10
P-191	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.5	141.4	4	2	2	1	4	1			UNK			1	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 6,800	>10
P-192	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	6.2	512.1	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 37,000	>10
P-193	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	56.2	1	2	2	1	4	4			UNK			1	75	43	2.28	2.28	3.00	1.29	3.60	2.00	0.43	3.60	3.60	8.21	Low Risk	$ 2,700	>10
P-194	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.0	314.2	1	2	2	1	3	4			UNK			1	75	43	2.28	2.28	3.00	1.29	2.80	2.00	0.43	2.80	2.80	6.38	Low Risk	$ 15,000	>10
P-195	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.5	187.0	4	2	2	1	3	1			UNK			1	75	12	3.52	3.52	1.71	1.71	2.80	1.14	0.57	2.80	2.80	9.86	Low Risk	$ 9,000	>10
P-196	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	293.3	1	2	2	1	4	4			UNK			1	75	43	2.28	2.28	3.00	1.29	3.60	2.00	0.43	3.60	3.60	8.21	Low Risk	$ 14,000	>10
P-197	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.0	127.6	1	2	2	1	3	1			UNK			1	75	43	2.28	2.28	1.29	1.29	2.80	0.86	0.43	2.80	2.80	6.38	Low Risk	$ 6,100	>10
P-198	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.6	92.6	2	2	2	1	1	4			UNK			1	75	-10	4.00	4.00	3.14	1.43	1.20	2.10	0.48	1.20	2.10	8.38	Important	$ 4,400	Sewer Renewal 2
P-199	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.6	372.0	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 13,000	>10
P-200	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.8	149.7	4	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.80	0.95	0.48	1.80	1.80	4.10	Low Risk	$ 5,400	>10
P-201	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	6.4	198.0	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 7,100	>10
P-202	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	5.5	357.1	2	2	2	1	3	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.80	0.95	0.48	2.80	2.80	6.38	Low Risk	$ 17,000	>10
P-203	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	4.6	249.3	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 9,000	>10
P-204	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.1	52.2	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 2,500	>10
P-205	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.1	28.2	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 1,400	>10
P-206	COLLECTOR	PVC	GRAVITY	6	1984	6'' PVC 1984	Unk	42.5	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 1,500	>10
P-207	COLLECTOR	PVC	GRAVITY	6	1984	6'' PVC 1984	Unk	95.5	1	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.96	Low Risk	$ 3,400	>10
P-208	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.9	144.6	2	2	2	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	$ 10,000	Sewer Renewal 3
P-209	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.4	111.4	4	2	2	1	4	1			UNK			1	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 5,300	>10
P-210	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.9	133.3	1	2	1	1	2	1			UNK			1	75	12	3.52	3.52	1.00	1.00	1.80	0.67	0.33	1.80	1.80	6.34	Low Risk	$ 4,800	>10
P-211	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.9	185.3	1	2	1	1	2	1			UNK			1	75	12	3.52	3.52	1.00	1.00	1.80	0.67	0.33	1.80	1.80	6.34	Low Risk	$ 6,700	>10
P-212	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.8	171.7	2	2	2	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	$ 12,000	Sewer Renewal 3
P-213	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.7	266.7	2	2	2	1	1	1	0000-413A	11/21/2011	1.0			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	$ 19,000	Sewer Renewal 3
P-214	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.4	292.0	4	2	1	1	4	1			UNK			1	75	12	3.52	3.52	1.43	1.43	3.40	0.95	0.48	3.40	3.40	11.97	Low Risk	$ 11,000	>10
P-215	COLLECTOR	VCP	GRAVITY	10	1953	10'' VCP 1953	9.1	235.4	4	2	2	2	3	1			UNK			1	75	12	3.52	3.52	1.71	2.29	2.80	1.14	0.76	2.80	2.80	9.86	Low Risk	$ 14,000	>10
P-216	COLLECTOR	VCP	GRAVITY	10	1953	10'' VCP 1953	5.4	349.2	4	2	2	1	4	1	2200-2100	11/30/2011	2.2			1.72	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 21,000	>10
P-217	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.4	238.9	4	2	2	1	2	1	3222-0000	11/21/2011	3.2			2.32	75	-2	4.00	4.00	1.71	1.71	2.00	1.14	0.57	2.00	2.00	8.00	Important	$ 17,000	Sewer Renewal 3
P-218	COLLECTOR	VCP	GRAVITY	10	1957	10'' VCP 1957	7.0	416.0	4	2	2	1	2	1			UNK			1	75	16	3.36	3.36	1.71	1.71	2.00	1.14	0.57	2.00	2.00	6.72	Low Risk	$ 25,000	>10
P-219	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	5.3	16.3	4	2	3	1	2	1			UNK			1	75	16	3.36	3.36	2.00	2.00	2.20	1.33	0.67	2.20	2.20	7.39	Low Risk	$ 1,200	>10
P-220	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	5.3	101.5	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 7,300	>10
P-221	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	25.7	2	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.05	Low Risk	$ 1,200	>10
P-222	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	76.0	4	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.43	1.43	1.80	0.95	0.48	1.80	1.80	6.05	Low Risk	$ 3,600	>10
P-223	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.7	240.4	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 12,000	>10
P-224	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.2	313.0	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 11,000	>10
P-225	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.4	615.5	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 22,000	>10
P-226	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.0	287.3	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 10,000	>10
P-227	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.6	102.2	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 3,700	>10
P-228	COLLECTOR	UNKNOWN	GRAVITY	8	1944	8'' 1944	7.7	121.2	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 5,800	≤5
P-229	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	165.7	1	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.71	1.00	1.00	1.81	0.33	1.00	1.81	7.02	Low Risk	$ 8,000	≤5
P-230	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	37.5	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 1,800	≤5
P-231	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	177.8	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 9,000	≤5
P-232	COLLECTOR	UNKNOWN	GRAVITY	18	1957	18'' 1957	4.9	205.2	4	2	4	1	1	1			UNK			1	75	16	3.36	3.36	2.29	2.29	1.60	1.52	0.76	1.60	1.60	5.38	Low Risk	$ 22,000	>10
P-233	COLLECTOR	ACP	GRAVITY	8	1957	8'' 1957	Unk	284.9	4	2	1	1	1	1			UNK			1	50	-9	4.00	4.00	1.43	1.43	1.00	0.95	0.48	1.00	1.00	4.00	Important	$ 14,000	Sewer Renewal 3
P-234	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	9.2	247.2	4	2	3	2	2	1			UNK			1	75	16	3.36	3.36	2.00	2.57	2.20	1.33	0.86	2.20	2.20	7.39	Low Risk	$ 18,000	>10
P-235	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.2	337.8	4	2	4	2	1	1			UNK			1	50	-9	4.00	4.00	2.29	2.86	1.60	1.52	0.95	1.60	1.60	6.40	Important	$ 36,000	Sewer Renewal 3
P-236	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	6.0	177.3	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 19,000	>10
P-237	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.7	218.1	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-238	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.7	28.3	2	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.28	Low Risk	$ 1,400	>10
P-239	COLLECTOR	ACP	GRAVITY	6	1984	6'' ACP 1984	7.7	139.5	2	2	1	1	1	1			UNK			1	50	18	2.92	2.92	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.92	Low Risk	$ 5,000	>10
P-240	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	4.9	27.1	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 2,900	>10
P-241	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	8.2	114.6	2	2	3	2	2	1			UNK			1	75	44	2.24	2.24	1.71	2.29	2.20	1.14	0.76	2.20	2.20	4.93	Low Risk	$ 5,500	>10
P-242	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.6	205.8	2	2	1	1	2	1	0000-2100	11/29/2011	1.0			1	75	23	3.08	3.08	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.54	Low Risk	$ 10,000	>10
P-243	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.2	203.5	1	2	3	2	4	1	0000-0000	11/22/2011	1.0			1	75	23	3.08	3.08	1.57	2.14	3.80	1.05	0.71	3.80	3.80	11.70	Low Risk	$ 15,000	>10
P-244	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.0	90.6	2	2	3	1	4	1	0000-0000	11/30/2011	1.0			1	75	23	3.08	3.08	1.71	1.71	3.80	1.14	0.57	3.80	3.80	11.70	Low Risk	$ 6,500	>10
P-245	COLLECTOR	CIP	GRAVITY	12	1964	12'' CIP 1964	7.1	97.6	2	2	3	1	4	1	0000-0000	11/30/2011	1.0			1	115	63	2.36	2.36	1.71	1.71	3.80	1.14	0.57	3.80	3.80	8.95	Low Risk	$ 7,000	>10
P-246	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	6.9	319.4	4	2	2	1	3	1			UNK			1	75	29	2.84	2.84	1.71	1.71	2.80	1.14	0.57	2.80	2.80	7.95	Low Risk	$ 15,000	>10
P-247	COLLECTOR	VCP	GRAVITY	8	1970	8'' VCP 1970	9.4	12.1	1	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.29	1.86	2.80	0.86	0.62	2.80	2.80	7.95	Low Risk	$ 600	>10
P-248	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.4	244.4	1	2	3	2	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.57	2.14	3.80	1.05	0.71	3.80	3.80	10.79	Low Risk	$ 18,000	>10
P-249	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.4	76.9	4	2	2	2	3	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	2.80	1.14	0.76	2.80	2.80	7.95	Low Risk	$ 5,500	>10
P-250	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	7.1	162.3	1	2	3	1	4	1	0000-3100	11/22/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.57	1.57	3.80	1.05	0.52	3.80	3.80	8.21	Low Risk	$ 29,000	>10
P-251	COLLECTOR	CIP	GRAVITY	12	1964	12'' CIP 1964	5.9	88.4	1	2	3	1	4	1	0000-0000	11/22/2011	1.0	CIPPL	Oct-12	1	115	46	2.80	2.80	1.57	1.57	3.80	1.05	0.52	3.80	3.80	10.64	Low Risk	$ 16,000	>10
P-252	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	5.9	109.7	1	2	3	1	4	1			UNK			1	75	23	3.08	3.08	1.57	1.57	3.80	1.05	0.52	3.80	3.80	11.70	Low Risk	$ 8,000	>10
P-253	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.3	122.7	2	2	3	2	4	1			UNK			1	75	23	3.08	3.08	1.71	2.29	3.80	1.14	0.76	3.80	3.80	11.70	Low Risk	$ 9,000	>10

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors											
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-257	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.6	216.2	2	2	3	1	2	1			UNK			1	75	23	3.08	3.08	1.71	1.71	2.20	1.14	0.57	2.20	2.20	6.78	Low Risk	$ 10,000	>10
P-258	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	8.3	90.7	2	2	3	2	3	1			UNK			1	75	23	3.08	3.08	1.71	2.29	3.00	1.14	0.76	3.00	3.00	9.24	Low Risk	$ 5,400	>10
P-259	FORCE	DIP	PRESSURIZED	4	1984	4'' DIP 1984	Unk	1432.2	2	1	3	1	4	1			UNK			1	100	68	1.96	1.96	1.71	1.71	3.80	1.14	0.57	3.80	3.80	7.45	Low Risk	$ 34,000	>10
P-260	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	300.5	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 14,000	>10
P-261	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	5.8	59.9	2	2	1	1	1	1			UNK			1	75	44	2.24	2.24	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.24	Low Risk	$ 2,900	>10
P-262	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	7.9	179.0	2	2	1	1	1	1			UNK			1	75	44	2.24	2.24	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.24	Low Risk	$ 9,000	>10
P-263	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	317.4	2	2	1	2	1	1			UNK			1	75	44	2.24	2.24	1.14	1.71	1.00	0.76	0.57	1.00	1.00	2.24	Low Risk	$ 15,000	>10
P-264	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	124.3	2	2	3	2	1	1			UNK			1	75	44	2.24	2.24	1.71	2.29	1.40	1.14	0.76	1.40	1.40	3.14	Low Risk	$ 6,000	>10
P-265	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	137.2	2	2	3	2	1	1			UNK			1	75	44	2.24	2.24	1.71	2.29	1.40	1.14	0.76	1.40	1.40	3.14	Low Risk	$ 6,600	>10
P-266	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	9.4	183.3	2	2	3	2	1	1			UNK			1	75	44	2.24	2.24	1.71	2.29	1.40	1.14	0.76	1.40	1.40	3.14	Low Risk	$ 9,000	>10
P-267	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	8.8	114.6	2	2	3	2	2	1			UNK			1	75	44	2.24	2.24	1.71	2.29	2.20	1.14	0.76	2.20	2.20	4.93	Low Risk	$ 5,500	>10
P-268	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.6	192.5	1	2	1	1	1	1			UNK			1	75	23	3.08	3.08	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.08	Low Risk	$ 9,000	>10
P-269	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	118.6	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 5,700	>10
P-270	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	20.2	1	2	3	1	3	1			UNK			1	100	68	1.96	1.96	1.57	1.57	3.00	1.05	0.52	3.00	3.00	5.88	Low Risk	$ 1,000	>10
P-271	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	250.6	1	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.06	Low Risk	$ 12,000	>10
P-272	COLLECTOR	UNKNOWN	GRAVITY	18	1984	18'' 1984	10.9	331.9	4	2	4	2	3	1			UNK			1	75	43	2.28	2.28	2.29	2.86	3.20	1.52	0.95	3.20	3.20	7.30	Low Risk	$ 36,000	>10
P-273	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	10.9	201.3	1	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.00	1.57	1.80	0.67	0.52	1.80	1.80	4.10	Low Risk	$ 7,200	>10
P-274	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	10.9	255.6	4	2	2	2	4	1			UNK			1	75	43	2.28	2.28	1.71	2.29	3.60	1.14	0.76	3.60	3.60	8.21	Low Risk	$ 12,000	>10
P-275	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	10.9	209.2	4	2	1	2	4	1			UNK			1	75	43	2.28	2.28	1.43	2.00	3.40	0.95	0.67	3.40	3.40	7.75	Low Risk	$ 8,000	>10
P-276	COLLECTOR	UNKNOWN	GRAVITY	18	1951	18'' 1951	10.9	157.9	4	2	4	2	4	1			UNK			1	75	10	3.60	3.60	2.29	2.86	4.00	1.52	0.95	4.00	4.00	14.40	Crit-Mon	$ 17,000	Sewer Renewal 1
P-277	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	7.7	266.4	4	2	3	1	3	4			UNK			1	75	23	3.08	3.08	3.71	2.00	3.00	2.48	0.67	3.00	3.00	9.24	Low Risk	$ 24,000	>10
P-278	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.7	323.8	4	2	2	1	3	3			UNK			1	75	23	3.08	3.08	2.86	1.71	2.80	1.90	0.57	2.80	2.80	8.62	Low Risk	$ 16,000	>10
P-279	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.8	46.7	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 3,400	>10
P-280	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	Unk	308.5	2	2	1	1	3	3			UNK			1	75	43	2.28	2.28	2.29	1.14	2.60	1.52	0.38	2.60	2.60	5.93	Low Risk	$ 19,000	>10
P-281	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	Unk	235.0	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 11,000	>10
P-282	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	8.5	324.9	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 29,000	>10
P-283	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	159.1	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 11,000	>10
P-284	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	Unk	207.4	2	2	1	1	3	3			UNK			1	75	43	2.28	2.28	2.29	1.14	2.60	1.52	0.38	2.60	2.60	5.93	Low Risk	$ 12,000	>10
P-285	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.0	46.2	4	2	1	2	3	3			UNK			1	75	23	3.08	3.08	2.57	2.00	2.60	1.71	0.67	2.60	2.60	8.01	Low Risk	$ 2,200	>10
P-286	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	63.9	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 4,600	>10
P-287	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	7.3	135.0	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 10,000	>10
P-288	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	10.0	160.9	4	2	3	2	4	3			UNK			1	75	16	3.36	3.36	3.14	2.57	3.80	2.10	0.86	3.80	3.80	12.77	Low Risk	$ 12,000	>10
P-289	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	9.2	66.7	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 6,000	>10
P-290	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8'' 1977	4.7	96.7	2	2	1	1	3	3			UNK			1	75	36	2.56	2.56	2.29	1.14	2.60	1.52	0.38	2.60	2.60	6.66	Low Risk	$ 4,600	>10
P-291	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	83.3	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 6,000	>10
P-292	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8'' 1977	4.7	155.7	2	2	2	1	4	3			UNK			1	75	36	2.56	2.56	2.57	1.43	3.60	1.71	0.48	3.60	3.60	9.22	Low Risk	$ 7,500	>10
P-293	COLLECTOR	VCP	GRAVITY	8	1977	8'' 1977	4.7	75.8	2	2	2	1	3	3			UNK			1	75	36	2.56	2.56	2.57	1.43	2.80	1.71	0.48	2.80	2.80	7.17	Low Risk	$ 3,600	>10
P-294	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8'' 1977	4.7	174.8	2	2	1	1	2	3			UNK			1	75	36	2.56	2.56	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.61	Low Risk	$ 8,000	>10
P-295	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	Unk	207.8	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 10,000	>10
P-296	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	7.7	373.7	4	2	3	1	3	3			UNK			1	75	23	3.08	3.08	3.14	2.00	3.00	2.10	0.67	3.00	3.00	9.24	Low Risk	$ 34,000	>10
P-297	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.8	275.3	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 20,000	>10
P-298	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	46.3	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 3,300	>10
P-299	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.2	212.9	2	2	1	1	2	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.10	Low Risk	$ 8,000	>10
P-300	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	5.6	153.0	2	2	2	1	3	3			UNK			1	75	43	2.28	2.28	2.57	1.43	2.80	1.71	0.48	2.80	2.80	6.38	Low Risk	$ 9,000	>10
P-301	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.3	178.8	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 6,400	>10
P-302	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.3	108.1	2	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.28	Low Risk	$ 3,900	>10
P-303	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	6.3	183.7	2	2	2	1	2	3			UNK			1	75	43	2.28	2.28	2.57	1.43	2.00	1.71	0.48	2.00	2.00	4.56	Low Risk	$ 11,000	>10
P-304	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	7.0	150.3	2	2	2	1	1	3			UNK			1	75	43	2.28	2.28	2.57	1.43	1.20	1.71	0.48	1.20	1.71	3.91	Low Risk	$ 9,000	>10
P-305	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	7.1	140.2	2	2	1	1	4	3			UNK			1	75	43	2.28	2.28	2.29	1.14	3.40	1.52	0.38	3.40	3.40	7.75	Low Risk	$ 5,000	>10
P-306	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	10.9	398.2	1	2	3	2	4	1			UNK			1	50	-9	4.00	4.00	1.57	2.14	3.80	1.05	0.71	3.80	3.80	15.20	Important	$ 43,000	Sewer Renewal 2
P-307	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.0	148.7	1	2	3	2	4	3			UNK			1	50	-9	4.00	4.00	2.71	2.14	3.80	1.81	0.71	3.80	3.80	15.20	Important	$ 16,000	Sewer Renewal 2
P-308	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.1	266.9	1	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.71	1.57	3.80	1.81	0.52	3.80	3.80	15.20	Important	$ 29,000	Sewer Renewal 2
P-309	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.1	119.2	2	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.86	1.71	3.80	1.90	0.57	3.80	3.80	15.20	Important	$ 13,000	Sewer Renewal 2
P-310	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	4.8	162.2	1	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.71	1.57	3.80	1.81	0.52	3.80	3.80	15.20	Important	$ 18,000	Sewer Renewal 2
P-311	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.8	34.8	2	2	2	1	4	3			UNK			1	75	43	2.28	2.28	2.57	1.43	3.60	1.71	0.48	3.60	3.60	8.21	Low Risk	$ 1,700	>10
P-312	COLLECTOR	UNKNOWN	GRAVITY	4	1964	4'' 1964	3.1	311.2	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 7,500	>10
P-313	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	5.7	135.7	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,500	>10
P-314	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.7	136.0	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,500	>10
P-315	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.5	187.0	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 9,000	>10
P-316	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.5	108.6	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 5,200	>10
P-317	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.7	96.5	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 4,600	>10
P-318	COLLECTOR	UNKNOWN	GRAVITY	4	1964	4'' 1964	3.1	286.5	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,900	>10
P-319	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	5.0	231.9	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 11,000	>10
P-320	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	4.1	230.7	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 11,000	>10
P-321	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.9	166.1	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 8,000	>10
P-322	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	8.7	123.7	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 5,900	>10
P-323	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	16.6	335.0	4	2	4	3	4	1			UNK			1	50	-9	4.00	4.00	2.29	3.43	4.00	1.52	1.14	4.00	4.00	16.00	High Risk	$ 36,000	Sewer Renewal 1
P-324	COLLECTOR	UNKNOWN	GRAVITY	18	1984	18'' 1984	10.9	44.8	4	2	4	2	4	1			UNK			1	75	43	2.28	2.28	2.29	2.86	4.00	1.52	0.95	4.00	4.00	9.12	Crit-Mon	$ 4,800	Sewer Renewal 1
P-325	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	13.8	293.2	4	2	4	3	4	1			UNK			1	50	-9	4.00	4.00	2.29	3.43	4.00	1.52	1.14	4.00	4.00	16.00	High Risk	$ 32,000	Sewer Renewal 1
P-326	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	16.6	356.0	4	2	4	3	4	3			UNK			1	50	-9	4.00	4.00	3.43	3.43	4.00	2.29	1.14	4.00	4.00	16.00	High Risk	$ 38,000	Sewer Renewal 1
P-327	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	5.8	189.3	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 4,500	>10
P-328	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	281.6	4	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.28	Low Risk	$ 14,000	>10
P-329	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	9.1	385.2	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 42,000	>10
P-330	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.6	212.8	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 10,000	>10
P-331	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	9.1	62.1	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 6,700	>10
P-332	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	10.0	47.6	4	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.28	Low Risk	$ 2,300	>10
P-333	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	4.1	278.7	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 6,700	>10
P-334	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	366.0	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 18,000	>10
P-335	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	316.8	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 15,000	>10
P-336	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	394.2	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 19,000	>10
P-337	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.2	417.0	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 20,000	>10
P-338	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	7.4	196.2	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 4,700	>10
P-339	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	9.1	180.0	2	2	1	2	3	1			UNK			1	75	43	2.28	2.28	1.14	1.71	2.60	0.76	0.57	2.60	2.60	5.93	Low Risk	$ 4,300	>10
P-340	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	107.3	2	2	1	2	3	1			UNK			1	75	43	2.28	2.28	1.14	1.71	2.60	0.76	0.57	2.60	2.60	5.93	Low Risk	$ 5,200	>10
P-341	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	133.9	2	2	2	2	3	1			UNK			1	75	43	2.28	2.28	1.43	2.00	2.80	0.95	0.67	2.80	2.80	6.38	Low Risk	$ 6,400	>10
P-342	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors											
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-344	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	205.0	2	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.14	1.71	1.80	0.76	0.57	1.80	1.80	4.10	Low Risk	$ 10,000	>10
P-345	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.4	208.2	4	2	4	1	4	3	5400-4200	9/23/14	UNK			1	50	-9	4.00	4.00	3.43	2.29	4.00	2.29	0.76	4.00	4.00	16.00	High Risk	$ 22,000	Sewer Renewal 1
P-346	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	8.1	283.1	4	2	4	2	4	3			5.4	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.86	4.00	2.29	0.95	4.00	4.00	4.48	Crit-Mon	$ 31,000	Sewer Renewal 1
P-347	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	11.3	223.0	4	2	4	2	4	3			UNK	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.86	4.00	2.29	0.95	4.00	4.00	4.48	Crit-Mon	$ 24,000	Sewer Renewal 1
P-348	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	8.1	209.5	4	2	4	2	4	3			UNK			1	50	-9	4.00	4.00	3.43	2.86	4.00	2.29	0.95	4.00	4.00	16.00	High Risk	$ 23,000	Sewer Renewal 1
P-349	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	90.4	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 4,300	>10
P-350	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	345.7	2	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.14	1.71	1.80	0.76	0.57	1.80	1.80	4.10	Low Risk	$ 17,000	>10
P-351	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	309.4	2	2	1	1	2	1			UNK			1	100	66	2.02	2.02	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.64	Low Risk	$ 15,000	>10
P-352	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8'' 2004	Unk	138.4	2	2	1	1	3	1			UNK			1	75	63	1.48	1.48	1.14	1.14	2.60	0.76	0.38	2.60	2.60	3.85	Low Risk	$ 6,600	>10
P-353	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	365.9	4	2	1	2	2	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.80	1.71	0.67	1.80	1.80	5.54	Low Risk	$ 18,000	>10
P-354	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	354.6	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 17,000	>10
P-355	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	103.6	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 5,000	>10
P-356	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	198.9	2	2	1	1	4	3			UNK			1	75	23	3.08	3.08	2.29	1.14	3.40	1.52	0.38	3.40	3.40	10.47	Low Risk	$ 10,000	>10
P-357	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	299.5	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 14,000	>10
P-358	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	402.9	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 19,000	>10
P-359	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	9.5	11.6	1	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.29	1.86	2.80	0.86	0.62	2.80	2.80	7.95	Low Risk	$ 800	>10
P-360	FORCE	CIP	PRESSURIZED	8	1964	8'' CIP 1964	9.2	925.1	2	1	4	2	4	1			UNK			1	115	63	2.36	2.36	2.00	2.57	4.00	1.33	0.86	4.00	4.00	9.43	Crit-Mon	$ 44,000	>10
P-361	FORCE	PVC		6	1985	6'' PVC 1985	Unk	3748.2	4	1	1	1	4	1			UNK			1	100	69	1.93	1.93	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.56	Low Risk	$ 135,000	>10
P-362	FORCE	CIP	PRESSURIZED	6	1970	6'' CIP 1970	5.0	634.3	4	1	2	1	3	1			UNK			1	115	69	2.20	2.20	1.71	1.71	2.80	1.14	0.57	2.80	2.80	6.16	Low Risk	$ 23,000	>10
P-363	FORCE	CIP	PRESSURIZED	6	1964	6'' CIP 1964	5.6	417.0	4	1	2	1	3	1			UNK			1	115	63	2.36	2.36	1.71	1.71	2.80	1.14	0.57	2.80	2.80	6.60	Low Risk	$ 15,000	>10
P-364	FORCE	CIP	PRESSURIZED	12	2004	12'' CIP 2004	Unk	1207.2	2	1	4	1	4	1			UNK			1	115	103	1.31	1.31	2.00	2.00	4.00	1.33	0.67	4.00	4.00	5.25	Crit-Mon	$ 87,000	>10
P-365	COLLECTOR	UNKNOWN	GRAVITY	8	1988	8'' 1988	5.5	279.5	2	2	1	1	1	3			UNK			1	75	47	2.12	2.12	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.23	Low Risk	$ 13,000	>10
P-366	COLLECTOR	VCP	GRAVITY	8	1968	8'' 1968	5.2	66.1	2	2	2	1	1	3			UNK			1	75	27	2.92	2.92	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.01	Low Risk	$ 3,200	>10
P-367	COLLECTOR	VCP	GRAVITY	8	1988	8'' 1988	5.5	32.2	2	2	1	1	1	3			UNK			1	75	47	2.12	2.12	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.23	Low Risk	$ 1,500	>10
P-368	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	308.8	2	2	1	1	2	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.80	1.52	0.38	1.80	1.80	5.54	Low Risk	$ 15,000	>10
P-369	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	198.2	2	2	1	1	2	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.80	1.52	0.38	1.80	1.80	5.54	Low Risk	$ 10,000	>10
P-370	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.9	102.9	2	2	3	1	4	3			UNK			1	75	23	3.08	3.08	2.86	1.71	3.80	1.90	0.57	3.80	3.80	11.70	Low Risk	$ 4,900	>10
P-371	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	380.4	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 18,000	>10
P-372	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	Unk	48.3	1	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.80	Low Risk	$ 2,300	>10
P-373	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	280.0	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 13,000	>10
P-374	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	120.7	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 5,800	>10
P-375	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	80.9	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 3,900	>10
P-376	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	74.1	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 3,600	>10
P-377	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	66.8	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 3,200	>10
P-378	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	122.7	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 5,900	>10
P-379	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	184.1	2	2	2	1	3	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.80	0.95	0.48	2.80	2.80	5.49	Low Risk	$ 9,000	>10
P-380	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	74.2	1	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.06	Low Risk	$ 3,600	>10
P-381	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	305.6	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 15,000	>10
P-382	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	237.3	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 11,000	>10
P-383	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	144.8	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,000	>10
P-384	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	92.7	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 4,400	>10
P-385	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	227.6	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 11,000	>10
P-386	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	217.0	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 10,000	>10
P-387	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	117.3	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 5,600	>10
P-388	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	82.5	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 4,000	>10
P-389	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	67.6	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 3,200	>10
P-390	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	181.3	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 9,000	>10
P-391	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	394.6	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 19,000	>10
P-392	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	235.5	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 11,000	>10
P-393	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	55.1	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 2,600	>10
P-394	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	152.8	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,300	>10
P-395	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.5	255.7	2	2	1	1	1	1	2100-0000	11/25/2011	2.1			1.66	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 15,000	Sewer Renewal 3
P-396	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.0	149.9	2	2	1	1	1	1			UNK			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	$ 9,000	Sewer Renewal 3
P-397	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	103.8	2	2	1	1	2	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 5,000	≤5
P-398	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.0	92.3	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 4,400	≤5
P-399	COLLECTOR	LVCP	GRAVITY	8	2010	8'' LVCP 2010	5.6	155.3	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 7,500	>10
P-400	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18'' 2010	8.1	153.0	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 17,000	>10
P-401	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	318.2	1	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.00	1.57	1.00	0.67	0.52	1.00	1.00	2.28	Low Risk	$ 15,000	>10
P-402	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	Unk	213.8	2	2	1	1	2	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.10	Low Risk	$ 10,000	>10
P-403	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	101.5	1	2	3	1	3	1			UNK			1	100	68	1.96	1.96	1.57	1.57	3.00	1.05	0.52	3.00	3.00	5.88	Low Risk	$ 4,900	>10
P-404	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	151.2	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 7,300	>10
P-405	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	68.6	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 3,300	>10
P-406	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	43.8	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 2,100	>10
P-407	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	88.6	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 4,300	>10
P-408	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	73.1	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 3,500	>10
P-409	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	22.4	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 1,100	>10
P-410	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	169.6	2	2	1	1	2	1			UNK			1	100	66	2.02	2.02	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.64	Low Risk	$ 8,000	>10
P-411	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	178.3	2	2	1	1	3	1			UNK			1	100	66	2.02	2.02	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.25	Low Risk	$ 9,000	>10
P-412	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	324.3	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 16,000	>10
P-413	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	54.7	1	2	1	1	4	3			UNK			1	75	23	3.08	3.08	2.14	1.00	3.40	1.43	0.33	3.40	3.40	10.47	Low Risk	$ 2,600	>10
P-414	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	95.7	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 4,600	>10
P-415	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	10.0	66.5	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 6,000	>10
P-416	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.3	200.9	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 10,000	>10
P-417	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.5	162.7	1	2	2	1	1	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	1.20	0.86	0.43	1.20	1.20	4.51	Low Risk	$ 12,000	≤5
P-418	COLLECTOR	LVCP	GRAVITY	10	2007	10'' LVCP 2007	9.1	35.4	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 2,100	>10
P-419	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	383.7	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 18,000	>10
P-420	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	143.3	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 6,900	>10
P-421	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	296.5	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 14,000	>10
P-422	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	190.5	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 9,000	>10
P-423	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	337.1	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 16,000	>10
P-424	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	266.6	1	2	1	1	2	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.80	0.67	0.33	1.80	1.80	5.40	Low Risk	$ 13,000	>10
P-425	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	Unk	7.1	1	2	4	1	4	1			UNK			1	75	23	3.08	3.08	1.86	1.86	4.00	1.24	0.62	4.00	4.00	12.32	Crit-Mon	$ 500	>10
P-426	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	6.4	217.7	4	2	4	1	3	3			UNK			1	50	4	3.76	3.76	3.43	2.29	3.20	2.29	0.76	3.20	3.20	12.03	Low Risk	$ 24,000	≤5
P-427	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	7.6	296.7	4	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 76,000	>10
P-428	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	9.7	246.0	4	2	4	2	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.86	4.00	1.52	0.95	4.00	4.00	4.48	Crit-Mon	$ 63,000	>10
P-429	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.7	267.3	4	2	4	2

Table A-1 Collection System Sorted by Pipe ID

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1-4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-431	COLLECTOR	RCP	GRAVITY	18	2004	18" RCP 2004	5.5	137.5	2	2	4	1	4	1			UNK			1	50	38	1.72	1.72	2.00	2.00	4.00	1.33	0.67	4.00	4.00	6.88	Crit-Mon	$ 15,000	>10
P-432	COLLECTOR	RCP	GRAVITY	18	1970	18" RCP 1970	5.4	343.5	4	2	4	1	4	1			UNK	CIPPL + Replace	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 37,000	>10
P-433	COLLECTOR	RCP	GRAVITY	18	1970	18" RCP 1970	5.4	150.4	4	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 38,000	>10
P-434	COLLECTOR	RCP	GRAVITY	18	1970	18" RCP 1970	6.7	219.3	4	2	4	1	4	3			UNK	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.29	4.00	2.29	0.76	4.00	4.00	4.48	Crit-Mon	$ 24,000	>10
P-435	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	5.4	117.5	4	2	2	1	4	1			UNK			1	75	29	2.84	2.84	1.71	1.71	3.60	1.14	0.57	3.60	3.60	10.22	Low Risk	$ 5,600	>10
P-436	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	6.4	221.1	2	2	2	1	3	1			UNK			1	75	29	2.84	2.84	1.43	1.43	2.80	0.95	0.48	2.80	2.80	7.95	Low Risk	$ 11,000	>10
P-437	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8" 1984	7.3	160.6	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 8,000	>10
P-438	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8" 1984	8.3	101.6	2	2	2	2	2	1			UNK			1	75	43	2.28	2.28	1.43	2.00	2.00	0.95	0.67	2.00	2.00	4.56	Low Risk	$ 4,900	>10
P-439	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8" 1984	5.6	153.6	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 7,400	>10
P-440	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	151.1	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,300	>10
P-441	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	193.6	1	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.96	Low Risk	$ 9,000	>10
P-442	COLLECTOR	VCP	GRAVITY	12	1978	12" VCP 1978	5.7	110.7	2	2	2	1	1	1	3100-0000	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.20	0.95	0.48	1.20	1.20	3.02	Low Risk	$ 8,000	>10
P-443	COLLECTOR	UNKNOWN	GRAVITY	6	1983	6" 1983	6.1	97.7	2	2	1	1	2	1			UNK			1	75	42	2.32	2.32	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.18	Low Risk	$ 3,500	>10
P-444	COLLECTOR	UNKNOWN	GRAVITY	6	1983	6" 1983	6.0	100.4	2	2	1	1	2	1			UNK			1	75	42	2.32	2.32	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.18	Low Risk	$ 3,600	>10
P-445	COLLECTOR	UNKNOWN	GRAVITY	6	1983	6" 1983	6.0	346.8	4	2	1	1	4	1			UNK			1	75	42	2.32	2.32	1.43	1.43	3.40	0.95	0.48	3.40	3.40	7.89	Low Risk	$ 12,000	>10
P-446	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	113.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 8,000	>10
P-447	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8" 2004	Unk	137.7	2	2	1	1	3	1			UNK			1	75	63	1.48	1.48	1.14	1.14	2.60	0.76	0.38	2.60	2.60	3.85	Low Risk	$ 6,600	>10
P-448	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8" 2004	Unk	105.3	2	2	1	1	4	1			UNK			1	75	63	1.48	1.48	1.14	1.14	3.40	0.76	0.38	3.40	3.40	5.03	Low Risk	$ 5,100	>10
P-450	UNKNOWN	UNKNOWN	UNKNOWN	unk	unk		Unk	696.5	1	0	4	1	4	1			UNK			1	75	25	3.00	3.00	1.86	1.86	4.00	1.24	0.62	4.00	4.00	12.00	Crit-Mon	$ 107,000	>10
P-451	COLLECTOR	VCP	GRAVITY	8	1968	8" VCP 1968	7.1	241.5	2	2	1	1	2	1	0000-0000	11/29/2011	1.0			1	75	27	2.92	2.92	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.26	Low Risk	$ 12,000	>10

Table A-2 Facilities Sorted by Asset ID

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Cross	Civil / Site Safety & Security	Cross-C301	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
Cross	Civil / Site Safety & Security	Cross-C302	Fences	Building Exterior	Site Fence	Repair or replace damaged fencing and privacy screening in rear of site.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Cross	Civil / Site Safety & Security	Cross-C303	Gutters	Building Exterior	Building Drainage Gutters	Clean gutters of debris and unclog drainage structures.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 200	≤5
Cross	Civil / Site Safety & Security	Cross-C304	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 5,100	6-10
Cross	Civil / Site Safety & Security	Cross-C305	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E307)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Cross	Civil / Site Safety & Security	Cross-C306	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 26,000	Emergency Bypasses
Cross	Electrical / Emergency Power	Cross-E301	Conduit/Wiring	Indoors	All conduit and wiring in the building has been heated to the point of softening and significantly drooping throughout the room, which is putting major strain on the wiring, connections and wiring insulation. (NOTE: we believe this overheating is due to the ventilation louvers being disconnected and the engine exhaust not being insulated).	Replace all softened/drooping conduit. Replace all wiring run in conduits inside the buillding as it is unreliable and unsafe due to major overheating and physical strain from stretching/softening conduits	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 25,000	Cross St. PS Improveme
Cross	Electrical / Emergency Power	Cross-E302	Conduit/Wiring	Indoors	Some conduits have become disconnected	Reconnect conduits to avoid tearing/disconnecting wiring	≤5	Very High	4	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	8.00	Important	$ 1,000	Cross St. PS Improveme
Cross	Electrical / Emergency Power	Cross-E303	Electrical Equipment	Indoors	The panelboard and breakers are unreliable due to probable overheating	Replace panelboard	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 2,500	Cross St. PS Improveme
Cross	Electrical / Emergency Power	Cross-E304	Lighting	Indoors	Lighting is inefficient and dim	Provide new lighting	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 1,100	≤5
Cross	Electrical / Emergency Power	Cross-E305	Electrical Equipment	Indoors	No surge protection provided	Provide a surge protection (at least 100kA/phase) on the main service to protect electrical equipment	≤5	High	3	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	6.00	Low Risk	$ 2,500	≤5
Cross	Electrical / Emergency Power	Cross-E306	Electrical Equipment	Indoors	Box cover loose (located on wall below engine exhaust)	Fasten cover onto box	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 100	Cross St. PS Improveme
Cross	Electrical / Emergency Power	Cross-E307	Electrical Equipment	Indoors	No emergency lighting installaed	Provide an emergency light	≤5	Very High	4	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	8.00	Important	$ 400	Cross St. PS Improveme
Cross	Electrical / Emergency Power	Cross-E308	Lighting	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Cross	Electrical / Emergency Power	Cross-E309	Meter	Outdoors	Abondonned utility meter socket/enclosure was not demolished	Remove abondonned utility meter socket enclosure and conduit	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 300	≤5
Cross	HVAC / Plumbing	Cross-H301	Louver	Cross Street PS	cooling air inlet louver	Actuator linkage disconnected; replace; unknown if operational - increase wall opening, replace louver, damper and actuator	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 5,000	Cross St. PS Improveme
Cross	HVAC / Plumbing	Cross-H302	Louver	Cross Street PS	Air Exhaust Fan & Louver - Operates upon integrated temperature sensor; unknown if fan turns on when generator starts; unknown age and performance date; louver operates per fan start, bent and rusted in places	Relocate to manual louver location, increase wall opening, replace louver, replace with larger fan, assure operation with generator start and at high temperature detection, patch current opening.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 6,600	Cross St. PS Improveme
Cross	HVAC / Plumbing	Cross-H303	Louver	Cross Street PS	Manual louver	See air exhaust fan and louver recommendation	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	Cross St. PS Improveme
Cross	HVAC / Plumbing	Cross-H304	Piping	Cross Street PS	engine exhaust pipe	Rusted out; replace and assure code distance to wall opening (fan&louver); improve wall penetration detail, insulate interior pipe	≤5	High	3	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	6.00	Low Risk	$ 4,200	≤5
Cross	HVAC / Plumbing	Cross-H305	Heater	Cross Street PS	wall mount electric unit heater	Works, but fuse turned off --> manual start required; old appearance; replace	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Cross	HVAC / Plumbing	Cross-H306	Dehumidifier	Cross Street PS	dehumidifier	doesn't appear to work; replace	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 1,900	≤5
Cross	Instrumentation & Controls	Cross-I301	Meter	Building Interior	Doppler type Sonic Transducer Flow Meter with Polysonics digital display.	Replace with 12-inch magnetic flow meter at end of useful life	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 9,000	≤5
Cross	Instrumentation & Controls	Cross-I302	Alarm system	Building Interior	Remote Alarm Dialing Monitor	Replace with SCADA system	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Cross	Instrumentation & Controls	Cross-I303	Instrument/Controls	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Replace with Ultrasonic Level Indicator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
Cross	Instrumentation & Controls	Cross-I304	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
Cross	Process / Mechanical	Cross-P301	Pump	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B. 25 HP, 1765 RPM Gorman-Rupp Motor	Replace in kind at of of useful life. Repair Seal Leak in interim.	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 27,000	≤5
Cross	Process / Mechanical	Cross-P302	Pump	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B. 25 HP, 1760 RPM Baldor Motor	Replace in kind at of of useful life. Repair Seal Leak in interim.	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 27,000	≤5
Cross	Process / Mechanical	Cross-P303	Pump	Building Interior	Pump Backup Motor. Gorman-Rupp Watchdog. Belt Drive Connection to Pumps.	Replace with external backup generator. Protect nearby conduits with heat shield in interim. Provide backup cappability to both pumps. Properly ventilate (See H301 - H303).	≤5	High	3	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	6.00	Low Risk	$ 95,000	≤5
Cross	Process / Mechanical	Cross-P304	Piping and Valves	Building Interior	8-inch swing check valves (Qty 2)	Replace and / or relocated check valvess to be horizontally mounted, not vertically mounted.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 7,100	≤5
Cross	Structural/Architectural	Cross-S301	Foundation	Building Exterior	Concrete Building Slab Is Being Undermined	Install Foundatio Wall and Flowable Fill	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 10,000	≤5
Cross	Structural/Architectural	Cross-S302	Doors	Building Exterior	Double Door Paint Deteriorated	Paint doors (2) and Frame	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Cross	Structural/Architectural	Cross-S303	Stairs	Building Exterior	Concrete Stairs Are Deteriorated	Remove and Replace Concrete Stairs	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 8,000	≤5
Cross	Structural/Architectural	Cross-S304	Handrails	Building Exterior	Concrete Stairs Do Not Have Guardrail/Handrails	Install Aluminum Guardrail/Handrail	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
Erin	Civil / Site Safety & Security	Erin-C201	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 11,000	6-10
Erin	Civil / Site Safety & Security	Erin-C202	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Erin	Civil / Site Safety & Security	Erin-C203	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E206)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Erin	Civil / Site Safety & Security	Erin-C204	Safety equipment	Building Interior	Safety Harness & Cable for Pump Chamber Tube	Replace Safety Harness and Cable with a Cable & Harness Long Enough to Reach Bottom of Pump Chamber	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 1,000	Jaffrey Center & Erin P
Erin	Civil / Site Safety & Security	Erin-C205	Safety equipment	Building Interior	Fire Extinguisher	Replace Missing Fire Extinguisher	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin P
Erin	Civil / Site Safety & Security	Erin-C206	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 28,000	Emergency Bypasses
Erin	Electrical / Emergency Power	Erin-E201	Electrical Equipment	Indoors	Panelboards are approaching the end of their useful life	Replace panelboards	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,500	6-10
Erin	Electrical / Emergency Power	Erin-E202	Electrical Equipment	Indoors	The generator is approaching the end of its useful life	Replace generator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 25,000	6-10
Erin	Electrical / Emergency Power	Erin-E203	Electrical Equipment	Indoors	The automatic transfer switch is approaching the end of its useful life	Replace automatic transfer switch	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 4,000	6-10
Erin	Electrical / Emergency Power	Erin-E204	Electrical Equipment	Indoors	The fire alarm and security panels are approaching the end of their useful lives	Replace the panels and devices	6-10	Medium	2	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	4.00	Low Risk	$ 5,000	6-10
Erin	Electrical / Emergency Power	Erin-E205	Electrical Equipment	Bottom level	Disconnect switches are rusted	Replace disconnect switches	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 2,000	6-10
Erin	Electrical / Emergency Power	Erin-E206	Electrical Equipment	Bottom level	Receptacles are not GFCI	Replace general use receptacles (outlets) with GFCI type	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 500	Jaffrey Center & Erin P
Erin	Electrical / Emergency Power	Erin-E207	Conduit/Wiring	Below grade locations	conduit straps are rusted.	Replace rusted conduit straps	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 500	≤5
Erin	Electrical / Emergency Power	Erin-E208	Lighting	Indoors	Lighting is inefficient	Replace lighting with new LED type	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 2,100	≤5
Erin	Electrical / Emergency Power	Erin-E209	Lighting	Indoors	No emergency lighting installaed	Provide an emergency light	≤5	Very High	4	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	8.00	Important	$ 400	Jaffrey Center & Erin P

Table A-2 Facilities Sorted by Asset ID

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Erin	Electrical / Emergency Power	Erin-E210	Electrical Equipment	Ground Floor	Surge protection is old and small for the application	Replace existing surge protectors with a larger surge protection device (120KA or larger) on the main service to protect electrical equipment	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 3,000	≤5
Erin	Electrical / Emergency Power	Erin-E211	Lighting	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Erin	Electrical / Emergency Power	Erin-E212	Electrical Equipment	Below grade locations	Receptacle boxes are not weatherproof	Replace below grade receptacle boxes with cast aluminum, weather resistant type.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
Erin	HVAC / Plumbing	Erin-H201	Heater	Erin Lane PS	Electric Wall Heater, 1st floor	replace in kind	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,400	≤5
Erin	HVAC / Plumbing	Erin-H202	Louver	Erin Lane PS	Air intake louver - 1st floor	good conditions, age unknown, actuator operational	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Erin	HVAC / Plumbing	Erin-H203	Ducts	Erin Lane PS	Generator Air Exhaust Duct - 1st floor	repainting (price for 5hr @ $90..-; no mark-up, assumed maintenance job)	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,400	6-10
Erin	HVAC / Plumbing	Erin-H204	Louver	Erin Lane PS	Generator Air Exhaust Louver - 1st floor	good conditions, age unknown, actuator operational	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Erin	HVAC / Plumbing	Erin-H205	Piping	Erin Lane PS	Generator Engine Exhaust pipe - 1st floor	rusty in places, clean and repaint/rust protect (2hr @ $90..-; no mark-up, assumed maintenance job; replace if needed "C")	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,200	6-10
Erin	HVAC / Plumbing	Erin-H206	manhole	Erin Lane PS	Air Exhaust Fan - bottom of manhole	good contition, slight rust, expected life 20yr, unknown age	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 700	6-10
Erin	HVAC / Plumbing	Erin-H207	Piping	Erin Lane PS	Air Exhaust piping - Manhole to outside	repaint, install screen against pests and small animals at outside opening, replace/repair broken outlet pipe	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 300	≤5
Erin	HVAC / Plumbing	Erin-H208	Heater	Erin Lane PS	Electric Unit Heater - bottom of pump chamber	replace in kind and mount per maufacturers instructions	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Erin	HVAC / Plumbing	Erin-H209	Dehumidifier	Erin Lane PS	Dehumidifier - bottom of pump chamber	residential style, dirty, age unknown, replace, appears to be 70qt size, replace with industrial grade	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 1,900	≤5
Erin	Instrumentation & Controls	Erin-I201	Air Bubbler	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Replace with Ultrasonic Level Indicator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
Erin	Instrumentation & Controls	Erin-I202	Instrument/Controls	Wet Well & Controls Cabinet	Float Backup Wet Well and Alarm Level Indicators	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
Erin	Instrumentation & Controls	Erin-I203	Instrument/Controls	Building Interior	Remote Alarm Dialing Monitor	Replace with SCADA system	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Erin	Instrumentation & Controls	Erin-I204	Instrument/Controls	Building Interior	Flow Meter	Install a 4" magnetic flow meter on discharge pipe	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 4,100	≤5
Erin	Instrumentation & Controls	Erin-I205	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
Erin	Process / Mechanical	Erin-P201	Pump	Dry Well - Pump Chamber	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B/F.	Replace in kind	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 13,000	≤5
Erin	Process / Mechanical	Erin-P202	Pum	Dry Well - Pump Chamber	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B/F.	Replace in kind	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 13,000	≤5
Erin	Process / Mechanical	Erin-P203	Piping and Valves	Dry Well - Pump Chamber	Process Piping & Valves	Sandblast and Repaint process piping and valves. Replace Vertically Mounted Check Valves with Horizontally Mounted Check Valves. Replace Missing Pump #2 Check Valve Recoil Spring Immediately.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
Erin	Process / Mechanical	Erin-P204	Pump	Dry Well - Pump Chamber	Simplex Sump Pump	Replace in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Erin	Structural/Architectural	Erin-S201	Arch. Details	Building Exterior	Paint on Wood Building Trim Deteriorated	Paint Wood Trim	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 5,000	≤5
Erin	Structural/Architectural	Erin-S202	Doors	Building Exterior	Door Paint Deteriorated	Paint doors (2) and Frame	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 800	≤5
Erin	Structural/Architectural	Erin-S203	Doors	Building Exterior	Door Hardware Deteriorated / Cylinder Lock	Replace Door Hardware	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,000	≤5
Erin	Structural/Architectural	Erin-S204	Walls	Building Interior	Paint On Walls Of Pump Chamber Can Deteriorated	Paint Interior Of Pump Chamber Can	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Civil / Site Safety & Security	Hadley-C101	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 17,000	6-10
Hadley	Civil / Site Safety & Security	Hadley-C102	Handrail	Building Exterior	Concrete Stairs & Aluminum Handrail	Repair Concrete Cracks and Spalling. Reconfigure Handrail Location. Dry Well entrance is not blocked by open swing door.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk		≤5
Hadley	Civil / Site Safety & Security	Hadley-C103	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Hadley	Civil / Site Safety & Security	Hadley-C104	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E109)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Hadley	Civil / Site Safety & Security	Hadley-C105	Access Hatch	Dry Well	Floor Access Hatches Fall Proptection	Provide Fall Protection Netting on all Motor Hatches. Replace missing chain and posts around motor access hatches.	≤5	High	3	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	8.00	Low Risk	$ 6,200	≤5
Hadley	Civil / Site Safety & Security	Hadley-C106	Drains	Dry Well	Floor Drains do not exist	Install Floor Drains on Sub Floor #1 (Storage Level) near location of plant water system.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 4,100	≤5
Hadley	Electrical / Emergency Power	Hadley-E101	Lighting	All of Dry Well	Lighting is old and inefficient	Replace fixtures with LED type	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 4,900	6-10
Hadley	Electrical / Emergency Power	Hadley-E102	Fire Alarm	Dry Well Ground Floor	Fire Alarm Panel Old and becoming unreliable	Replace panel	6-10	Medium	2	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	5.33	Low Risk	$ 2,500	6-10
Hadley	Electrical / Emergency Power	Hadley-E103	Instrument/Controls	Dry Well Ground Floor	Security Control Panel Old and becoming unreliable	Replace panel	6-10	Medium	2	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	4.00	Low Risk	$ 1,500	6-10
Hadley	Electrical / Emergency Power	Hadley-E104	Electrical Equipment	Dry Well Ground Floor	Replace damaged receptacle/outlet behind the fuel day tank - Safety	Replace receptacle	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 200	Hadley Rd. PS Improve
Hadley	Electrical / Emergency Power	Hadley-E105	Electrical Equipment	Dry Well Ground Floor	No surge protection provided	Provide a surge protection (at least 200kA/phase) on the main service to protect electrical equipment	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,000	≤5
Hadley	Electrical / Emergency Power	Hadley-E106	Electrical Equipment	Dry Well Ground Floor	Panelboards in fair physical condition, but is old and becoming unreliable	Replace the panelboard	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 2,000	6-10
Hadley	Electrical / Emergency Power	Hadley-E107	Electrical Equipment	Dry Well Middle Level	K & H Controls dual pump control panel (unused) old and in fair condition	Remove panel and wiring, cap unused conduits	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
Hadley	Electrical / Emergency Power	Hadley-E108	Lighting	Dry Well Pump Room	Lighting is dim	Provide one additional light fixture	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Hadley	Electrical / Emergency Power	Hadley-E109	Lighting	Outdoors	Lighting is old and seems to be inoperable - Security	Replace lighting with new LED fixtures (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 2,000	≤5
Hadley	Electrical / Emergency Power	Hadley-E110	Lighting	Various	No emergency lighting or exist signs installed - Safety	Provide emergnecy lighting and exit signs	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 9,000	Hadley Rd. PS Improve
Hadley	Electrical / Emergency Power	Hadley-E111	Instrument/Controls	Wet Well	No combustible gas detector installed - Safety	Provide a combustible gas detector, connect alarm to auto dialer, and provide warning lights and horn inside and outside of wet well, in accordance with NFPA 820.	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 8,000	Hadley Rd. PS Improve
Hadley	Electrical / Emergency Power	Hadley-E112	Electrical Equipment	Wet Well	Lamp in one of the explosion proof fixtures is out	Replace blown lamp in explosion proof fixture	≤5	High	3	Moderate	2	Low	1	Minor offense	2	1.33	0.33	2.00	2.00	6.00	Low Risk	$ 300	≤5
Hadley	HVAC / Plumbing	Hadley-H101	Louver	Hadley Road PS - dry well	air inlet louver - above door	good conditions, age unknown	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Hadley	HVAC / Plumbing	Hadley-H102	Heater	Hadley Road PS - dry well	wall mount electric unit heaters (2) - 1st floor	manufactured by CPE - out of business since about 1990; replace unit in kind	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 2,800	≤5
Hadley	HVAC / Plumbing	Hadley-H103	Ducts	Hadley Road PS - dry well	Generator Air Exhaust Duct - 1st floor	good conditions, clean, insect screen good, install date 2009	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 5,400	>10
Hadley	HVAC / Plumbing	Hadley-H104	Louver	Hadley Road PS - dry well	Generator Air Exhaust Louver - 1st floor	good conditions, clean, install date 2009	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Hadley	HVAC / Plumbing	Hadley-H105	Heater	Hadley Road PS - dry well	wall mount electric unit heaters - bottom floor	Chromalox Unit, built 2005; replace in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Hadley	HVAC / Plumbing	Hadley-H106	Heater	Hadley Road PS - dry well	wall mount electric unit heater - middle floor	manufactured by CPE - out of business since about 1990; replace unit in kind	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Hadley	HVAC / Plumbing	Hadley-H107	Fan	Hadley Road PS - dry well	exhaust fan - middle floor	appears to be in good conditions, age unknown	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 3,800	>10

Table A-2 Facilities Sorted by Asset ID

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Hadley	HVAC / Plumbing	Hadley-H108	Ducts	Hadley Road PS - dry well	exhaust duct & louvers	appears to be in good conditions, age unknown, duct to attic and sidewall louvers	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 9,000	>10
Hadley	HVAC / Plumbing	Hadley-H109	Piping	Hadley Road PS - dry well	engine exhaust pipe	rusty in places - including drain, inspect and replace or re-protect - at drain removal inspect interior pipe conditions	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,300	≤5
Hadley	HVAC / Plumbing	Hadley-H110	Fan	Hadley Road PS - wet well	exhaust fan	unknown age, very dirty screen with at least 25% of free area clogged - which could influence performance and life; replace or clean screen and inspect fan at the same time; operation with ligthswitch - clean screen immediately (estimated $500.- of own manpower)	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 5,900	≤5
Hadley	HVAC / Plumbing	Hadley-H111	Louver	Hadley Road PS - wet well	exhaust louver	dirty, but overall look of good condition; clean and inspect then more closely	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,200	≤5
Hadley	HVAC / Plumbing	Hadley-H112	Louver	Hadley Road PS - wet well	air intake louver/damper	very dirty, rusty actuator, bird screen intakt, clean and inspect at that time more closely	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,200	≤5
Hadley	HVAC / Plumbing	Hadley-H113	Heater	Hadley Road PS - wet well	wall mount electric unit heater	very rusty unit, electric coil in bad shape, replace in kind	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 10,000	≤5
Hadley	Instrumentation & Controls	Hadley-I101	Instrument/Controls	Wet well	Submersible Pressure Transducers	Replace in kind at end of useful life. Ensure bottom portion of wet well tanks are cleaned, not just the top portion of the tanks.	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Hadley	Instrumentation & Controls	Hadley-I102	Electrical Equipment	Wet well	Backup Float Switch System	Replace in kind at end of useful life	≤5	High	3	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	4.00	Low Risk	$ 1,200	≤5
Hadley	Instrumentation & Controls	Hadley-I103	Meter	Wet well	Ultrasonic Flow Meter	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
Hadley	Process / Mechanical	Hadley-P10	Valves	Wet Well	12-inch Knife Gate Valves (Qty 2)	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 10,000	>10
Hadley	Process / Mechanical	Hadley-P104	Piping and Valves	Dry Well	10" Plug Valves (Qty 3), 8" Plug Valves (Qty 3), 8" Check Valves (Qty 3)	Replace in kind at end of useful life	>10	Low	1	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	1.33	Low Risk	$ 31,000	>10
Hadley	Process / Mechanical	Hadley-P105	Instrument/Controls	Dry Well - First Floor	Automatic Water Sampler. American Sigma 900 Max.	Remove or Clean	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 200	≤5
Hadley	Process / Mechanical	Hadley-P106	Screenings	Wet Well	Screenings Grinder & Conveyor. JWCE Auger Monster and Channel Monster.	Replace with Mechanically Cleaned Fine Bar Screen and Washer Compactor	≤5	Very High	4	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	5.33	Important	$ 442,000	Hadley Rd. PS Improve
Hadley	Process / Mechanical	Hadley-P107	Service Water System	Dry Well Storage Room Level	Service Water System. Two 50 gallon storage tanks, One Goulds 1/2 HP Pump, and Piping.	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 18,000	>10
Hadley	Process / Mechanical	Hadley-P109	Grinder	Wet Well	Manual Bar Racks (Qty 2). One @ 2.5 inch bar spacing. One @ 1.5 inch bar spacing, located in screenings grinder bypass channel.	Replace in kind at end of useful life. Supplement with Mechanically Cleaned Fine Bar Screen (See Item P106)	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 2,100	>10
Hadley	Process / Mechanical	Hadley-P110	Blowers	Dry Well - First Floor	Blowers. Roots / Dresser Industries, 3 HP. Not in Service.	Abandon or Demolish.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
Hadley	Process / Mechanical	Hadley-P111	Pumps	Dry Well - Pump Room	Simplex Sump Pump by Myer Pumps (Qty 2)	Replace in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Hadley	Process / Mechanical	Hadley-PINF-1	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3s-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	Hadley-PINF-2	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	Hadley-PINF-3	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3s-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	Hadley-PSTG-1,3,4,5,7,8,9	Gates	Wet Well	Slide Gates by Waterman Industries (Qty 7)	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 67,000	6-10
Hadley	Process / Mechanical	Hadley-PSTG-2,6,10	Gates	Wet Well	Channel Stop Gates (Qty 3)	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 9,000	>10
Hadley	Structural/Architectural	Hadley-S101	Roofing	Building Exterior	Roof Aspahalt Shingles Are Worn	Remove and Replace Asphalt Shingles	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 15,000	6-10
Hadley	Structural/Architectural	Hadley-S102	Walls	Building Exterior - South Elev	Masonry Control Joint Sealant Has Failed	Remove and Replac Joint Sealant	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S103	Stairs	Building Exterior - North Elev	Concrete Stairs to Pump Room Are Deteriorated	Remove and Replace Concrete Stairs	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 8,000	≤5
Hadley	Structural/Architectural	Hadley-S104	Stairs	Building Exterior - North Elev	Concrete Stairs to wetwell Are Deteriorated	Replace Aluminum Windows (3)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 8,000	≤5
Hadley	Structural/Architectural	Hadley-S105	Sealants	Building Exterior	Joint Sealant Around Doors and louvers Failed	Remove and replace Joint Sealant	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Structural/Architectural	Hadley-S106	Doors	Building Exterior Door	Pump Room - Double Door Paint Deteriorated	Paint doors (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Hadley	Structural/Architectural	Hadley-S107	Doors	Building Exterior Door	Pump Room - Double Door Hardware Corroded	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S108	Doors	Building Exterior Door	Escape-Way Single Door Damaged At Lock	Remove and Replace Door	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Structural/Architectural	Hadley-S109	Doors	Building Exterior Door	Escape-Way Single Door Hardware	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S110	Railing	Building Exterior Door	Escape-Way Door Landing Guardrail Missing	Install Aluminum Guardrail	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 3,000	≤5
Hadley	Structural/Architectural	Hadley-S111	Doors	Building Exterior Door	Wetwell - Single Door Paint Deteriorated	Paint door	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 800	≤5
Hadley	Structural/Architectural	Hadley-S112	Doors	Building Exterior Door	Wetwell - Single Door Hardware Corroded	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,200	≤5
Hadley	Structural/Architectural	Hadley-S113	Doors	Building Exterior Door	Wetwell - Double Door Paint Deteriorated	Paint doors (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Hadley	Structural/Architectural	Hadley-S114	Doors	Building Exterior Door	Wetwell - Double Door Hardware Corroded	Remove and Replace Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S115	Sealants	Building Interior - Pump Roo	Intermed Level - Wall Mech Seals Leaking 6" & 8"	Repair Link Seals (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 4,000	≤5
Hadley	Structural/Architectural	Hadley-S116	Sealants	Building Interior - Pump Roo	Lower Level - Wall Mech Seals Leaking 10"	Repair Link Seals (1)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,000	≤5
Hadley	Structural/Architectural	Hadley-S117	Walls	Building Interior - Pump Roo	Lower Level - Paint Peeling From Walls	Paint Lower Level Walls	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 6,000	≤5
Hadley	Structural/Architectural	Hadley-S118	Stairs	Building Interior - Wet Well	Concrete Stair and nosings are deteriorated	Repair concrete stairs and nosings	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 5,000	≤5
Hadley	Structural/Architectural	Hadley-S119	Beams	Building Interior - Wet Well	Monorail Beam & Supports are Deteriorated	Paint Monorail beam and Supports	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C401	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 13,000	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C402	Fences	Building Exterior	Perimeter Fencing and Barbed Wire	Repair or replace damaged fencing and barbed wire	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C403	Manhole	Building Exterior	Wetwell Manhole Cover	Replace Cracked Manhole Cover	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 700	≤5
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C404	Drains	Indoors	Floor Drainage in catchment area does not appear to have gas protection between wet well and pump room	Install gas / vapor barrier between wet well and pump room through drain hole	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 2,000	Jaffrey Center & Erin P
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C405	Safety equipment	Indoors	Fire Extinguisher	Replace Missing Fire Extinguisher	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin P
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C406	Alarm system	Indoors	Site Security - Alarm Systm	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C407	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 19,000	Emergency Bypasses
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E401	Counduit/wiring	Indoors	Panelboard is in fair physical condition, but is old and becoming unreliable	Replace the panelboard	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 2,500	6-10
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E402	Counduit/wiring	Indoors	Transfer Switch (ATS will be approaching the end of its useful life	Replace the ATS	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 4,000	6-10
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E403	Counduit/wiring	Indoors	Abandoned conduit with exposed wiring below phone equipment	Remove abandoned Conduit/Wire	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 200	Jaffrey Center & Erin P
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E404	Conduit/Wiring	Indoors	Float switch cable tie wrapped to conduits	Run cable in PVC conduit through the station	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 500	Jaffrey Center & Erin P
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E405	open	Indoors	12"x12" PVC box missing screws/open	Provide new screws in 12"x12" PVC box	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin P
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E406	Electrical Equipment	Indoors	No surge protection provided	Provide a surge protection on the main service to protect electrical equipment	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E407	Electrical Equipment	Indoors	No emergency lighting or exist signs installed - Safety	Provide an emergency light	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 400	Jaffrey Center & Erin P

Table A-2 Facilities Sorted by Asset ID

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E408	Conduit/Wiring	Outdoors	Electric Service conduit support corroded	Replace support (conduit strap)	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E409	Conduit/Wiring	Outdoors	Float switch conduit does not include an explosion proof seal (EY Fitting)	Provide an explosion proof conduit seal (EY Fitting)	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 800	Jaffrey Center & Erin P
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E410	Electrical Equipment	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E411	Conduit/Wiring	Outdoors	Coupling for generator power conduit (near ground) is rusting.	Sand and coat coupling to prvent extensive corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
Jaffrey Ctr	HVAC / Plumbing	Jaffrey Ctr-H401	outdoors	Jaffrey Center PS	wall fan with penetration to outdoors	no screen in place, age unknown - estimated beyond 10years, still operating, rusty sleeve, study temperature in pump station to determine adequate inlet size	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Jaffrey Ctr	HVAC / Plumbing	Jaffrey Ctr-H402	heater	Jaffrey Center PS	wall mount electric unit heater	age unknown - estimated to be beyond 10years, appears to be operating, bend grille, dirty, size estimate at 1.5kW	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I401	Monitor	Building Interior	Remote Alarm Dialing Monitor	Replace with SCADA System	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I402	Btion &la	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Replace with Ultrasonic Level Indicator	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I403	Instrument/Controls	Wet Well & Controls Cabinet	Float Backup Wet Well Level Indicators.	Replace in kind at end of useful life	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 600	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I404	Instrument/Controls	Building Interior	Flow Meter	Install a 4" magnetic flow meter on discharge pipe	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 4,100	≤5
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I405	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P401	Motor	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B. 5 HP, 1730 RPM Gorman-Rupp Motor	Replace in kind	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P402	Motor	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B. 5 HP, 1730 RPM Gorman-Rupp Motor	Replace in kind	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P403	Valves	Building Interior	Check Valves (Qty 2)	Replace valves at end of service life. Touch up paint on discharge piping in short term.	>10	Low	1	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	1.33	Low Risk	$ 3,300	>10
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S401	deterioration	Building Exterior - East Eleva	Door and frame show signs of deterioration	Remove & Replace Door, Frame and Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S402	roof	Building Exterior - South Elev	Tree branches are growing over the roof	Trim tree branches	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S403	deteriorated	Building Exterior - Roof	The roof shinglesare deteriorated	Remove and Replace Roof Shingles	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 5,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S404	deteriorated	Building Exterior	Concrete Block (CMU) Paint is deteriorated	Paint CMU	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S405	access	Building Interior	The ceiling doesn't have attic access	Provide 20"x30" Attic Access Per IBC1209.2	≤5	High	3	Low	1	Severe	4	In compliance	1	0.67	1.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
WWTF	Civil / Site Safety & Security	WWTF-AB5	Grab Bars	Administration Building	Non-compliant ADA Locker Room	Install grab bars and roll-in access	≤5	High	3	low	1	Low	1	Minor offense	2	0.67	0.33	2.00	2.00	6.00	Low Risk	$ 1,500	WWTF Adminstration I
WWTF	Civil / Site Safety & Security	WWTF-AB6	Fire Alarm System	Administration Building	Lack of alarm strobes and pull stations	Install additional alarm strobes and pull stations	≤5	High	3	significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 5,800	WWTF Adminstration I
WWTF	Electrical / Emergency Power	WWTF-E1	Electrical Equipment	Influent Channel / Grit Tank Area	3 signal conduits on top of the North side (cast into concrete) are severely rusted.	Replace fittings on top; remove rust from conduits and coat with PVC coating	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E2	Electrical Equipment	Process Building - Exterior	The exterior lighting on the building remains on all day.	Provide a photocell on the lighting circuit to turn the lights off during daylight hours.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 500	≤5
WWTF	Electrical / Emergency Power	WWTF-E3	Electrical Equipment	Process Building - Dewatering Room	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E4	Electrical Equipment	Process Building - Dewatering Room	The Odor Control disconnect switch only has a 20" wide work space clearance; the NEC requires 30".	Do no work on this disconnect swiitch while it is live; turn off power at the source prior to opening it.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	WWTF General Improv
WWTF	Electrical / Emergency Power	WWTF-E5	Electrical Equipment	Process Building - Dewatering Room	The Polymer Control Panel has open holes on the bottom.	Provide hole plugs for the panel to help prevent corrosion inside the panel.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E6	Electrical Equipment	Process Building - Grit Removal Room	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E7	Electrical Equipment	Process Building - Corridor P-107	The conduit at the door security contact is not fastened to the wall.	Fasten conduit to the wall	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E8	Electrical Equipment	Process Building - Chem Room P-108	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E9	Electrical Equipment	Process Building - Sludge Loading Bay P-110	The two disconnect switches on the SW wall each have a conduit entering the bottom that appear to be missing gaskets	Provide gaskets on these conduit entries to reduce internal corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E10	Electrical Equipment	Process Building - Sludge Loading Bay P-110	Conduit supports straps on the ceiling are rusting	Replace with PVC coated conduit straps	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
WWTF	Electrical / Emergency Power	WWTF-E11	Electrical Equipment	Process Building - Electrical Room P-103	The West side of the wall is missing an emergency light. This violates Code.	Provide a two-head emergency light towards the north end of the west wall.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 500	WWTF General Improv
WWTF	Electrical / Emergency Power	WWTF-E12	Electrical Equipment	Process Building - Electrical Room P-103	The flex conduit connection to the AC-2 Blower enclosure is very loose.	Tighten connection; this may require new locknuts	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E13	Electrical Equipment	Process Building - Electrical Room P-103	The VFD for the Aerator MA-1 is louder than expected. This may or may not be normal for this drive under these circumstances.	Compare the sound level of this drive to that of another Aerator. If it is significantly louder, check with the VFD manufacturer to determine if there may be a problem.	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ -	≤5
WWTF	Electrical / Emergency Power	WWTF-E14	Electrical Equipment	Process Building - Pump Room P-001	The conduit between the CFP-1 disconnect switch and motor is not fastened to the strut support.	Fasten the conduit to the strut support	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E15	Electrical Equipment	Process Building - Pump Room P-001	There are a number of field threads on conduits that are rusting.	Provide galvanizing coating on these rusted threads to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E16	Electrical Equipment	Process Building - Pump Room P-001	The floor anchors supporting the RAS pump disconnect switches are rusting.	Remove rust and coat with galvanizing coating to prevent further corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E17	Electrical Equipment	Process Building - Boiler Room P-002	There are a number of field threads on conduits that are rusting.	Provide galvanizing coating on these rusted threads to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E18	Electrical Equipment	Outdoors - Generator	The generator enclosure door does not properly close and cannot be locked.	Fix door.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
WWTF	Electrical / Emergency Power	WWTF-E19	Electrical Equipment	UV Disinfection - UV Room D-102	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E20	Electrical Equipment	Blower Building - UV Room D-102	The two plant water pump disconnect switches do not have sufficient electrical working space around them, as required by the NEC.	Do no work on these disconnect swiitches while they are live; turn off power at the source prior to opening them.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	WWTF General Improv
WWTF	Electrical / Emergency Power	WWTF-E21	Electrical Equipment	Outdoors - Various	The epoxy coating on many of the strut supports is pealing off.	Recoat	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 100	6-10
WWTF	Electrical / Emergency Power	WWTF-E22	Electrical Equipment	Polymer Room	A receptacle cover is missing.	Provide a "weatherproof-while-in-use" cover.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E23	Electrical Equipment	Polymer Building Basement	There are a number of field threads on conduits that are rusting.	Coat the rusted threads with galvanizing coating on the non-PVC coated conduit and with PVC coating (rated for the application) on PVC coated conduits to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E24	Electrical Equipment	Secondary Calrifiers	The SC-1 disconnect switch on the exerior platform does not have sufficient electrical working space around it (the black metal structure is in front of it), as required by the NEC.	Do no work on this disconnect switch while it is live; turn off power at the source prior to opening it.	≤5	Very High	4	Severe	4	Moderate	2	Minor offense	2	2.67	0.67	2.00	2.67	10.67	Important	$ -	WWTF General Improv
WWTF	Electrical / Emergency Power	WWTF-E25	Electrical Equipment	Secondary Calrifiers	The Clarifier No. 1 exhaust fan/light switch is not working.	Fix the switch	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 100	WWTF General Improv
WWTF	Electrical / Emergency Power	WWTF-AB3	Emergency Power	Administration Building	CAT 06 kW Emergency Generator	Replace in kind at end of service life	>10	Low	1	Low	1	Significant	3	Minor offense	2	0.67	1.00	2.00	2.00	2.00	Low Risk	$ 62,000	>10

Table A-2 Facilities Sorted by Asset ID

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
WWTF	HVAC / Plumbing	WWTF-AB4	Water Heater	Administration Building	Hot Water Boiler	Replace in kind at end of service life	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 25,000	>10
WWTF	Instrumentation & Controls	WWTF-AB10	Laboratory Equipment	Administration Building	Mettler AE 160 Analytical Balance Scale	Replace with comparable analytical balance	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 4,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB11	Laboratory Equipment	Administration Building	Ohaus Explorer Pro Balance Scale	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 700	6-10
WWTF	Instrumentation & Controls	WWTF-AB12	Laboratory Equipment	Administration Building	Precision Gravity Convection Oven	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB13	Laboratory Equipment	Administration Building	Quincy Lab Gravimetric Oven	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,400	6-10
WWTF	Instrumentation & Controls	WWTF-AB14	Laboratory Equipment	Administration Building	Welch Vacuum Pump	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB15	Laboratory Equipment	Administration Building	Westover Electron Microscope	Replace with similar at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-AB16	Laboratory Equipment	Administration Building	Thermo Scientific Magnetic Stir Plate	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 500	6-10
WWTF	Instrumentation & Controls	WWTF-AB17	Laboratory Equipment	Administration Building	Hach DR 2800 Spectrophotometer	Replace with Hach DR3900	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB18	Laboratory Equipment	Administration Building	Hach DRB 200 digestion block	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-AB19	Laboratory Equipment	Administration Building	Thermolyne muffle furnace	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 4,300	6-10
WWTF	Instrumentation & Controls	WWTF-AB20	Laboratory Equipment	Administration Building	Lab-Line Ambi Hi-Lo incubator	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB21	Laboratory Equipment	Administration Building	Kenmore lab refrigerator	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB22	Laboratory Equipment	Administration Building	Kenmore freezer	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,300	6-10
WWTF	Instrumentation & Controls	WWTF-AB23	Laboratory Equipment	Administration Building	GE Dishwasher	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB24	Laboratory Equipment	Administration Building	YSI 550A dissolved oxygen meter	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,400	6-10
WWTF	Instrumentation & Controls	WWTF-AB8	Laboratory Equipment	Administration Building	Thermo Scientific Orion 3 Star pH Meter	Replace Thermo Scientific Oriion Star A211 pH Meter & Probe	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB9	Laboratory Equipment	Administration Building	Hach Sension 3 pH meter	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,600	6-10
WWTF	Instrumentation & Controls	WWTF-IAE/AI-40A&B	SC200 Controller.	Oxidation Ditch	Dissolved Oxygen Sensor by Hach	Properly Store offline DO probe. Replace in kind at end of useful life. Replace both SC100 Controllers with one SC200 Controller.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 11,000	≤5
WWTF	Instrumentation & Controls	WWTF-IAE/AI-40C&D	SC200 Controller.	Oxidation Ditch	pH Sensor by Hach	Address warning / error messages in both probes (replace both salt bridges and calibrate). Properly store offline pH probe. Replace sensor in kind at end of useful life. Replace both SC100 Controllers with one SC200 Controller.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 8,000	≤5
WWTF	Instrumentation & Controls	WWTF-IAE/AIT-21A	Hausser	Influent Channel / Grit Tank .	Millipore Influent - pH Sensor by Endress-Hausser	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 1,900	6-10
WWTF	Instrumentation & Controls	WWTF-IAE/AIT-22A	Hausser	Influent Channel / Grit Tank .	Millipore Influent - ORP Sensor by Endress-Hausser	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-IFE/FIT-23A	HydroRanger2000	Influent Channel / Grit Tank .	Millipore Influent - Ultrasonic Flow Meter by Siemens, HydroRanger2000	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
WWTF	Instrumentation & Controls	WWTF-IFE-50A & FE-50B	Krohne	Process Building - Pump Roo	RAS & WAS Electromagnetic 8-inch Flow Meters (Qty 2) by Krohne	Replace in kind at end of service life.	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 5,500	6-10
WWTF	Instrumentation & Controls	WWTF-IFE-55A	Krohne	Process Building - Pump Roo	WAS Electromagnetic 4-inch Flow Meter by Krohne	Replace in kind at end of service life. Ensure calibrations are kept up to date.	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 4,100	6-10
WWTF	Instrumentation & Controls	WWTF-ILE/LIT-35A	Transducer	Septage Receiving	Level Pressure Transducer	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 1,800	6-10
WWTF	Instrumentation & Controls	WWTF-ILSHH-50A	Warning Alarm	Process Building - Pump Roo	Float Switch Flood Warning Alarm	Provide Backup Pump Room Flood Warning Alarm	≤5	High	3	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
WWTF	Process / Mechanical	WWTF-P112	rack	Septage Receiving	Manually raked bar rack	Replace at end of useful life / Install mechanically cleaned bar rack.	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 1,700	6-10
WWTF	Process / Mechanical	WWTF-P113	Edgechanical M	Sludge Holding and Dewateri	Sludge Holding Tanks No. 1 & No. 2	Repair cracked concrete on tank exterior	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 9,000	≤5
WWTF	Process / Mechanical	WWTF-P114	Qty 2)	Process Building - Pump Roo	Sump Pumps (Qty 2)	Replace in kind at end of useful life	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,100	≤5
WWTF	Process / Mechanical	WWTF-P115	DynaBLEND	Process Building - Dewaterin	Polymer Feed System by DynaBLEND	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 31,000	6-10
WWTF	Process / Mechanical	WWTF-P116	Piping	Plant & Well Water System	Plant Water System Piping in process building pump room	Further evaluate and reinforce DI to PVC pipe interface. Replace valves at end of useful life.	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 2,100	>10
WWTF	Process / Mechanical	WWTF-P117	Off station.	Process Building - Chemical S	Ferric Storage Area	Provide Wash-Off station within the spill containment area, or a clear unobstructed path to wash-off station.	≤5	Very High	4	Severe	4	Low	1	Major offense (1 time)	3	2.67	0.33	3.00	3.00	12.00	Important	$ 11,000	WWTF General Improv
WWTF	Process / Mechanical	WWTF-P118	Sanitaire	Post Aeration System	Post Aeration Tank & Fine Bubble Diffused Aeration System by Sanitaire	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 23,000	>10
WWTF	Process / Mechanical	WWTF-P119	EasyAir	UV Disinfection Building	Rotary Lobe Blowers by Roots-EasyAir	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 62,000	>10
WWTF	Process / Mechanical	WWTF-P120	NsationtechanicaleM	Plant & Well Water System	Plant Water Pressure Tank & Pumps in UV Disinfection Building	Remove condensation rust and repaint. Replace in kind at end of useful life	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 12,000	>10
WWTF	Process / Mechanical	WWTF-P121	Ind echanicaleM	Plant & Well Water System	Potable Water Well Pumping System	Replace in kind at end of useful life	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 7,000	>10
WWTF	Process / Mechanical	WWTF-P123	Valves	Sludge Holding and Dewateri	Centrifuge Feed Pump Discharge Line Check Valve	Install check valve on discharge line of centrifuge feed pumps.	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
WWTF	Process / Mechanical	WWTF-P.SEP-1	Wemco	Septage Receiving	Septage Transfer Pump by Wemco	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 36,000	6-10
WWTF	Process / Mechanical	WWTF-PALK-3	Useful life	Process Building - Chemical S	Magnesium Hydroxide Mechnical Mixer	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 3,800	>10
WWTF	Process / Mechanical	WWTF-PANM-1,2,3,4	EIMCO	Oxidation Ditch	Anaerobic Reactor Mixers (Qty 4) by EIMCO	Replace in kind at end of useful life / Replace with surface mixers	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 98,000	>10
WWTF	Process / Mechanical	WWTF-PAXM-1,2	EIMCO	Oxidation Ditch	Anoxic Reactor Mixers (Qty 2) by EIMCO	Replace in kind at end of useful life / Replace with surface mixers	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 49,000	>10
WWTF	Process / Mechanical	WWTF-PC-1	Useful life	Process Building - Dewaterin	Caked Sludge Screw Conveyor by Spirac	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 62,000	>10
WWTF	Process / Mechanical	WWTF-PCEN-1	Separator	Process Building - Dewaterin	Centrifuge by Westfalia Separator	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 410,000	>10
WWTF	Process / Mechanical	WWTF-PCFP-1 & CFP-2	Useful life	Sludge Holding and Dewateri	Centrifuge Feed Pumps (Qty 2) by Moyno in Process Building Pump Room	Install check valve on discharge side. Replace pump in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 103,000	>10
WWTF	Process / Mechanical	WWTF-PCM-1,2	mixer	ACTIFLO System	Coagulation tank mixer	Replace / maintain failed bearing. Replace mixer in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 110,000	6-10
WWTF	Process / Mechanical	WWTF-PGC-1	Classifier	Process Building - Grit Remo	Grit Classifier Structure	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 320,000	>10
WWTF	Process / Mechanical	WWTF-PGPW-1	Wheel	Influent Channel / Grit Tank .	Grit Paddle Wheel	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk		>10
WWTF	Process / Mechanical	WWTF-PGR-1 & GR-2	Useful life	Sludge Holding and Dewateri	Sludge Grinders (Qty 2) by Moyno in Process Building Pump Room	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 66,000	>10
WWTF	Process / Mechanical	WWTF-PGT-1	Pump	Process Building - Pump Roo	Grit Pump	Install hand guard around shaft. Consider providing a backup grit pump. Replace in kind at end of useful life.	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 46,000	≤5
WWTF	Process / Mechanical	WWTF-PHC-1,2,3,4	Mechanism	ACTIFLO System	Hydrocyclone (Qty 4)	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 15,000	6-10
WWTF	Process / Mechanical	WWTF-PIM-1,2	mixer	ACTIFLO System	Injection tank mixer	Touch-up paint. Address mixer vibration and humming sound. Replace mixer in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 110,000	6-10
WWTF	Process / Mechanical	WWTF-PMA-1, 2,3,4	EIMCO	Oxidation Ditch	Mechanical Surface Aerators by EIMCO	Repaint. Address oil site cracks and any oil leaks. Replace in kind at end of useful life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 488,000	>10
WWTF	Process / Mechanical	WWTF-PMAG-1,2	Injection point.	Process Building - Chemical S	Magnesium Hydroxide Chemical Feed Pumps (Qty 2) by Masterflex	Replace in kind at end of useful life. Repair and clean MAG leak at RAS header injection point.	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 9,000	6-10
WWTF	Process / Mechanical	WWTF-PMM-1,2	Mixer	ACTIFLO System	Maturation Mixer	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 169,000	>10
WWTF	Process / Mechanical	WWTF-PMRP-1,2,3,4,5	Pumps	ACTIFLO System	Microsand Recirculation Pumps (Qty 5) by McLanahan	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 117,000	>10
WWTF	Process / Mechanical	WWTF-PPAC-1,2	Useful life	Process Building - Chemical S	Ferric Chemical Feed Pumps (Qty 2) by Masterflex	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 9,000	6-10

Table A-2 Facilities Sorted by Asset ID

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
WWTF	Process / Mechanical	WWTF-PRS-1,2,3	Hidrostal	Process Building - Pump Roo	Return Sludge Pumps (Qty 3) by Wemco-Hidrostal	Touch up chipped paint on discharge piping. Replace in kind at end of service life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 101,000	>10
WWTF	Process / Mechanical	WWTF-PSC-1	Wemco	Secondary Calrifiers	Chop-Flow Scum Pump by Wemco	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 36,000	>10
WWTF	Process / Mechanical	WWTF-PSCD-1 & SCD-2	nt Drives. Replace Intechanical	Secondary Calrifiers	50 ft Diameter Secondary Clarifier System by EIMCO	Clean and repaint drives. Replace in kind at end of useful life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 412,000	>10
WWTF	Process / Mechanical	WWTF-PSTB-1 & STB-2	EasyAir	Sludge Holding and Dewateri	Sludge Tank Blowers by Roots-EasyAir	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 98,000	>10
WWTF	Process / Mechanical	WWTF-PSTS-1,2	Mechanism	ACTIFLO System	Settling Tank Scraper Mechanism	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 66,000	6-10
WWTF	Process / Mechanical	/WTF-PUV-1A,B & UV-2A,	Useful life	UV Disinfection Building	UV3000Plus Ultraviolet Disinfection System by Trojan	Replace in kind at end of useful life	6-10	Medium	2	Moderate	2	Severe	4	Multiple offenses	4	1.33	1.33	4.00	4.00	8.00	Crit-Mon	$ 884,000	6-10
WWTF	Process / Mechanical	WWTF-PWS-1 & WS-2	Hidrostal	Process Building - Pump Roo	Waste Sludge Pumps (Qty 2) by Wemco-Hidrostal	Replace in kind at end of service life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 68,000	>10
WWTF	Structural/Architectural	WWTF-S501	Corrosion	Influent Channel / Grit Tank .	Influent Channel Concrete - Spalling , corrosion, deterioration	Repair damaged concrete and apply protective epoxy coating.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
WWTF	Structural/Architectural	WWTF-S502	afflorescence	Influent Channel / Grit Tank .	Grit Chamber Tank Concrete Exterior - Cracking and efflorescence	Repairing cracked concrete and water leaks in concrete.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,800	≤5
WWTF	Structural/Architectural	WWTF-AB1	Building	Administration Building	Building Exterior Control Joints Missing Sealant	Apply Sealant to Repair Control Joints	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 300	WWTF Adminstration I
WWTF	Structural/Architectural	WWTF-AB2	Building	Administration Building	Asphalt Shingle Roof is Aged and Worn	Replace roof in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 38,000	WWTF Adminstration I
WWTF	Structural/Architectural	WWTF-AB7	Building	Administration Building	Lack of Storage Space	Construct a new 2-bay garage	≤5	Very High	4	low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	4.00	Important	$ 350,000	WWTF Adminstration I

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
Sewer Renewal Project 1																																			
P-119	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	11.3	114.2	4	2	4	2	4	4			UNK			1	50	-9	4.00	4.00	4.00	2.86	4.00	2.67	0.95	4.00	4.00	16.00	High Risk	$ 12,000	Sewer Renewal 1
P-323	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	16.6	335.0	4	2	4	3	4	1			UNK			1	50	-9	4.00	4.00	2.29	3.43	4.00	1.52	1.14	4.00	4.00	16.00	High Risk	$ 36,000	Sewer Renewal 1
P-325	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	13.8	293.2	4	2	4	3	4	1			UNK			1	50	-9	4.00	4.00	2.29	3.43	4.00	1.52	1.14	4.00	4.00	16.00	High Risk	$ 32,000	Sewer Renewal 1
P-326	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	16.6	356.0	4	2	4	3	4	3			UNK			1	50	-9	4.00	4.00	3.43	3.43	4.00	2.29	1.14	4.00	4.00	16.00	High Risk	$ 38,000	Sewer Renewal 1
P-345	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.4	208.2	4	2	4	1	4	3	5400-4200	9/23/14	UNK			1	50	-9	4.00	4.00	3.43	2.29	4.00	2.29	0.76	4.00	4.00	16.00	High Risk	$ 22,000	Sewer Renewal 1
P-348	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	8.1	209.5	4	2	4	2	4	3			UNK			1	50	-9	4.00	4.00	3.43	2.86	4.00	2.29	0.95	4.00	4.00	16.00	High Risk	$ 23,000	Sewer Renewal 1
P-276	COLLECTOR	UNKNOWN	GRAVITY	18	1951	18'' 1951	10.9	157.9	4	2	4	2	4	1			UNK			1	75	10	3.60	3.60	2.29	2.86	4.00	1.52	0.95	4.00	4.00	14.40	Crit-Mon	$ 17,000	Sewer Renewal 1
P-324	COLLECTOR	UNKNOWN	GRAVITY	18	1984	18'' 1984	10.9	44.8	4	2	4	2	4	1			UNK			1	75	43	2.28	2.28	2.29	2.86	4.00	1.52	0.95	4.00	4.00	9.12	Crit-Mon	$ 4,800	Sewer Renewal 1
P-346	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	8.1	283.1	4	2	4	2	4	3			5.4	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.86	4.00	2.29	0.95	4.00	4.00	4.48	Crit-Mon	$ 31,000	Sewer Renewal 1
P-347	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	11.3	223.0	4	2	4	2	4	3			UNK	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.86	4.00	2.29	0.95	4.00	4.00	4.48	Crit-Mon	$ 24,000	Sewer Renewal 1
																																	Project Total	**$ 239,800**	
Sewer Renewal Project 2																																			
P-124	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	3.5	143.9	1	2	2	1	3	4			UNK			1	75	-10	4.00	4.00	3.00	1.29	2.80	2.00	0.43	2.80	2.80	11.20	Important	**$ 6,900**	Sewer Renewal 2
P-198	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.6	92.6	2	2	2	1	1	4			UNK			1	75	-10	4.00	4.00	3.14	1.43	1.20	2.10	0.48	1.20	2.10	8.38	Important	**$ 4,400**	Sewer Renewal 2
P-134	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.4	69.9	1	2	2	1	2	4			UNK			1	75	-10	4.00	4.00	3.00	1.29	2.00	2.00	0.43	2.00	2.00	8.00	Important	**$ 3,400**	Sewer Renewal 2
P-187	COLLECTOR	UNKNOWN	GRAVITY	8	1931	8'' 1931	5.6	144.9	2	2	1	1	1	4			UNK			1	75	-10	4.00	4.00	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.62	Important	**$ 7,000**	Sewer Renewal 2
P-306	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	10.9	398.2	1	2	3	2	4	1			UNK			1	50	-9	4.00	4.00	1.57	2.14	3.80	1.05	0.71	3.80	3.80	15.20	Important	**$ 43,000**	Sewer Renewal 2
P-307	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.0	148.7	1	2	3	2	4	3			UNK			1	50	-9	4.00	4.00	2.71	2.14	3.80	1.81	0.71	3.80	3.80	15.20	Important	**$ 16,000**	Sewer Renewal 2
P-308	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.1	266.9	1	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.71	1.57	3.80	1.81	0.52	3.80	3.80	15.20	Important	**$ 29,000**	Sewer Renewal 2
P-309	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.1	119.2	2	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.86	1.71	3.80	1.90	0.57	3.80	3.80	15.20	Important	**$ 13,000**	Sewer Renewal 2
P-310	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	4.8	162.2	1	2	3	1	4	3			UNK			1	50	-9	4.00	4.00	2.71	1.57	3.80	1.81	0.52	3.80	3.80	15.20	Important	**$ 18,000**	Sewer Renewal 2
P-169	COLLECTOR	ACP	GRAVITY	8	1964	8'' 1964	11.8	344.7	2	2	2	2	2	4			UNK			1	50	-2	4.00	4.00	3.14	2.00	2.00	2.10	0.67	2.00	2.10	8.38	Important	**$ 17,000**	Sewer Renewal 2
																																	Project Total	**$ 157,700**	
Sewer Renewal Project 3																																			
P-235	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.2	337.8	4	2	4	2	1	1			UNK			1	50	-9	4.00	4.00	2.29	2.86	1.60	1.52	0.95	1.60	1.60	6.40	Important	**$ 36,000**	Sewer Renewal 3
P-233	COLLECTOR	ACP	GRAVITY	8	1957	8'' 1957	Unk	284.9	4	2	1	1	1	1			UNK			1	50	-9	4.00	4.00	1.43	1.43	1.00	0.95	0.48	1.00	1.00	4.00	Important	**$ 14,000**	Sewer Renewal 3
P-054	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.5	324.9	2	2	1	1	1	1	0000-0000	11/25/2011	1.0			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 19,000**	Sewer Renewal 3
P-069	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.0	148.2	2	2	1	1	1	1	1100-0000	11/25/2011	1.1			1.06	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 9,000**	Sewer Renewal 3
P-070	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	4.5	166.1	2	2	1	1	1	1			UNK			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 10,000**	Sewer Renewal 3
P-395	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.5	255.7	2	2	1	1	1	1	2100-0000	11/25/2011	2.1			1.66	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 15,000**	Sewer Renewal 3
P-396	COLLECTOR	VCP	GRAVITY	10	1934	10'' VCP 1934	5.0	149.9	2	2	1	1	1	1			UNK			1	75	-7	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 9,000**	Sewer Renewal 3
P-180	COLLECTOR	VCP	GRAVITY	6	1939	6'' VCP 1939	4.8	303.7	4	2	1	1	3	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	2.60	0.95	0.48	2.60	2.60	10.40	Important	**$ 11,000**	Sewer Renewal 3
P-217	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.4	238.9	4	2	2	1	2	1	3222-0000	11/21/2011	3.2			2.32	75	-2	4.00	4.00	1.71	1.71	2.00	1.14	0.57	2.00	2.00	8.00	Important	**$ 17,000**	Sewer Renewal 3
P-208	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.9	144.6	2	2	2	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	**$ 10,000**	Sewer Renewal 3
P-212	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.8	171.7	2	2	2	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	**$ 12,000**	Sewer Renewal 3
P-213	COLLECTOR	VCP	GRAVITY	12	1939	12'' VCP 1939	5.7	266.7	2	2	2	1	1	1	0000-413A	11/21/2011	1.0			1	75	-2	4.00	4.00	1.43	1.43	1.20	0.95	0.48	1.20	1.20	4.80	Important	**$ 19,000**	Sewer Renewal 3
P-003	COLLECTOR	VCP	GRAVITY	8	1939	8'' VCP 1939	5.7	262.5	4	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.43	1.43	1.00	0.95	0.48	1.00	1.00	4.00	Important	**$ 13,000**	Sewer Renewal 3
P-053	COLLECTOR	VCP	GRAVITY	8	1939	8'' VCP 1939	5.5	245.2	2	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 12,000**	Sewer Renewal 3
P-062	COLLECTOR	VCP	GRAVITY	6	1939	6'' VCP 1939	5.1	213.1	2	2	1	1	1	1			UNK			1	75	-2	4.00	4.00	1.14	1.14	1.00	0.76	0.38	1.00	1.00	4.00	Important	**$ 8,000**	Sewer Renewal 3
																																	Project Total	**$ 214,000**	
Low Risk Assets - Remaining Service Life 5 years or less																																			
P-228	COLLECTOR	UNKNOWN	GRAVITY	8	1944	8'' 1944	7.7	121.2	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 5,800	≤5
P-230	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	37.5	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 1,800	≤5
P-231	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	177.8	2	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.39	Low Risk	$ 9,000	≤5
P-229	COLLECTOR	VCP	GRAVITY	8	1944	8'' 1944	7.7	165.7	1	2	1	1	1	4			UNK			1	75	3	3.88	3.88	2.71	1.00	1.00	1.81	0.33	1.00	1.81	7.02	Low Risk	$ 8,000	≤5
P-043	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.0	156.7	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 8,000	≤5
P-048	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.5	186.9	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 9,000	≤5
P-398	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.0	92.3	2	2	1	1	4	1			UNK			1	50	4	3.76	3.76	1.14	1.14	3.40	0.76	0.38	3.40	3.40	12.78	Low Risk	$ 4,400	≤5
P-426	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	6.4	217.7	4	2	4	1	3	3			UNK			1	50	4	3.76	3.76	3.43	2.29	3.20	2.29	0.76	3.20	3.20	12.03	Low Risk	$ 24,000	≤5
P-050	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.2	138.9	1	2	2	1	3	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.80	0.86	0.43	2.80	2.80	10.53	Low Risk	$ 10,000	≤5
P-051	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.2	217.4	1	2	2	1	3	1	0000-4100	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.80	0.86	0.43	2.80	2.80	10.53	Low Risk	$ 16,000	≤5
P-021	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.5	195.9	2	2	1	1	3	1			UNK			1	50	4	3.76	3.76	1.14	1.14	2.60	0.76	0.38	2.60	2.60	9.78	Low Risk	$ 9,000	≤5
P-046	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.4	173.2	1	2	2	1	2	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 12,000	≤5
P-049	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.3	138.2	1	2	2	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 10,000	≤5
P-052	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.8	144.5	1	2	2	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 10,000	≤5
P-078	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	120.1	1	2	2	1	2	1			UNK			1	50	4	3.76	3.76	1.29	1.29	2.00	0.86	0.43	2.00	2.00	7.52	Low Risk	$ 5,800	≤5
P-026	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	7.5	173.4	2	2	1	1	2	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 8,000	≤5
P-027	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.8	50.8	2	2	1	1	2	1	0000-0000	04/29/2015	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 2,400	≤5
P-028	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	6.0	120.8	2	2	1	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 5,800	≤5
P-077	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	162.1	2	2	1	1	2	1	0000-0000	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 8,000	≤5
P-397	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.5	103.8	2	2	1	1	2	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.77	Low Risk	$ 5,000	≤5
P-072	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.6	181.0	4	2	2	1	1	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.71	1.71	1.20	1.14	0.57	1.20	1.20	4.51	Low Risk	$ 13,000	≤5
P-417	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	4.5	162.7	1	2	2	1	1	1	0000-0000	11/18/2011	1.0			1	50	4	3.76	3.76	1.29	1.29	1.20	0.86	0.43	1.20	1.20	4.51	Low Risk	$ 12,000	≤5
P-025	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	4.5	243.0	2	2	1	1	1	1			UNK			1	50	4	3.76	3.76	1.14	1.14	1.00	0.76	0.38	1.00	1.00	3.76	Low Risk	$ 12,000	≤5
P-029	COLLECTOR	ACP	GRAVITY	8	1970	8'' ACP 1970	5.3	200.1	2	2	1	1	1	1	0000-4100	11/17/2011	1.0			1	50	4	3.76	3.76	1.14	1.14	1.00	0.76	0.38	1.00	1.00	3.76	Low Risk	$ 10,000	≤5
P-127	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	4.2	309.8	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 15,000	≤5
P-161	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	4.5	55.4	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 2,700	≤5
P-162	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	5.0	355.4	2	2	2	1	1	4			UNK			1	75	5	3.80	3.80	3.14	1.43	1.20	2.10	0.48	1.20	2.10	7.96	Low Risk	$ 17,000	≤5
P-128	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	4.0	286.2	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 14,000	≤5
P-138	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	5.2	317.3	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 15,000	≤5
P-139	COLLECTOR	UNKNOWN	GRAVITY	8	1946	8'' 1946	4.9	205.8	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 10,000	≤5
P-140	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	4.0	293.0	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 14,000	≤5
P-156	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	5.3	247.3	2	2	1	1	2	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.80	1.90	0.38	1.80	1.90	7.24	Low Risk	$ 12,000	≤5
P-159	COLLECTOR	VCP	GRAVITY	8	1946	8'' 1946	5.0	393.3	2	2	1	1	1	4			UNK			1	75	5	3.80	3.80	2.86	1.14	1.00	1.90	0.38	1.00	1.90	7.24	Low Risk	$ 19,000	≤5
																																	Project Total	**$ 337,700**	
Low Risk Assets - Remaining Service Life >10 years																																			
P-191	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.5	141.4	4	2	2	1	4	1			UNK			1	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 6,800	>10
P-209	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.4	111.4	4	2	2	1	4	1			UNK			1	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 5,300	>10
P-216	COLLECTOR	VCP	GRAVITY	10	1953	10'' VCP 1953	5.4	349.2	4	2	2	1	4	1	2200-2100	11/30/2011	2.2			1.72	75	12	3.52	3.52	1.71	1.71	3.60	1.14	0.57	3.60	3.60	12.67	Low Risk	$ 21,000	>10
P-214	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.4	292.0	4	2	1	1	4	1			UNK			1	75	12	3.52	3.52	1.43	1.43	3.40	0.95	0.48	3.40	3.40	11.97	Low Risk	$ 11,000	>10
P-195	COLLECTOR	VCP	GRAVITY	8	1953	8'' VCP 1953	5.5	187.0	4	2	2	1	3	1			UNK			1	75	12	3.52	3.52	1.71	1.71	2.80	1.14	0.57	2.80	2.80	9.86	Low Risk	$ 9,000	>10
P-215	COLLECTOR	VCP	GRAVITY	10	1953	10'' VCP 1953	9.1	235.4	4	2	2	2	3	1			UNK			1	75	12	3.52	3.52	1.71	2.29	2.80	1.14	0.76	2.80	2.80	9.86	Low Risk	$ 14,000	>10
P-210	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.9	133.3	1	2	1	1	2	1			UNK			1	75	12	3.52	3.52	1.00	1.00	1.80	0.67	0.33	1.80	1.80	6.34	Low Risk	$ 4,800	>10
P-211	COLLECTOR	VCP	GRAVITY	6	1953	6'' VCP 1953	5.9	185.3	1	2	1	1	2	1			UNK			1	75	12	3.52	3.52	1.00	1.00	1.80	0.67	0.33	1.80	1.80	6.34	Low Risk	$ 6,700	>10

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-279	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.8	46.7	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 3,400	>10
P-286	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	63.9	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 4,600	>10
P-287	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	7.3	135.0	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 10,000	>10
P-288	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	10.0	160.9	4	2	3	2	4	3			UNK			1	75	16	3.36	3.36	3.14	2.57	3.80	2.10	0.86	3.80	3.80	12.77	Low Risk	$ 12,000	>10
P-291	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	83.3	2	2	3	1	4	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.80	1.90	0.57	3.80	3.80	12.77	Low Risk	$ 6,000	>10
P-185	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	7.3	152.4	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 11,000	>10
P-192	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	6.2	512.1	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 37,000	>10
P-220	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	5.3	101.5	4	2	3	1	3	1			UNK			1	75	16	3.36	3.36	2.00	2.00	3.00	1.33	0.67	3.00	3.00	10.08	Low Risk	$ 7,300	>10
P-283	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	159.1	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 11,000	>10
P-297	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.8	275.3	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 20,000	>10
P-298	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	4.7	46.3	2	2	3	1	3	3			UNK			1	75	16	3.36	3.36	2.86	1.71	3.00	1.90	0.57	3.00	3.00	10.08	Low Risk	$ 3,300	>10
P-219	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	5.3	16.3	4	2	3	1	2	1			UNK			1	75	16	3.36	3.36	2.00	2.00	2.20	1.33	0.67	2.20	2.20	7.39	Low Risk	$ 1,200	>10
P-234	COLLECTOR	VCP	GRAVITY	12	1957	12'' VCP 1957	9.2	247.2	4	2	3	2	2	1			UNK			1	75	16	3.36	3.36	2.00	2.57	2.20	1.33	0.86	2.20	2.20	7.39	Low Risk	$ 18,000	>10
P-218	COLLECTOR	VCP	GRAVITY	10	1957	10'' VCP 1957	7.0	416.0	4	2	2	1	2	1			UNK			1	75	16	3.36	3.36	1.71	1.71	2.00	1.14	0.57	2.00	2.00	6.72	Low Risk	$ 25,000	>10
P-186	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	150.2	2	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.05	Low Risk	$ 7,200	>10
P-221	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	25.7	2	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.14	1.14	1.80	0.76	0.38	1.80	1.80	6.05	Low Risk	$ 1,200	>10
P-222	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	5.3	76.0	4	2	1	1	2	1			UNK			1	75	16	3.36	3.36	1.43	1.43	1.80	0.95	0.48	1.80	1.80	6.05	Low Risk	$ 3,600	>10
P-232	COLLECTOR	UNKNOWN	GRAVITY	18	1957	18'' 1957	4.9	205.2	4	2	4	1	1	1			UNK			1	75	16	3.36	3.36	2.29	2.29	1.60	1.52	0.76	1.60	1.60	5.38	Low Risk	$ 22,000	>10
P-177	COLLECTOR	UNKNOWN	GRAVITY	8	1957	8'' 1957	4.9	571.6	4	2	1	1	1	1			UNK			1	75	16	3.36	3.36	1.43	1.43	1.00	0.95	0.48	1.00	1.00	3.36	Low Risk	$ 27,000	>10
P-239	COLLECTOR	ACP	GRAVITY	6	1984	6'' ACP 1984	7.7	139.5	2	2	1	1	1	1			UNK			1	50	18	2.92	2.92	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.92	Low Risk	$ 5,000	>10
P-425	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	Unk	7.1	1	2	4	1	4	1			UNK			1	75	23	3.08	3.08	1.86	1.86	4.00	1.24	0.62	4.00	4.00	12.32	Crit-Mon	$ 500	>10
P-157	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.9	284.1	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 20,000	>10
P-164	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.9	383.8	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 28,000	>10
P-172	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.4	221.5	1	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.29	1.57	3.80	2.19	0.52	3.80	3.80	11.70	Low Risk	$ 16,000	>10
P-174	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.3	195.2	2	2	3	2	4	4			UNK			1	75	23	3.08	3.08	3.43	2.29	3.80	2.29	0.76	3.80	3.80	11.70	Low Risk	$ 14,000	>10
P-175	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	5.9	189.3	2	2	3	1	4	4			UNK			1	75	23	3.08	3.08	3.43	1.71	3.80	2.29	0.57	3.80	3.80	11.70	Low Risk	$ 14,000	>10
P-243	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.2	203.5	1	2	3	2	4	1	0000-0000	11/22/2011	1.0			1	75	23	3.08	3.08	1.57	2.14	3.80	1.05	0.71	3.80	3.80	11.70	Low Risk	$ 15,000	>10
P-244	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	6.0	90.6	2	2	3	1	4	1	0000-0000	11/30/2011	1.0			1	75	23	3.08	3.08	1.71	1.71	3.80	1.14	0.57	3.80	3.80	11.70	Low Risk	$ 6,500	>10
P-252	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	5.9	109.7	1	2	3	1	4	1			UNK			1	75	23	3.08	3.08	1.57	1.57	3.80	1.05	0.52	3.80	3.80	11.70	Low Risk	$ 8,000	>10
P-253	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.3	122.7	2	2	3	2	4	1			UNK			1	75	23	3.08	3.08	1.71	2.29	3.80	1.14	0.76	3.80	3.80	11.70	Low Risk	$ 9,000	>10
P-254	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	8.3	118.1	2	2	3	2	4	1			UNK			1	75	23	3.08	3.08	1.71	2.29	3.80	1.14	0.76	3.80	3.80	11.70	Low Risk	$ 9,000	>10
P-282	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	8.5	324.9	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 29,000	>10
P-289	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	9.2	66.7	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 6,000	>10
P-370	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.9	102.9	2	2	3	1	4	3			UNK			1	75	23	3.08	3.08	2.86	1.71	3.80	1.90	0.57	3.80	3.80	11.70	Low Risk	$ 4,900	>10
P-415	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	10.0	66.5	4	2	3	2	4	3			UNK			1	75	23	3.08	3.08	3.14	2.57	3.80	2.10	0.86	3.80	3.80	11.70	Low Risk	$ 6,000	>10
P-158	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.0	291.9	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 14,000	>10
P-163	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.8	254.0	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 15,000	>10
P-166	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.1	260.2	1	2	2	1	4	4			UNK			1	75	23	3.08	3.08	3.00	1.29	3.60	2.00	0.43	3.60	3.60	11.09	Low Risk	$ 12,000	>10
P-356	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	198.9	2	2	1	1	4	3			UNK			1	75	23	3.08	3.08	2.29	1.14	3.40	1.52	0.38	3.40	3.40	10.47	Low Risk	$ 10,000	>10
P-413	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	54.7	1	2	1	1	4	3			UNK			1	75	23	3.08	3.08	2.14	1.00	3.40	1.43	0.33	3.40	3.40	10.47	Low Risk	$ 2,600	>10
P-120	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	10.7	297.8	4	2	3	2	3	4			UNK			1	75	23	3.08	3.08	3.71	2.57	3.00	2.48	0.86	3.00	3.00	9.24	Low Risk	$ 27,000	>10
P-173	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	10.7	225.0	4	2	3	2	3	4			UNK			1	75	23	3.08	3.08	3.71	2.57	3.00	2.48	0.86	3.00	3.00	9.24	Low Risk	$ 16,000	>10
P-258	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	8.3	90.7	2	2	3	2	3	1			UNK			1	75	23	3.08	3.08	1.71	2.29	3.00	1.14	0.76	3.00	3.00	9.24	Low Risk	$ 5,400	>10
P-277	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	7.7	266.4	4	2	3	1	3	4			UNK			1	75	23	3.08	3.08	3.71	2.00	3.00	2.48	0.67	3.00	3.00	9.24	Low Risk	$ 24,000	>10
P-296	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	7.7	373.7	4	2	3	1	3	3			UNK			1	75	23	3.08	3.08	3.14	2.00	3.00	2.10	0.67	3.00	3.00	9.24	Low Risk	$ 34,000	>10
P-146	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	Unk	37.6	2	2	2	1	3	4			UNK			1	75	23	3.08	3.08	3.14	1.43	2.80	2.10	0.48	2.80	2.80	8.62	Low Risk	$ 1,800	>10
P-147	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	8.0	199.1	2	2	2	2	3	4			UNK			1	75	23	3.08	3.08	3.14	2.00	2.80	2.10	0.67	2.80	2.80	8.62	Low Risk	$ 10,000	>10
P-167	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	7.1	295.6	1	2	2	1	3	4			UNK			1	75	23	3.08	3.08	3.00	1.29	2.80	2.00	0.43	2.80	2.80	8.62	Low Risk	$ 14,000	>10
P-168	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	9.5	246.5	1	2	2	2	3	4			UNK			1	75	23	3.08	3.08	3.00	1.86	2.80	2.00	0.62	2.80	2.80	8.62	Low Risk	$ 12,000	>10
P-182	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.5	150.2	2	2	2	1	3	1	0000-0000	11/29/2011	1.0			1	75	23	3.08	3.08	1.43	1.43	2.80	0.95	0.48	2.80	2.80	8.62	Low Risk	$ 7,200	>10
P-255	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	8.0	223.2	2	2	2	2	3	1			UNK			1	75	23	3.08	3.08	1.43	2.00	2.80	0.95	0.67	2.80	2.80	8.62	Low Risk	$ 11,000	>10
P-278	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.7	323.8	4	2	2	1	3	3			UNK			1	75	23	3.08	3.08	2.86	1.71	2.80	1.90	0.57	2.80	2.80	8.62	Low Risk	$ 16,000	>10
P-060	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.6	22.7	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 1,100	>10
P-063	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.6	316.9	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 15,000	>10
P-064	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.6	21.4	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 1,300	>10
P-065	COLLECTOR	VCP	GRAVITY	8	1964	8'' 1964	6.6	62.9	4	2	1	1	3	1			UNK			1	75	23	3.08	3.08	1.43	1.43	2.60	0.95	0.48	2.60	2.60	8.01	Low Risk	$ 3,000	>10
P-285	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.0	46.2	4	2	1	2	3	3			UNK			1	75	23	3.08	3.08	2.57	2.00	2.60	1.71	0.67	2.60	2.60	8.01	Low Risk	$ 2,200	>10
P-257	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.6	216.2	2	2	3	1	2	1			UNK			1	75	23	3.08	3.08	1.71	1.71	2.20	1.14	0.57	2.20	2.20	6.78	Low Risk	$ 10,000	>10
P-160	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.9	469.6	2	2	2	1	2	4			UNK			1	75	23	3.08	3.08	3.14	1.43	2.00	2.10	0.48	2.00	2.10	6.45	Low Risk	$ 23,000	>10
P-008	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.6	380.5	4	2	2	1	2	1			UNK			1	75	23	3.08	3.08	1.71	1.71	2.00	1.14	0.57	2.00	2.00	6.16	Low Risk	$ 18,000	>10
P-170	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	286.5	2	2	1	2	1	4			UNK			1	75	23	3.08	3.08	2.86	1.71	1.00	1.90	0.57	1.00	1.90	5.87	Low Risk	$ 14,000	>10
P-171	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	10.4	288.8	2	2	1	2	1	4			UNK			1	75	23	3.08	3.08	2.86	1.71	1.00	1.90	0.57	1.00	1.90	5.87	Low Risk	$ 14,000	>10
P-055	COLLECTOR	VCP	GRAVITY	10	1964	10'' VCP 1964	6.0	249.0	4	2	1	1	2	1			UNK			1	75	23	3.08	3.08	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.54	Low Risk	$ 15,000	>10
P-242	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	7.6	205.8	2	2	1	1	2	1	0000-2100	11/29/2011	1.0			1	75	23	3.08	3.08	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.54	Low Risk	$ 10,000	>10
P-353	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	365.9	4	2	1	2	2	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.80	1.71	0.67	1.80	1.80	5.54	Low Risk	$ 18,000	>10
P-368	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	308.8	2	2	1	1	2	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.80	1.52	0.38	1.80	1.80	5.54	Low Risk	$ 15,000	>10
P-369	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	6.0	198.2	2	2	1	1	2	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.80	1.52	0.38	1.80	1.80	5.54	Low Risk	$ 10,000	>10
P-315	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.5	187.0	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 9,000	>10
P-316	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.5	108.6	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 5,200	>10
P-317	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.7	96.5	2	2	2	1	1	3			UNK			1	75	23	3.08	3.08	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.28	Low Risk	$ 4,600	>10
P-354	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	354.6	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 17,000	>10
P-355	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	103.6	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 5,000	>10
P-414	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	10.7	95.7	4	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.57	2.00	1.00	1.71	0.67	1.00	1.71	5.28	Low Risk	$ 4,600	>10
P-312	COLLECTOR	UNKNOWN	GRAVITY	4	1964	4'' 1964	3.1	311.2	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 7,500	>10
P-313	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	5.7	135.7	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,500	>10
P-314	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	5.7	136.0	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,500	>10
P-318	COLLECTOR	UNKNOWN	GRAVITY	4	1964	4'' 1964	3.1	286.5	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 6,900	>10
P-319	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	5.0	231.9	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 11,000	>10
P-320	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	4.1	230.7	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 11,000	>10
P-321	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	6.9	166.1	2	2	1	1	1	3			UNK			1	75	23	3.08	3.08	2.29	1.14	1.00	1.52	0.38	1.00	1.52	4.69	Low Risk	$ 8,000	>10
P-322	COLLECTOR	VCP	GRAVITY	8	1964	8'' VCP 1964	8.7	123.7	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 5,900	>10
P-357	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	299.5	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 14,000	>10
P-358	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	402.9	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 19,000	>10
P-371	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	380.4	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 18,000	>10
P-412	COLLECTOR	UNKNOWN	GRAVITY	8	1964	8'' 1964	11.8	324.3	2	2	1	2	1	3			UNK			1	75	23	3.08	3.08	2.29	1.71	1.00	1.52	0.57	1.00	1.52	4.69	Low Risk	$ 16,000	>10
P-268	COLLECTOR

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-419	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	383.7	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 18,000	>10
P-420	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	143.3	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 6,900	>10
P-421	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	296.5	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 14,000	>10
P-422	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	190.5	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 9,000	>10
P-423	COLLECTOR	UNKNOWN	GRAVITY	unk	unk		6.3	337.1	1	2	1	1	1	1			UNK			1	75	25	3.00	3.00	1.00	1.00	1.00	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 16,000	>10
P-450	UNKNOWN	UNKNOWN	UNKNOWN	unk	unk		Unk	696.5	1	0	4	1	4	1			UNK			1	75	25	3.00	3.00	1.86	1.86	4.00	1.24	0.62	4.00	4.00	12.00	Crit-Mon	$ 107,000	>10
P-126	COLLECTOR	UNKNOWN	GRAVITY	8	1968	8" 1968	4.2	176.6	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 8,000	>10
P-148	COLLECTOR	VCP	GRAVITY	8	1968	8" 1968	4.5	184.1	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 9,000	>10
P-151	COLLECTOR	VCP	GRAVITY	8	1968	8" 1968	4.9	289.0	2	2	2	1	1	4			UNK			1	75	27	2.92	2.92	3.14	1.43	1.20	2.10	0.48	1.20	2.10	6.12	Low Risk	$ 14,000	>10
P-149	COLLECTOR	VCP	GRAVITY	8	1968	8" 1968	5.9	209.5	2	2	1	1	1	4			UNK			1	75	27	2.92	2.92	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.56	Low Risk	$ 10,000	>10
P-150	COLLECTOR	VCP	GRAVITY	8	1968	8" 1968	5.6	281.6	2	2	1	1	1	4			UNK			1	75	27	2.92	2.92	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.56	Low Risk	$ 14,000	>10
P-451	COLLECTOR	VCP	GRAVITY	8	1968	8" VCP 1968	7.1	241.5	2	2	1	1	2	1	0000-0000	11/29/2011	1.0			1	75	27	2.92	2.92	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.26	Low Risk	$ 12,000	>10
P-366	COLLECTOR	VCP	GRAVITY	8	1968	8" 1968	5.2	66.1	2	2	2	1	1	3			UNK			1	75	27	2.92	2.92	2.57	1.43	1.20	1.71	0.48	1.20	1.71	5.01	Low Risk	$ 3,200	>10
P-248	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.4	244.4	1	2	3	2	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.57	2.14	3.80	1.05	0.71	3.80	3.80	10.79	Low Risk	$ 18,000	>10
P-009	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.5	288.5	4	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	3.60	1.14	0.76	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-009	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.5	288.5	4	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	3.60	1.14	0.76	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-011	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	8.3	298.2	1	2	2	2	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-012	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	275.7	1	2	2	1	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 20,000	>10
P-013	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	8.7	286.8	1	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-014	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.9	225.0	1	2	2	1	4	1	0000-2H00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 16,000	>10
P-015	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	313.7	1	2	2	1	4	1	0000-2K00	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 23,000	>10
P-033	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.5	267.9	1	2	2	2	4	1	0000-0000	11/28/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 19,000	>10
P-089	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	5.5	210.2	1	2	2	1	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 15,000	>10
P-090	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	6.3	195.3	1	2	2	1	4	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	3.60	0.86	0.43	3.60	3.60	10.22	Low Risk	$ 14,000	>10
P-091	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.0	179.8	2	2	2	1	4	1	2100-2100	11/22/2011	2.1			1.66	75	29	2.84	2.84	1.43	1.43	3.60	0.95	0.48	3.60	3.60	10.22	Low Risk	$ 13,000	>10
P-092	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.6	150.3	2	2	2	1	4	1	0000-2100	11/22/2011	1.0			1	75	29	2.84	2.84	1.43	1.43	3.60	0.95	0.48	3.60	3.60	10.22	Low Risk	$ 11,000	>10
P-093	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	8.2	290.7	1	2	2	2	4	1	0000-1100	11/22/2011	1.0			1	75	29	2.84	2.84	1.29	1.86	3.60	0.86	0.62	3.60	3.60	10.22	Low Risk	$ 21,000	>10
P-435	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	5.4	117.5	4	2	2	1	4	1			UNK			1	75	29	2.84	2.84	1.71	1.71	3.60	1.14	0.57	3.60	3.60	10.22	Low Risk	$ 5,600	>10
P-121	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	3.9	286.7	1	2	1	1	4	4			UNK			1	75	29	2.84	2.84	2.71	1.00	3.40	1.81	0.33	3.40	3.40	9.66	Low Risk	$ 14,000	>10
P-131	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	3.9	145.1	1	2	1	1	4	4			UNK			1	75	29	2.84	2.84	2.71	1.00	3.40	1.81	0.33	3.40	3.40	9.66	Low Risk	$ 7,000	>10
P-039	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	10.8	247.7	2	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.80	0.95	0.67	2.80	2.80	7.95	Low Risk	$ 18,000	>10
P-074	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.2	277.1	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 20,000	>10
P-095	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	132.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 10,000	>10
P-096	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.2	317.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 23,000	>10
P-099	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.0	317.0	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 23,000	>10
P-246	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	6.9	319.4	4	2	2	1	3	1			UNK			1	75	29	2.84	2.84	1.71	1.71	2.80	1.14	0.57	2.80	2.80	7.95	Low Risk	$ 15,000	>10
P-247	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	9.4	12.1	1	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.29	1.86	2.80	0.86	0.62	2.80	2.80	7.95	Low Risk	$ 600	>10
P-249	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.4	76.9	4	2	2	2	3	1	0000-0000	11/22/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	2.80	1.14	0.76	2.80	2.80	7.95	Low Risk	$ 5,500	>10
P-359	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.5	11.6	1	2	2	2	3	1			UNK			1	75	29	2.84	2.84	1.29	1.86	2.80	0.86	0.62	2.80	2.80	7.95	Low Risk	$ 800	>10
P-436	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	6.4	221.1	2	2	2	1	3	1			UNK			1	75	29	2.84	2.84	1.43	1.43	2.80	0.95	0.48	2.80	2.80	7.95	Low Risk	$ 11,000	>10
P-446	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	113.5	1	2	2	1	3	1	0000-0000	11/21/2011	1.0			1	75	29	2.84	2.84	1.29	1.29	2.80	0.86	0.43	2.80	2.80	7.95	Low Risk	$ 8,000	>10
P-023	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	10.8	215.1	2	2	1	2	3	1			UNK			1	75	29	2.84	2.84	1.14	1.71	2.60	0.76	0.57	2.60	2.60	7.38	Low Risk	$ 15,000	>10
P-031	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	9.5	94.7	4	2	1	2	3	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.60	0.95	0.67	2.60	2.60	7.38	Low Risk	$ 4,500	>10
P-088	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.7	108.3	2	2	1	1	3	1			UNK			1	75	29	2.84	2.84	1.14	1.14	2.60	0.76	0.38	2.60	2.60	7.38	Low Risk	$ 8,000	>10
P-129	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	4.9	202.2	2	2	1	1	3	4			UNK			1	75	29	2.84	2.84	2.86	1.14	2.60	1.90	0.38	2.60	2.60	7.38	Low Risk	$ 10,000	>10
P-130	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	4.4	222.8	1	2	1	1	3	4			UNK			1	75	29	2.84	2.84	2.71	1.00	2.60	1.81	0.33	2.60	2.60	7.38	Low Risk	$ 11,000	>10
P-123	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	5.5	169.8	2	2	2	1	2	4			UNK			1	75	29	2.84	2.84	3.14	1.43	2.00	2.10	0.48	2.00	2.10	5.95	Low Risk	$ 8,000	>10
P-133	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	5.4	21.2	1	2	2	1	2	4			UNK			1	75	29	2.84	2.84	3.00	1.29	2.00	2.00	0.43	2.00	2.00	5.68	Low Risk	$ 1,000	>10
P-005	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	4.3	304.4	4	2	2	1	2	1			UNK			1	75	29	2.84	2.84	1.71	1.71	2.00	1.14	0.57	2.00	2.00	5.68	Low Risk	$ 15,000	>10
P-040	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	11.0	241.4	2	2	2	2	2	1			UNK			1	75	29	2.84	2.84	1.43	2.00	2.00	0.95	0.67	2.00	2.00	5.68	Low Risk	$ 17,000	>10
P-132	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	5.4	248.3	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 12,000	>10
P-135	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	7.5	163.7	2	2	1	1	1	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.00	1.90	0.38	1.00	1.90	5.41	Low Risk	$ 8,000	>10
P-136	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	6.7	344.7	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 17,000	>10
P-137	COLLECTOR	UNKNOWN	GRAVITY	8	1970	8" 1970	6.1	252.2	2	2	1	1	2	4			UNK			1	75	29	2.84	2.84	2.86	1.14	1.80	1.90	0.38	1.80	1.90	5.41	Low Risk	$ 12,000	>10
P-007	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	Unk	106.5	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 5,100	>10
P-010	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	6.3	142.3	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 6,800	>10
P-032	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	2.6	299.2	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 14,000	>10
P-094	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	Unk	141.8	2	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.14	1.14	1.80	0.76	0.38	1.80	1.80	5.11	Low Risk	$ 6,800	>10
P-097	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	4.3	72.8	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 3,500	>10
P-098	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	4.3	357.7	4	2	1	1	2	1			UNK			1	75	29	2.84	2.84	1.43	1.43	1.80	0.95	0.48	1.80	1.80	5.11	Low Risk	$ 17,000	>10
P-030	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	5.0	211.2	4	2	2	1	1	1			UNK			1	75	29	2.84	2.84	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.41	Low Risk	$ 15,000	>10
P-034	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	11.3	245.1	2	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.20	0.95	0.67	1.20	1.20	3.41	Low Risk	$ 18,000	>10
P-035	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	11.3	190.8	4	2	2	2	1	1	0000-0000	11/25/2011	1.0			1	75	29	2.84	2.84	1.71	2.29	1.20	1.14	0.76	1.20	1.20	3.41	Low Risk	$ 14,000	>10
P-037	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	9.2	243.0	4	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.71	2.29	1.20	1.14	0.76	1.20	1.20	3.41	Low Risk	$ 17,000	>10
P-038	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	7.1	210.5	4	2	2	1	1	1			UNK			1	75	29	2.84	2.84	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.41	Low Risk	$ 15,000	>10
P-041	COLLECTOR	VCP	GRAVITY	12	1970	12" VCP 1970	11.2	250.0	2	2	2	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.20	0.95	0.67	1.20	1.20	3.41	Low Risk	$ 18,000	>10
P-036	COLLECTOR	VCP	GRAVITY	8	1970	8" VCP 1970	11.3	207.4	4	2	1	2	1	1			UNK			1	75	29	2.84	2.84	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.84	Low Risk	$ 10,000	>10
P-079	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	4.8	88.1	1	2	2	1	1	1			UNK			1	50	30	2.20	2.20	1.29	1.29	1.20	0.86	0.43	1.20	1.20	2.64	Low Risk	$ 4,200	>10
P-080	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	4.0	115.3	1	2	2	1	1	1			UNK			1	50	30	2.20	2.20	1.29	1.29	1.20	0.86	0.43	1.20	1.20	2.64	Low Risk	$ 5,500	>10
P-022	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	3.8	204.8	4	2	1	1	1	1			UNK			1	50	30	2.20	2.20	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.20	Low Risk	$ 10,000	>10
P-081	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	4.0	82.7	4	2	1	1	1	1			UNK			1	50	30	2.20	2.20	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.20	Low Risk	$ 4,000	>10
P-082	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	3.9	177.1	4	2	1	1	1	1			UNK			1	50	30	2.20	2.20	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.20	Low Risk	$ 9,000	>10
P-083	COLLECTOR	ACP	GRAVITY	8	1996	8" ACP 1996	3.9	264.6	4	2	1	1	1	1			UNK			1	50	30	2.20	2.20	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.20	Low Risk	$ 13,000	>10
P-292	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8" 1977	4.7	155.7	2	2	2	1	4	3			UNK			1	75	36	2.56	2.56	2.57	1.43	3.60	1.71	0.48	3.60	3.60	9.22	Low Risk	$ 7,500	>10
P-293	COLLECTOR	VCP	GRAVITY	8	1977	8" 1977	4.7	75.8	2	2	2	1	3	3			UNK			1	75	36	2.56	2.56	2.57	1.43	2.80	1.71	0.48	2.80	2.80	7.17	Low Risk	$ 3,600	>10
P-290	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8" 1977	4.7	96.7	2	2	1	1	3	3			UNK			1	75	36	2.56	2.56	2.29	1.14	2.60	1.52	0.38	2.60	2.60	6.66	Low Risk	$ 4,600	>10
P-294	COLLECTOR	UNKNOWN	GRAVITY	8	1977	8" 1977	4.7	174.8	2	2	1	1	2	3			UNK			1	75	36	2.56	2.56	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.61	Low Risk	$ 8,000	>10
P-066	COLLECTOR	VCP	GRAVITY	12	1978	12" VCP 1978	5.7	292.1	4	2	2	1	1	1			UNK			1	75	37	2.52	2.52	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.02	Low Risk	$ 21,000	>10
P-071	COLLECTOR	VCP	GRAVITY	12	1978	12" VCP 1978	4.6	200.8	4	2	2	1	1	1	3112-1A00	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.71	1.71	1.20	1.14	0.57	1.20	1.20	3.02	Low Risk	$ 14,000	>10
P-442	COLLECTOR	VCP	GRAVITY	12	1978	12" VCP 1978	5.7	110.7	2	2	2	1	1	1	3100-0000	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.20	0.95	0.48	1.20	1.20	3.02	Low Risk	$ 8,000	>10
P-042	COLLECTOR	VCP	GRAVITY	8	1978	8" VCP 1978	4.6	207.9	4	2	1	1	1	1	3121-2100	11/17/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-045	COLLECTOR	VCP	GRAVITY	8	1978	8" VCP 1978	4.6	205.4	4	2	1	1	1	1	0000-5112	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-045	COLLECTOR	VCP	GRAVITY	8	1978	8" VCP 1978	4.6	205.4	4	2	1	1	1	1	0000-5112	11/18/2011	1.0			1	75	37	2.52	2.52	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.52	Low Risk	$ 10,000	>10
P-067	COLLECTOR	VCP	GRAVITY	8	1978	8" VCP 1978	4.6	49.9	4	2	1	1	1	1	3100-1300	11/18/2011	3.1			2.26	75	37	2.52	2.52	1.43	1

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-444	COLLECTOR	UNKNOWN	GRAVITY	6	1983	6'' 1983	6.0	100.4	2	2	1	1	2	1			UNK			1	75	42	2.32	2.32	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.18	Low Risk	$ 3,600	>10
P-104	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	5.5	332.4	4	2	2	1	4	1	3100-1100	11/25/2011	3.1			2.26	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 16,000	>10
P-105	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	7.7	268.6	4	2	2	1	4	1			UNK			1	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 13,000	>10
P-111	COLLECTOR	VCP	GRAVITY	10	1984	10'' VCP 2007	3.5	545.4	4	2	2	1	4	1			UNK			1	75	43	2.28	2.28	1.71	1.71	3.60	1.14	0.57	3.60	3.60	8.21	Low Risk	$ 33,000	>10
P-193	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	56.2	1	2	2	1	4	4			UNK			1	75	43	2.28	2.28	3.00	1.29	3.60	2.00	0.43	3.60	3.60	8.21	Low Risk	$ 2,700	>10
P-196	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	293.3	1	2	2	1	4	4			UNK			1	75	43	2.28	2.28	3.00	1.29	3.60	2.00	0.43	3.60	3.60	8.21	Low Risk	$ 14,000	>10
P-274	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	10.9	255.6	4	2	2	2	4	1			UNK			1	75	43	2.28	2.28	1.71	2.29	3.60	1.14	0.76	3.60	3.60	8.21	Low Risk	$ 12,000	>10
P-311	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.8	34.8	2	2	2	1	4	3			UNK			1	75	43	2.28	2.28	2.57	1.43	3.60	1.71	0.48	3.60	3.60	8.21	Low Risk	$ 1,700	>10
P-342	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	10.0	134.1	2	2	2	2	4	1			UNK			1	75	43	2.28	2.28	1.43	2.00	3.60	0.95	0.67	3.60	3.60	8.21	Low Risk	$ 6,400	>10
P-275	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	10.9	209.2	4	2	1	2	4	1			UNK			1	75	43	2.28	2.28	1.43	2.00	3.40	0.95	0.67	3.40	3.40	7.75	Low Risk	$ 8,000	>10
P-305	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	7.1	140.2	2	2	1	1	4	3			UNK			1	75	43	2.28	2.28	2.29	1.14	3.40	1.52	0.38	3.40	3.40	7.75	Low Risk	$ 5,000	>10
P-272	COLLECTOR	UNKNOWN	GRAVITY	18	1984	18'' 1984	10.9	331.9	4	2	4	2	3	1			UNK			1	75	43	2.28	2.28	2.29	2.86	3.20	1.52	0.95	3.20	3.20	7.30	Low Risk	$ 36,000	>10
P-112	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 2007	9.8	187.7	4	2	2	2	3	1	0000-4131	12/20/2011	1.0			1	75	43	2.28	2.28	1.71	2.29	2.80	1.14	0.76	2.80	2.80	6.38	Low Risk	$ 9,000	>10
P-194	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.0	314.2	1	2	2	1	3	4			UNK			1	75	43	2.28	2.28	3.00	1.29	2.80	2.00	0.43	2.80	2.80	6.38	Low Risk	$ 15,000	>10
P-197	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.0	127.6	1	2	2	1	3	1			UNK			1	75	43	2.28	2.28	1.29	1.29	2.80	0.86	0.43	2.80	2.80	6.38	Low Risk	$ 6,100	>10
P-202	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	5.5	357.1	2	2	2	1	3	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.80	0.95	0.48	2.80	2.80	6.38	Low Risk	$ 17,000	>10
P-300	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	5.6	153.0	2	2	2	1	3	3			UNK			1	75	43	2.28	2.28	2.57	1.43	2.80	1.71	0.48	2.80	2.80	6.38	Low Risk	$ 9,000	>10
P-341	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	133.9	2	2	2	2	3	1			UNK			1	75	43	2.28	2.28	1.43	2.00	2.80	0.95	0.67	2.80	2.80	6.38	Low Risk	$ 6,400	>10
P-108	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1942	5.2	184.6	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 9,000	>10
P-280	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	Unk	308.5	2	2	1	1	3	3			UNK			1	75	43	2.28	2.28	2.29	1.14	2.60	1.52	0.38	2.60	2.60	5.93	Low Risk	$ 19,000	>10
P-284	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	Unk	207.4	2	2	1	1	3	3			UNK			1	75	43	2.28	2.28	2.29	1.14	2.60	1.52	0.38	2.60	2.60	5.93	Low Risk	$ 12,000	>10
P-337	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	4.2	417.0	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 20,000	>10
P-339	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	9.1	180.0	2	2	1	2	3	1			UNK			1	75	43	2.28	2.28	1.14	1.71	2.60	0.76	0.57	2.60	2.60	5.93	Low Risk	$ 4,300	>10
P-340	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	107.3	2	2	1	2	3	1			UNK			1	75	43	2.28	2.28	1.14	1.71	2.60	0.76	0.57	2.60	2.60	5.93	Low Risk	$ 5,200	>10
P-349	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	3.5	90.4	2	2	1	1	3	1			UNK			1	75	43	2.28	2.28	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.93	Low Risk	$ 4,300	>10
P-179	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	7.7	242.3	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 15,000	>10
P-190	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	4.8	206.6	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 7,400	>10
P-199	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.6	372.0	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 13,000	>10
P-223	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.7	240.4	2	2	2	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.20	2.10	0.48	1.20	2.10	4.78	Low Risk	$ 12,000	>10
P-224	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.2	313.0	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 11,000	>10
P-226	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.0	287.3	4	2	1	1	1	4			UNK			1	75	43	2.28	2.28	3.14	1.43	1.00	2.10	0.48	1.00	2.10	4.78	Low Risk	$ 10,000	>10
P-201	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	6.4	198.0	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 7,100	>10
P-204	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.1	52.2	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 2,500	>10
P-205	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.1	28.2	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 1,400	>10
P-303	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	6.3	183.7	2	2	2	1	2	3			UNK			1	75	43	2.28	2.28	2.57	1.43	2.00	1.71	0.48	2.00	2.00	4.56	Low Risk	$ 11,000	>10
P-437	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.3	160.6	2	2	2	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	2.00	0.95	0.48	2.00	2.00	4.56	Low Risk	$ 8,000	>10
P-438	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	101.6	2	2	2	2	2	1			UNK			1	75	43	2.28	2.28	1.43	2.00	2.00	0.95	0.67	2.00	2.00	4.56	Low Risk	$ 4,900	>10
P-122	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.4	345.3	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 12,000	>10
P-125	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	5.6	217.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-141	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	5.2	310.8	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 19,000	>10
P-142	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.7	194.7	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 9,000	>10
P-143	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.2	202.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-144	COLLECTOR	UNKNOWN	GRAVITY	10	1984	10'' 1984	5.0	206.4	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 12,000	>10
P-188	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.6	206.7	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 7,400	>10
P-189	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.6	271.6	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-225	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.4	615.5	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 22,000	>10
P-227	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	5.6	102.2	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 3,700	>10
P-237	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	7.7	218.1	2	2	1	1	1	4			UNK			1	75	43	2.28	2.28	2.86	1.14	1.00	1.90	0.38	1.00	1.90	4.34	Low Risk	$ 10,000	>10
P-100	COLLECTOR	VCP	GRAVITY	6	1984	6'' VCP 1984	4.3	221.5	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 8,000	>10
P-101	COLLECTOR	VCP	GRAVITY	6	1984	6'' VCP 1984	4.3	98.2	4	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.80	0.95	0.48	1.80	1.80	4.10	Low Risk	$ 3,500	>10
P-183	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	Unk	257.0	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 6,200	>10
P-200	COLLECTOR	VCP	GRAVITY	6	1984	6'' 1984	5.8	149.7	4	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.80	0.95	0.48	1.80	1.80	4.10	Low Risk	$ 5,400	>10
P-273	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	10.9	201.3	1	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.00	1.57	1.80	0.67	0.52	1.80	1.80	4.10	Low Risk	$ 7,200	>10
P-299	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.2	212.9	2	2	1	1	2	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.10	Low Risk	$ 8,000	>10
P-327	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	5.8	189.3	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 4,500	>10
P-333	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	4.1	278.7	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 6,700	>10
P-338	COLLECTOR	UNKNOWN	GRAVITY	4	1984	4'' 1984	7.4	196.2	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 4,700	>10
P-344	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	205.0	2	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.14	1.71	1.80	0.76	0.57	1.80	1.80	4.10	Low Risk	$ 10,000	>10
P-350	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	345.7	2	2	1	2	2	1			UNK			1	75	43	2.28	2.28	1.14	1.71	1.80	0.76	0.57	1.80	1.80	4.10	Low Risk	$ 17,000	>10
P-402	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	Unk	213.8	2	2	1	1	2	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.80	1.52	0.38	1.80	1.80	4.10	Low Risk	$ 10,000	>10
P-439	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	5.6	153.6	2	2	1	1	2	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.80	0.76	0.38	1.80	1.80	4.10	Low Risk	$ 7,400	>10
P-304	COLLECTOR	VCP	GRAVITY	10	1984	10'' 1984	7.0	150.3	2	2	2	1	1	3			UNK			1	75	43	2.28	2.28	2.57	1.43	1.20	1.71	0.48	1.20	1.71	3.91	Low Risk	$ 9,000	>10
P-281	COLLECTOR	VCP	GRAVITY	8	1984	8'' 1984	Unk	235.0	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 11,000	>10
P-295	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	Unk	207.8	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 10,000	>10
P-301	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.3	178.8	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 6,400	>10
P-416	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.3	200.9	2	2	1	1	1	3			UNK			1	75	43	2.28	2.28	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.47	Low Risk	$ 10,000	>10
P-073	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1984	5.7	380.7	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 18,000	>10
P-203	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	4.6	249.3	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 9,000	>10
P-238	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	7.7	28.3	2	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.28	Low Risk	$ 1,400	>10
P-302	COLLECTOR	UNKNOWN	GRAVITY	6	1984	6'' 1984	7.3	108.1	2	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.28	Low Risk	$ 3,900	>10
P-328	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	8.3	281.6	4	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.28	Low Risk	$ 14,000	>10
P-330	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	6.6	212.8	4	2	1	1	1	1			UNK			1	75	43	2.28	2.28	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.28	Low Risk	$ 10,000	>10
P-332	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	10.0	47.6	4	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.43	2.00	1.00	0.95	0.67	1.00	1.00	2.28	Low Risk	$ 2,300	>10
P-401	COLLECTOR	UNKNOWN	GRAVITY	8	1984	8'' 1984	9.1	318.2	1	2	1	2	1	1			UNK			1	75	43	2.28	2.28	1.00	1.57	1.00	0.67	0.52	1.00	1.00	2.28	Low Risk	$ 15,000	>10
P-145	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	6.1	148.7	2	2	1	1	3	4			UNK			1	75	44	2.24	2.24	2.86	1.14	2.60	1.90	0.38	2.60	2.60	5.82	Low Risk	$ 7,100	>10
P-152	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	6.1	297.8	2	2	2	1	3	4			UNK			1	75	44	2.24	2.24	2.86	1.14	2.60	1.90	0.38	2.60	2.60	5.82	Low Risk	$ 14,000	>10
P-241	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	8.2	114.6	2	2	3	2	2	1			UNK			1	75	44	2.24	2.24	1.71	2.29	2.20	1.14	0.76	2.20	2.20	4.93	Low Risk	$ 5,500	>10
P-256	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	7.6	43.8	2	2	3	1	2	1			UNK			1	75	44	2.24	2.24	1.71	1.71	2.20	1.14	0.57	2.20	2.20	4.93	Low Risk	$ 2,100	>10
P-267	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	8.8	114.6	2	2	3	2	2	1			UNK			1	75	44	2.24	2.24	1.71	2.29	2.20	1.14	0.76	2.20	2.20	4.93	Low Risk	$ 5,500	>10
P-153	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	5.2	326.4	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 16,000	>10
P-154	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	4.3	296.8	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 14,000	>10
P-155	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	3.4	141.1	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 6,800	>10
P-165	COLLECTOR	VCP	GRAVITY	8	1985	8'' 1985	5.7	163.6	2	2	1	1	2	4			UNK			1	75	44	2.24	2.24	2.86	1.14	1.80	1.90	0.38	1.80	1.90	4.27	Low Risk	$ 8,000	>10
P-264	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	124.3	2	2	3	2	1	1			UNK			1	75	44	2.24	2.24	1.71	2.29	1.40	1.14	0.76	1.40	1.40	3.14	Low Risk	$ 6,000	>10
P-265	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	137.2	2	2	3	2	1	1			UNK			1	75	44	2.24	2.24	1.71	2.29	1.40	1.14	0.76	1.40	1.40	3.14	Low Risk	$ 6,600	>10
P-266	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	9.4	183.3	2	2	3	2	1	1			UNK	

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-262	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	7.9	179.0	2	2	1	1	1	1			UNK			1	75	44	2.24	2.24	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.24	Low Risk	$ 9,000	>10
P-263	COLLECTOR	VCP	GRAVITY	8	1985	8'' VCP 1985	10.0	317.4	2	2	1	2	1	1			UNK			1	75	44	2.24	2.24	1.14	1.71	1.00	0.76	0.57	1.00	1.00	2.24	Low Risk	$ 15,000	>10
P-106	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	450.6	2	2	1	1	4	1			UNK			1	75	45	2.20	2.20	1.14	1.14	3.40	0.76	0.38	3.40	3.40	7.48	Low Risk	$ 22,000	>10
P-107	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.2	296.2	2	2	1	1	3	1			UNK			1	75	45	2.20	2.20	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.72	Low Risk	$ 14,000	>10
P-109	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	181.0	2	2	1	1	3	1			UNK			1	75	45	2.20	2.20	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.72	Low Risk	$ 9,000	>10
P-000	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	196.6	2	2	1	1	2	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.96	Low Risk	$ 9,000	>10
P-110	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	176.3	2	2	1	1	2	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.96	Low Risk	$ 8,000	>10
P-001	COLLECTOR	VCP	GRAVITY	8	1986	8'' VCP 1986	5.5	184.7	2	2	1	1	1	1			UNK			1	75	45	2.20	2.20	1.14	1.14	1.00	0.76	0.38	1.00	1.00	2.20	Low Risk	$ 9,000	>10
P-251	COLLECTOR	CIP	GRAVITY	12	1964	12'' CIP 1964	5.9	88.4	1	2	3	1	4	1	0000-0000	11/22/2011	1.0	CIPPL	Oct-12	1	115	46	2.80	2.80	1.57	1.57	3.80	1.05	0.52	3.80	3.80	10.64	Low Risk	$ 16,000	>10
P-181	COLLECTOR	VCP	GRAVITY	15	1964	15'' VCP 1964	4.8	143.1	4	2	3	1	4	1	5141-1400	11/30/2011	5.1	CIPPL	Oct-12	1	75	46	2.16	2.16	2.00	2.00	3.80	1.33	0.67	3.80	3.80	8.21	Low Risk	$ 30,000	>10
P-250	COLLECTOR	VCP	GRAVITY	12	1964	12'' VCP 1964	7.1	162.3	1	2	3	1	4	1	0000-3100	11/22/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.57	1.57	3.80	1.05	0.52	3.80	3.80	8.21	Low Risk	$ 29,000	>10
P-103	COLLECTOR	VCP	GRAVITY	8	1984	8'' VCP 1984	9.8	287.4	4	2	2	2	4	1	5100-0000	12/20/2011	5.1	Replace 8" VCP for 8" PVC	Oct-12	1	75	46	2.16	2.16	1.71	2.29	3.60	1.14	0.76	3.60	3.60	7.78	Low Risk	$ 14,000	>10
P-006	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	8.8	289.6	4	2	2	2	4	1	1100-4111	11/22/2011	1.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.71	2.29	3.60	1.14	0.76	3.60	3.60	7.78	Low Risk	$ 52,000	>10
P-024	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	10.8	246.9	2	2	2	2	4	1	0000-0000	11/21/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.43	2.00	3.60	0.95	0.67	3.60	3.60	7.78	Low Risk	$ 45,000	>10
P-085	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	4.6	175.6	1	2	2	1	4	1	1100-4121	11/22/2011	1.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.78	Low Risk	$ 32,000	>10
P-086	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	4.6	293.4	1	2	2	1	4	1	0000-0000	11/21/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.78	Low Risk	$ 53,000	>10
P-116	COLLECTOR	VCP	GRAVITY	12	1984	12'' VCP 2007	9.5	34.6	4	2	2	2	3	1			UNK	Replace 12" VCP for 12" PVC	Oct-12	1	75	46	2.16	2.16	1.71	2.29	2.80	1.14	0.76	2.80	2.80	6.05	Low Risk	$ 2,500	>10
P-087	COLLECTOR	VCP	GRAVITY	12	1970	12'' VCP 1970	4.5	166.4	2	2	1	1	3	1	0000-4200	11/25/2011	1.0	CIPPL	Oct-12	1	75	46	2.16	2.16	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.62	Low Risk	$ 30,000	>10
P-004	COLLECTOR	VCP	GRAVITY	12	1978	12'' VCP 1978	5.7	295.2	4	2	2	1	1	1	4131-2100	11/18/2011	4.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.71	1.71	1.20	1.14	0.57	1.20	1.20	2.59	Low Risk	$ 53,000	>10
P-044	COLLECTOR	ACP	GRAVITY	12	1970	12'' ACP 1970	5.5	202.9	2	2	2	1	2	1	5100-0000	11/17/2011	5.1	CIPPL	Oct-12	1	50	46	1.24	1.24	1.43	1.43	2.00	0.95	0.48	2.00	2.00	2.48	Low Risk	$ 37,000	>10
P-068	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	215.9	4	2	1	1	1	1	5131-3121	11/18/2011	5.1	CIPPL	Oct-12	1	75	46	2.16	2.16	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.16	Low Risk	$ 33,000	>10
P-084	COLLECTOR	VCP	GRAVITY	8	1978	8'' VCP 1978	4.6	214.5	4	2	1	1	1	1	3400-4100	11/17/2011	3.4	CIPPL	Oct-12	1	75	46	2.16	2.16	1.43	1.43	1.00	0.95	0.48	1.00	1.00	2.16	Low Risk	$ 33,000	>10
P-365	COLLECTOR	UNKNOWN	GRAVITY	8	1988	8'' 1988	5.5	279.5	2	2	1	1	1	3			UNK			1	75	47	2.12	2.12	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.23	Low Risk	$ 13,000	>10
P-367	COLLECTOR	VCP	GRAVITY	8	1988	8'' 1988	5.5	32.2	2	2	1	1	1	3			UNK			1	75	47	2.12	2.12	2.29	1.14	1.00	1.52	0.38	1.00	1.52	3.23	Low Risk	$ 1,500	>10
P-429	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	9.7	267.3	4	2	4	2	3	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.86	3.20	1.52	0.95	3.20	3.20	3.58	Low Risk	$ 68,000	>10
P-427	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	7.6	296.7	4	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 76,000	>10
P-428	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	9.7	246.0	4	2	4	2	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.86	4.00	1.52	0.95	4.00	4.00	4.48	Crit-Mon	$ 63,000	>10
P-432	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	5.4	343.5	4	2	4	1	4	1			UNK	CIPPL + Replace	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 37,000	>10
P-433	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	5.4	150.4	4	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.29	2.29	4.00	1.52	0.76	4.00	4.00	4.48	Crit-Mon	$ 38,000	>10
P-434	COLLECTOR	RCP	GRAVITY	18	1970	18'' RCP 1970	6.7	219.3	4	2	4	1	4	3			UNK	CIPSR	Oct-14	1	50	48	1.12	1.12	3.43	2.29	4.00	2.29	0.76	4.00	4.00	4.48	Crit-Mon	$ 24,000	>10
P-343	COLLECTOR	RCP	GRAVITY	18	1957	18'' RCP 1957	7.6	241.7	2	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.00	2.00	4.00	1.33	0.67	4.00	4.00	4.48	Crit-Mon	$ 62,000	>10
P-430	COLLECTOR	RCP	GRAVITY	18	1957	18'' 1957	5.5	175.1	2	2	4	1	4	1			UNK	CIPPL	Oct-14	1	50	48	1.12	1.12	2.00	2.00	4.00	1.33	0.67	4.00	4.00	4.48	Crit-Mon	$ 45,000	>10
P-075	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	Unk	87.4	1	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.80	Low Risk	$ 4,200	>10
P-076	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	4.0	88.0	4	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.80	Low Risk	$ 4,200	>10
P-372	COLLECTOR	VCP	GRAVITY	8	1996	8'' VCP 1996	Unk	48.3	1	2	1	1	1	1			UNK			1	75	55	1.80	1.80	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.80	Low Risk	$ 2,300	>10
P-245	COLLECTOR	CIP	GRAVITY	12	1964	12'' CIP 1964	7.1	97.6	2	2	3	1	4	1	0000-0000	11/30/2011	1.0			1	115	63	2.36	2.36	1.71	1.71	3.80	1.14	0.57	3.80	3.80	8.95	Low Risk	$ 7,000	>10
P-363	FORCE	CIP	PRESSURIZED	6	1964	6'' CIP 1964	5.6	417.0	4	1	2	1	3	1			UNK			1	115	63	2.36	2.36	1.71	1.71	2.80	1.14	0.57	2.80	2.80	6.60	Low Risk	$ 15,000	>10
P-448	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8'' 2004	Unk	105.3	2	2	1	1	4	1			UNK			1	75	63	1.48	1.48	1.14	1.14	3.40	0.76	0.38	3.40	3.40	5.03	Low Risk	$ 5,100	>10
P-352	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8'' 2004	Unk	138.4	2	2	1	1	3	1			UNK			1	75	63	1.48	1.48	1.14	1.14	2.60	0.76	0.38	2.60	2.60	3.85	Low Risk	$ 6,600	>10
P-447	COLLECTOR	UNKNOWN	GRAVITY	8	2004	8'' 2004	Unk	137.7	2	2	1	1	3	1			UNK			1	75	63	1.48	1.48	1.14	1.14	2.60	0.76	0.38	2.60	2.60	3.85	Low Risk	$ 6,600	>10
P-360	FORCE	CIP	PRESSURIZED	8	1964	8'' CIP 1964	9.2	925.1	2	1	4	2	4	1			UNK			1	115	63	2.36	2.36	2.00	2.57	4.00	1.33	0.86	4.00	4.00	9.43	Crit-Mon	$ 44,000	>10
P-411	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	178.3	2	2	1	1	3	1			UNK			1	100	66	2.02	2.02	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.25	Low Risk	$ 9,000	>10
P-351	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	309.4	2	2	1	1	2	1			UNK			1	100	66	2.02	2.02	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.64	Low Risk	$ 15,000	>10
P-410	COLLECTOR	PVC	GRAVITY	8	1982	8'' PVC 1982	4.5	169.6	2	2	1	1	2	1			UNK			1	100	66	2.02	2.02	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.64	Low Risk	$ 8,000	>10
P-059	COLLECTOR	PVC	GRAVITY	10	1983	10'' PVC 1983	6.1	159.7	4	2	1	1	4	1			UNK			1	100	67	1.99	1.99	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.77	Low Risk	$ 10,000	>10
P-058	COLLECTOR	PVC	GRAVITY	10	1983	10'' PVC 1983	5.7	107.4	4	2	1	1	4	1	0000-0000	11/30/2011	1.0			1	100	67	1.99	1.99	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.77	Low Risk	$ 6,400	>10
P-259	FORCE	DIP	PRESSURIZED	4	1984	4'' DIP 1984	Unk	1432.2	2	1	3	1	4	1			UNK			1	100	68	1.96	1.96	1.71	1.71	3.80	1.14	0.57	3.80	3.80	7.45	Low Risk	$ 34,000	>10
P-271	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	250.6	1	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.06	Low Risk	$ 12,000	>10
P-376	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	74.1	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 3,600	>10
P-377	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	66.8	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 3,200	>10
P-378	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	122.7	2	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.43	1.43	3.60	0.95	0.48	3.60	3.60	7.06	Low Risk	$ 5,900	>10
P-380	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	74.2	1	2	2	1	4	1			UNK			1	100	68	1.96	1.96	1.29	1.29	3.60	0.86	0.43	3.60	3.60	7.06	Low Risk	$ 3,600	>10
P-269	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	118.6	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 5,700	>10
P-375	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	80.9	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 3,900	>10
P-381	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	305.6	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 15,000	>10
P-382	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	237.3	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 11,000	>10
P-384	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	92.7	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 4,400	>10
P-385	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	227.6	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 11,000	>10
P-404	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	151.2	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 7,300	>10
P-405	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	68.6	1	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.00	1.00	3.40	0.67	0.33	3.40	3.40	6.66	Low Risk	$ 3,300	>10
P-406	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	43.8	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 2,100	>10
P-408	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	73.1	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 3,500	>10
P-409	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	22.4	2	2	1	1	4	1			UNK			1	100	68	1.96	1.96	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.66	Low Risk	$ 1,100	>10
P-270	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	20.2	1	2	3	1	3	1			UNK			1	100	68	1.96	1.96	1.57	1.57	3.00	1.05	0.52	3.00	3.00	5.88	Low Risk	$ 1,000	>10
P-403	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	101.5	1	2	3	1	3	1			UNK			1	100	68	1.96	1.96	1.57	1.57	3.00	1.05	0.52	3.00	3.00	5.88	Low Risk	$ 4,900	>10
P-379	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	184.1	2	2	2	1	3	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.80	0.95	0.48	2.80	2.80	5.49	Low Risk	$ 9,000	>10
P-374	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	120.7	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 5,800	>10
P-383	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	144.8	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,000	>10
P-386	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	217.0	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 10,000	>10
P-394	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	152.8	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,300	>10
P-407	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	88.6	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 4,300	>10
P-440	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	151.1	2	2	1	1	3	1			UNK			1	100	68	1.96	1.96	1.14	1.14	2.60	0.76	0.38	2.60	2.60	5.10	Low Risk	$ 7,300	>10
P-335	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	316.8	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 15,000	>10
P-392	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	235.5	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 11,000	>10
P-393	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	55.1	2	2	2	1	2	1			UNK			1	100	68	1.96	1.96	1.43	1.43	2.00	0.95	0.48	2.00	2.00	3.92	Low Risk	$ 2,600	>10
P-118	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	310.2	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 15,000	>10
P-176	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	276.1	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 13,000	>10
P-260	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	300.5	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 14,000	>10
P-373	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	280.0	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 13,000	>10
P-388	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	82.5	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 4,000	>10
P-389	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	67.6	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 3,200	>10
P-390	COLLECTOR	PVC	GRAVITY	8	1984	8'' PVC 1984	Unk	181.3	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 9,000	>10

Table A-3 Collection System Sorted by Project and Remaining Life

General Information									Consequence Factor Categories						Structural Condition/Upgrades						Age/Remaining Service Life				Consequence Factors										
PipeID	type	Material	FlowType	Diam.	Year Inst	PipeLabel	Aprox Depth (ft)	Length (ft)	rsk Road Type	rsk Pipe Type	rsk Network	rsk Depth	rsk Hydrology	rsk Wellhead Area	QSR-QMR	PACP_Date	Structural Condition (NASSCO) SCI	Upgrades	Upgrade Date	Structural PoF	ESL (yrs)	RL (yrs)	Age PoF (1 4)	Liklihood oF Failure Score	Health & Safety (unweighted)	Operations & Economic (unweighted)	Environmental/ Regulatory Compliance (unweighted)	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Renewal Cost	Renewal Project or remaining life class
P-391	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	394.6	2	2	1	1	2	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.80	0.76	0.38	1.80	1.80	3.53	Low Risk	$ 19,000	>10
P-206	COLLECTOR	PVC	GRAVITY	6	1984	6" PVC 1984	Unk	42.5	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 1,500	>10
P-207	COLLECTOR	PVC	GRAVITY	6	1984	6" PVC 1984	Unk	95.5	1	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.96	Low Risk	$ 3,400	>10
P-334	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	366.0	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 18,000	>10
P-336	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	394.2	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 19,000	>10
P-387	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	117.3	2	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.96	Low Risk	$ 5,600	>10
P-441	COLLECTOR	PVC	GRAVITY	8	1984	8" PVC 1984	Unk	193.6	1	2	1	1	1	1			UNK			1	100	68	1.96	1.96	1.00	1.00	1.00	0.67	0.33	1.00	1.00	1.96	Low Risk	$ 9,000	>10
P-002	FORCE	PVC	PRESSURIZED	6	1985	6" PVC 1985	Unk	7646.3	2	1	1	1	4	1			UNK			1	100	69	1.93	1.93	1.14	1.14	3.40	0.76	0.38	3.40	3.40	6.56	Low Risk	$ 275,000	>10
P-361	FORCE	PVC		6	1985	6" PVC 1985	Unk	3748.2	4	1	1	1	4	1			UNK			1	100	69	1.93	1.93	1.43	1.43	3.40	0.95	0.48	3.40	3.40	6.56	Low Risk	$ 135,000	>10
P-362	FORCE	CIP	PRESSURIZED	6	1970	6" CIP 1970	5.0	634.3	4	1	2	1	3	1			UNK			1	115	69	2.20	2.20	1.71	1.71	2.80	1.14	0.57	2.80	2.80	6.16	Low Risk	$ 23,000	>10
P-178	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	7.0	235.6	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 25,000	>10
P-236	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	6.0	177.3	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 19,000	>10
P-240	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	4.9	27.1	4	2	4	1	1	1			UNK			1	75	69	1.24	1.24	2.29	2.29	1.60	1.52	0.76	1.60	1.60	1.98	Low Risk	$ 2,900	>10
P-329	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	9.1	385.2	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 42,000	>10
P-331	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	9.1	62.1	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 6,700	>10
P-400	COLLECTOR	UNKNOWN	GRAVITY	18	2010	18" 2010	8.1	153.0	4	2	4	2	1	1			UNK			1	75	69	1.24	1.24	2.29	2.86	1.60	1.52	0.95	1.60	1.60	1.98	Low Risk	$ 17,000	>10
P-117	COLLECTOR	LVCP	GRAVITY	12	2007	12" LVCP 2007	9.5	378.2	4	2	2	2	3	1	0000-0000	12/20/2011	1.0			1	100	91	1.27	1.27	1.71	2.29	2.80	1.14	0.76	2.80	2.80	3.56	Low Risk	$ 27,000	>10
P-113	COLLECTOR	LVCP	GRAVITY	10	2007	10" LVCP 2007	8.8	244.6	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 15,000	>10
P-114	COLLECTOR	LVCP	GRAVITY	10	2007	10" LVCP 2007	8.8	273.7	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 16,000	>10
P-418	COLLECTOR	LVCP	GRAVITY	10	2007	10" LVCP 2007	9.1	35.4	4	2	2	2	2	1			UNK			1	100	91	1.27	1.27	1.71	2.29	2.00	1.14	0.76	2.00	2.00	2.54	Low Risk	$ 2,100	>10
P-102	COLLECTOR	LVCP	GRAVITY	10	2007	10" LVCP 2007	3.5	218.4	4	2	2	1	2	1	0000-0000	11/25/2011	1.0			1	100	91	1.27	1.27	1.71	1.71	2.00	1.14	0.57	2.00	2.00	2.54	Low Risk	$ 13,000	>10
P-115	COLLECTOR	LVCP	GRAVITY	8	2007	8" LVCP 2007	6.2	142.5	4	2	2	1	2	1	0000-0000	12/20/2011	1.0			1	100	91	1.27	1.27	1.71	1.71	2.00	1.14	0.57	2.00	2.00	2.54	Low Risk	$ 6,800	>10
P-056	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	6.6	180.3	4	2	2	1	4	1			UNK			1	100	94	1.18	1.18	1.71	1.71	3.60	1.14	0.57	3.60	3.60	4.25	Low Risk	$ 9,000	>10
P-057	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.7	206.8	4	2	1	1	3	1	0000-0000	11/30/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	2.60	0.95	0.48	2.60	2.60	3.07	Low Risk	$ 10,000	>10
P-017	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.6	129.4	4	2	1	1	2	1	0000-0000	11/30/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	1.80	0.95	0.48	1.80	1.80	2.12	Low Risk	$ 6,200	>10
P-016	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.7	251.1	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 12,000	>10
P-018	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.4	174.6	4	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.18	Low Risk	$ 8,000	>10
P-047	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.8	294.3	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 14,000	>10
P-399	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.6	155.3	2	2	1	1	1	1			UNK			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 7,500	>10
P-019	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.6	91.9	2	2	1	1	1	1	0000-0000	11/29/2011	1.0			1	100	94	1.18	1.18	1.14	1.14	1.00	0.76	0.38	1.00	1.00	1.18	Low Risk	$ 4,400	>10
P-020	COLLECTOR	LVCP	GRAVITY	8	2010	8" LVCP 2010	5.5	169.3	4	2	1	1	1	1	0000-0000	11/29/2011	1.0			1	100	94	1.18	1.18	1.43	1.43	1.00	0.95	0.48	1.00	1.00	1.18	Low Risk	$ 8,000	>10
P-364	FORCE	CIP	PRESSURIZED	12	2004	12" CIP 2004	Unk	1207.2	2	1	4	1	4	1			UNK			1	115	103	1.31	1.31	2.00	2.00	4.00	1.33	0.67	4.00	4.00	5.25	Crit-Mon	$ 87,000	>10
																																	Project Total	**$ 5,347,900**	

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
WWTF General Improvements																							
WWTF	Electrical / Emergency Power	WWTF-E11	Electrical Equipment	Process Building - Electrical Room P-103	The West side of the wall is missing an emergency light. This violates Code.	Provide a two-head emergency light towards the north end of the west wall.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 500	WWTF General Improvements
WWTF	Electrical / Emergency Power	WWTF-E20	Electrical Equipment	Blower Building - UV Room D-102	The two plant water pump disconnect switches do not have sufficient electrical working space around them, as required by the NEC.	Do no work on these disconnect swiitches while they are live; turn off power at the source prior to opening them.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	WWTF General Improvements
WWTF	Electrical / Emergency Power	WWTF-E24	Electrical Equipment	Secondary Calrifiers	The SC-1 disconnect switch on the exerior platform does not have sufficient electrical working space around it (the black metal structure is in front of it), as required by the NEC.	Do no work on this disconnect switch while it is live; turn off power at the source prior to opening it.	≤5	Very High	4	Severe	4	Moderate	2	Minor offense	2	2.67	0.67	2.00	2.67	10.67	Important	$ -	WWTF General Improvements
WWTF	Electrical / Emergency Power	WWTF-E25	Electrical Equipment	Secondary Calrifiers	The Clarifier No. 1 exhaust fan/light switch is not working.	Fix the switch	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 100	WWTF General Improvements
WWTF	Electrical / Emergency Power	WWTF-E4	Electrical Equipment	Process Building - Dewatering Room	The Odor Control disconnect switch only has a 20" wide work space clearance; the NEC requires 30".	Do no work on this disconnect swiitch while it is live; turn off power at the source prior to opening it.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	WWTF General Improvements
WWTF	Process / Mechanical	WWTF-P117	Off station.	Process Building - Chemical S	Ferric Storage Area	Provide Wash-Off station within the spill containment area, or a clear unobstructed path to wash-off station.	≤5	Very High	4	Severe	4	Low	1	Major offense (1 time)	3	2.67	0.33	3.00	3.00	12.00	Important	$ 11,000	WWTF General Improvements
																					Project Total	**$ 11,600**	
Jaffrey Center and Erin PS Improvements																							
Erin	Civil / Site Safety & Security	Erin-C204	Safety equipment	Building Interior	Safety Harness & Cable for Pump Chamber Tube	Replace Safety Harness and Cable with a Cable & Harness Long Enough to Reach Bottom of Pump Chamber	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 1,000	Jaffrey Center & Erin PS Improvements
Erin	Civil / Site Safety & Security	Erin-C205	Safety equipment	Building Interior	Fire Extinguisher	Replace Missing Fire Extinguisher	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin PS Improvements
Erin	Electrical / Emergency Power	Erin-E206	Electrical Equipment	Bottom level	Receptacles are not GFCI	Replace general use receptacles (outlets) with GFCI type	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 500	Jaffrey Center & Erin PS Improvements
Erin	Electrical / Emergency Power	Erin-E209	Lighting	Indoors	No emergency lighting installaed	Provide an emergency light	≤5	Very High	4	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	8.00	Important	$ 400	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C404	Drains	Indoors	Floor Drainage in catchment area does not appear to have gas protection between wet well and pump room	Install gas / vapor barrier between wet well and pump room through drain hole	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 2,000	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C405	Safety equipment	Indoors	Fire Extinguisher	Replace Missing Fire Extinguisher	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E403	Counduit/wiring	Indoors	Abandoned conduit with exposed wiring below phone equipment	Remove abandoned Conduit/Wire	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 200	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E404	Conduit/Wiring	Indoors	Float switch cable tie wrapped to conduits	Run cable in PVC conduit through the station	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 500	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E405	open	Indoors	12"x12" PVC box missing screws/open	Provide new screws in 12"x12" PVC box	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 100	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E407	Electrical Equipment	Indoors	No emergency lighting or exist signs installed - Safety	Provide an emergency light	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 400	Jaffrey Center & Erin PS Improvements
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E409	Conduit/Wiring	Outdoors	Float switch conduit does not include an explosion proof seal (EY Fitting)	Provide an explosion proof conduit seal (EY Fitting)	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 800	Jaffrey Center & Erin PS Improvements
																					Project Total	**$ 6,100**	
Hadley Rd. PS Improvements																							
Cross	Electrical / Emergency Power	Cross-E301	Conduit/Wiring	Indoors	All conduit and wiring in the building has been heated to the point of softening and significantly drooping throughout the room, which is putting major strain on the wiring, connections and wiring insulation. (NOTE: we believe this overheating is due to the ventilation louvers being disconnected and the engine exhaust not being insulated).	Replace all softened/drooping conduit. Replace all wiring run in conduits inside the buillding as it is unreliable and unsafe due to major overheating and physical strain from stretching/softening conduits	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 25,000	Cross St. PS Improvements
Cross	Electrical / Emergency Power	Cross-E302	Conduit/Wiring	Indoors	Some conduits have become disconnected	Reconnect conduits to avoid tearing/disconnecting wiring	≤5	Very High	4	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	8.00	Important	$ 1,000	Cross St. PS Improvements
Cross	Electrical / Emergency Power	Cross-E303	Electrical Equipment	Indoors	The panelboard and breakers are unreliable due to probable overheating	Replace panelboard	≤5	Very High	4	Severe	4	Significant	3	In compliance	1	2.67	1.00	1.00	2.67	10.67	Important	$ 2,500	Cross St. PS Improvements
Cross	Electrical / Emergency Power	Cross-E306	Electrical Equipment	Indoors	Box cover loose (located on wall below engine exhaust)	Fasten cover onto box	≤5	Very High	4	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	8.00	Important	$ 100	Cross St. PS Improvements
Cross	Electrical / Emergency Power	Cross-E307	Electrical Equipment	Indoors	No emergency lighting installaed	Provide an emergency light	≤5	Very High	4	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	8.00	Important	$ 400	Cross St. PS Improvements
Cross	HVAC / Plumbing	Cross-H301	Louver	Cross Street PS	cooling air inlet louver	actuator linkage disconnected; replace; unknown if operational - increase wall opening, replace louver, damper and actuator	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 5,000	Cross St. PS Improvements
Cross	HVAC / Plumbing	Cross-H302	Louver	Cross Street PS	Air Exhaust Fan & Louver - Operates upon integrated temperature sensor; unknown if fan turns on when generator starts; unknown age and performance date; louver operates per fan start, bent and rusted in places	Relocate to manual louver location, increase wall opening, replace louver, replace with larger fan, assure operation with generator start and at high temperature detection, patch current opening.	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 6,600	Cross St. PS Improvements
Cross	HVAC / Plumbing	Cross-H303	Louver	Cross Street PS	Manual louver	See air exhaust fan and louver recommendation	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ -	Cross St. PS Improvements
																					Project Total	**$ 40,600**	
Hadley Rd. PS Improvements																							
Hadley	Electrical / Emergency Power	Hadley-E104	Electrical Equipment	Dry Well Ground Floor	Replace damaged receptacle/outlet behind the fuel day tank - Safety	Replace receptacle	≤5	Very High	4	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	10.67	Important	$ 200	Hadley Rd. PS Improvements
Hadley	Electrical / Emergency Power	Hadley-E110	Lighting	Various	No emergency lighting or exist signs installed - Safety	Provide emergnecy lighting and exit signs	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 9,000	Hadley Rd. PS Improvements
Hadley	Electrical / Emergency Power	Hadley-E111	Instrument/Controls	Wet Well	No combustible gas detector installed - Safety	Provide a combustible gas detector, connect alarm to auto dialer, and provide warning lights and horn inside and outside of wet well, in accordance with NFPA 820.	≤5	Very High	4	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	10.67	Important	$ 8,000	Hadley Rd. PS Improvements
Hadley	Process / Mechanical	Hadley-P106	Screenings	Wet Well	Screenings Grinder & Conveyor. JWCE Auger Monster and Channel Monster.	Replace with Mechanically Cleaned Fine Bar Screen and Washer Compactor	≤5	Very High	4	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	5.33	Important	$ 442,000	Hadley Rd. PS Improvements
																					Project Total	**$ 459,200**	
Emergency Bypasses																							
Cross	Civil / Site Safety & Security	Cross-C306	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 26,000	Emergency Bypasses
Erin	Civil / Site Safety & Security	Erin-C206	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 28,000	Emergency Bypasses
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C407	Bypass	Building Exterior	No Bypass Pumping	Install a Bypass Pumping System	≤5	Very High	4	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	8.00	Important	$ 19,000	Emergency Bypasses
																					Project Total	**$ 73,000**	
WWTF Adminstration Building Improvements																							
WWTF	Structural/Architectural	WWTF-AB1	Building	Administration Building	Building Exterior Control Joints Missing Sealant	Apply Sealant to Repair Control Joints	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 300	WWTF Adminstration Building Improvements
WWTF	Structural/Architectural	WWTF-AB2	Building	Administration Building	Asphalt Shingle Roof is Aged and Worn	Replace roof in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 38,000	WWTF Adminstration Building Improvements
WWTF	Civil / Site Safety & Security	WWTF-AB5	Grab Bars	Administration Building	Non-compliant ADA Locker Room	Install grab bars and roll-in access	≤5	High	3	low	1	Low	1	Minor offense	2	0.67	0.33	2.00	2.00	6.00	Low Risk	$ 1,500	WWTF Adminstration Building Improvements
WWTF	Civil / Site Safety & Security	WWTF-AB6	Fire Alarm System	Administration Building	Lack of alarm strobes and pull stations	Install additional alarm strobes and pull stations	≤5	High	3	significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 5,800	WWTF Adminstration Building Improvements
WWTF	Structural/Architectural	WWTF-AB7	Building	Administration Building	Lack of Storage Space	Construct a new 2-bay garage	≤5	Very High	4	low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	4.00	Important	$ 350,000	WWTF Adminstration Building Improvements

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information								Likelihood of Failure		Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)		LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
																					Project Total	$ 395,600	
Low Risk Assets Improvements - Remaining Life 5 Years or less																							
Cross	Civil / Site Safety & Security	Cross-C302	Fences	Building Exterior	Site Fence	Repair or replace damaged fencing and privacy screening in rear of site.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Cross	Civil / Site Safety & Security	Cross-C303	Gutters	Building Exterior	Building Drainage Gutters	Clean gutters of debris and unclog drainage structures.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 200	≤5
Cross	Civil / Site Safety & Security	Cross-C305	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E307)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Cross	Electrical / Emergency Power	Cross-E304	Lighting	Indoors	Lighting is inefficient and dim	Provide new lighting	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 1,100	≤5
Cross	Electrical / Emergency Power	Cross-E305	Electrical Equipment	Indoors	No surge protection provided	Provide a surge protection (at least 100kA/phase) on the main service to protect electrical equipment	≤5	High	3	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	6.00	Low Risk	$ 2,500	≤5
Cross	Electrical / Emergency Power	Cross-E308	Lighting	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Cross	Electrical / Emergency Power	Cross-E309	Meter	Outdoors	Abondonned utility meter socket/enclosure was not demolished	Remove abondonned utility meter socket enclosure and conduit	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 300	≤5
Cross	HVAC / Plumbing	Cross-H304	Piping	Cross Street PS	engine exhaust pipe	rusted out; replace and assure code distance to wall opening (fan&louver); improve wall penetration detail, insulate interior pipe	≤5	High	3	Significant	3	Significant	3	In compliance	1	2.00	1.00	1.00	2.00	6.00	Low Risk	$ 4,200	≤5
Cross	HVAC / Plumbing	Cross-H305	Heater	Cross Street PS	wall mount electric unit heater	works, but fuse turned off --> manual start required; old appearance; replace	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Cross	HVAC / Plumbing	Cross-H306	Dehumidifier	Cross Street PS	dehumidifier	doesn't appear to work; replace	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 1,900	≤5
Cross	Instrumentation & Controls	Cross-I301	Meter	Building Interior	Doppler type Sonic Transducer Flow Meter with Polysonics digital display.	Replace with 12-inch magnetic flow meter at end of useful life	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 9,000	≤5
Cross	Process / Mechanical	Cross-P301	Pump	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B. 25 HP, 1765 RPM Gorman-Rupp Motor	Repalce in kind at of of useful life. Repair Seal Leak in interim.	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 27,000	≤5
Cross	Process / Mechanical	Cross-P302	Pump	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B. 25 HP, 1760 RPM Baldor Motor	Repalce in kind at of of useful life. Repair Seal Leak in interim.	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 27,000	≤5
Cross	Process / Mechanical	Cross-P303	Pump	Building Interior	Pump Backup Motor. Gorman-Rupp Watchdog. Belt Drive Connection to Pumps.	Replace with external backup generator. Protect nearby conduits with heat shield in interim. Provide backup cappability to both pumps. Properly ventilate (See H301 - H303).	≤5	High	3	Significant	3	Severe	4	In compliance	1	2.00	1.33	1.00	2.00	6.00	Low Risk	$ 95,000	≤5
Cross	Process / Mechanical	Cross-P304	Piping and Valves	Building Interior	8-inch swing check valves (Qty 2)	Replace and / or relocated check valvess to be horizontally mounted, not vertically mounted.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 7,100	≤5
Cross	Structural/Architectural	Cross-S301	Foundation	Building Exterior	Concrete Building Slab Is Being Undermined	Install Foundatio Wall and Flowable Fill	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 10,000	≤5
Cross	Structural/Architectural	Cross-S302	Doors	Building Exterior	Double Door Paint Deteriorated	Paint doors (2) and Frame	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Cross	Structural/Architectural	Cross-S303	Stairs	Building Exterior	Concrete Stairs Are Deteriorated	Remove and Replace Concrete Stairs	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 8,000	≤5
Cross	Structural/Architectural	Cross-S304	Handrails	Building Exterior	Concrete Stairs Do Not Have Guardrail/Handrails	Install Aluminum Guardrail/Handrail	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
Erin	Civil / Site Safety & Security	Erin-C203	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E206)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Erin	Electrical / Emergency Power	Erin-E207	Conduit/Wiring	Below grade locations	conduit straps are rusted.	Replace rusted conduit straps	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 500	≤5
Erin	Electrical / Emergency Power	Erin-E208	Lighting	Indoors	Lighting is inefficient	Replace lighting with new LED type	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 2,100	≤5
Erin	Electrical / Emergency Power	Erin-E210	Electrical Equipment	Ground Floor	Surge protection is old and small for the application	Replace existing surge protectors with a larger surge protection device (120KA or larger) on the main service to protect electrical equipment	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 3,000	≤5
Erin	Electrical / Emergency Power	Erin-E211	Lighting	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Erin	Electrical / Emergency Power	Erin-E212	Electrical Equipment	Below grade locations	Receptacle boxes are not weatherproof	Replace below grade receptacle boxes with cast aluminum, weather resistant type.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
Erin	HVAC / Plumbing	Erin-H201	Heater	Erin Lane PS	Electric Wall Heater, 1st floor	replace in kind	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,400	≤5
Erin	HVAC / Plumbing	Erin-H207	Piping	Erin Lane PS	Air Exhaust piping - Manhole to outside	repaint, install screen against pests and small animals at outside opening, replace/repair broken outlet pipe	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 300	≤5
Erin	HVAC / Plumbing	Erin-H208	Heater	Erin Lane PS	Electric Unit Heater - bottom of pump chamber	replace in kind and mount per maufacturers instructions	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Erin	HVAC / Plumbing	Erin-H209	Dehumidifier	Erin Lane PS	Dehumidifier - bottom of pump chamber	residential style, dirty, age unknown, replace, appears to be 70qt size, replace with industrial grade	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 1,900	≤5
Erin	Instrumentation & Controls	Erin-I204	Instrument/Controls	Building Interior	Flow Meter	Install a 4" magnetic flow meter on discharge pipe	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 4,100	≤5
Erin	Process / Mechanical	Erin-P201	Pump	Dry Well - Pump Chamber	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B/F.	Repalce in kind	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 13,000	≤5
Erin	Process / Mechanical	Erin-P202	Pum	Dry Well - Pump Chamber	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B/F.	Repalce in kind	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 13,000	≤5
Erin	Process / Mechanical	Erin-P203	Piping and Valves	Dry Well - Pump Chamber	Process Piping & Valves	Sandblast and Repaint process piping and valves. Replace Vertically Mounted Check Valves with Horizontally Mounted Check Valves. Replace Missing Pump #2 Check Valve Recoil Spring Immediately.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
Erin	Process / Mechanical	Erin-P204	Pump	Dry Well - Pump Chamber	Simplex Sump Pump	Repalce in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Erin	Structural/Architectural	Erin-S201	Arch. Details	Building Exterior	Paint on Wood Building Trim Deteriorated	Paint Wood Trim	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 5,000	≤5
Erin	Structural/Architectural	Erin-S202	Doors	Building Exterior	Door Paint Deteriorated	Paint doors (2) and Frame	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 800	≤5
Erin	Structural/Architectural	Erin-S203	Doors	Building Exterior	Door Hardware Deteriorated / Cylinder Lock	Replace Door Hardware	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,000	≤5
Erin	Structural/Architectural	Erin-S204	Walls	Building Interior	Paint On Walls Of Pump Chamber Can Deteriorated	Paint Interior Of Pump Chamber Can	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Civil / Site Safety & Security	Hadley-C102	Handrail	Building Exterior	Concrete Stairs & Aluminum Handrail	Repair Concrete Cracks and Spalling. Reconfigure Handrail Location. Dry Well entrance is not blocked by open swing door.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk		≤5
Hadley	Civil / Site Safety & Security	Hadley-C104	Lighting	Building Exterior	Site Security - Lighting	Install Motion Activated Lights on all sides of Pump Station (See E109)	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ -	≤5
Hadley	Civil / Site Safety & Security	Hadley-C105	Access Hatch	Dry Well	Floor Access Hatches Fall Proptection	Provide Fall Protection Netting on all Motor Hatches. Replace missing chain and posts around motor access hatches.	≤5	High	3	Severe	4	Low	1	In compliance	1	2.67	0.33	1.00	2.67	8.00	Low Risk	$ 6,200	≤5
Hadley	Civil / Site Safety & Security	Hadley-C106	Drains	Dry Well	Floor Drains do not exist	Install Floor Drains on Sub Floor #1 (Storage Level) near location of plant water system.	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 4,100	≤5
Hadley	Electrical / Emergency Power	Hadley-E105	Electrical Equipment	Dry Well Ground Floor	No surge protection provided	Provide a surge protection (at least 200kA/phase) on the main service to protect electrical equipment	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,000	≤5
Hadley	Electrical / Emergency Power	Hadley-E107	Electrical Equipment	Dry Well Middle Level	K & H Controls dual pump control panel (unused) old and in fair condition	Remove panel and wiring, cap unused conduits	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
Hadley	Electrical / Emergency Power	Hadley-E108	Lighting	Dry Well Pump Room	Lighting is dim	Provide one additional light fixture	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Hadley	Electrical / Emergency Power	Hadley-E109	Lighting	Outdoors	Lighting is old and seems to be inoperable - Security	Replace lighting with new LED fixtures (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 2,000	≤5
Hadley	Electrical / Emergency Power	Hadley-E112	Electrical Equipment	Wet Well	Lamp in one of the explosion proof fixtures is out	Replace blown lamp in explosion proof fixture	≤5	High	3	Moderate	2	Low	1	Minor offense	2	1.33	0.33	2.00	2.00	6.00	Low Risk	$ 300	≤5
Hadley	HVAC / Plumbing	Hadley-H102	Heater	Hadley Road PS - dry well	wall mount electric unit heaters (2) - 1st floor	manufactured by CPE - out of business since about 1990; replace unit in kind	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 2,800	≤5

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information								Consequence Factors (unweighted)								Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Hadley	HVAC / Plumbing	Hadley-H105	Heater	Hadley Road PS - dry well	wall mount electric unit heaters - bottom floor	Chromalox Unit, built 2005; replace in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Hadley	HVAC / Plumbing	Hadley-H106	Heater	Hadley Road PS - dry well	wall mount electric unit heater - middle floor	manufactured by CPE - out of business since about 1990; replace unit in kind	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Hadley	HVAC / Plumbing	Hadley-H109	Piping	Hadley Road PS - dry well	engine exhaust pipe	rusty in places - including drain, inspect and replace or re-protect - at drain removal inspect interior pipe conditions	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,300	≤5
Hadley	HVAC / Plumbing	Hadley-H110	Fan	Hadley Road PS - wet well	exhaust fan	unknown age, very dirty screen with at least 25% of free area clogged - which could influence performance and life; replace or clean screen and inspect fan at the same time; operation with ligthswitch - clean screen immediately (estimated $500.- of own manpower)	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 5,900	≤5
Hadley	HVAC / Plumbing	Hadley-H111	Louver	Hadley Road PS - wet well	exhaust louver	dirty, but overall look of good condition; clean and inspect then more closely	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,200	≤5
Hadley	HVAC / Plumbing	Hadley-H112	Louver	Hadley Road PS - wet well	air intake louver/damper	very dirty, rusty actuator, bird screen intakt, clean and inspect at that time more closely	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,200	≤5
Hadley	HVAC / Plumbing	Hadley-H113	Heater	Hadley Road PS - wet well	wall mount electric unit heater	very rusty unit, electric coil in bad shape, replace in kind	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 10,000	≤5
Hadley	Instrumentation & Controls	Hadley-I102	Electrical Equipment	Wet well	Backup Float Switch System	Replace in kind at end of useful life	≤5	High	3	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	4.00	Low Risk	$ 1,200	≤5
Hadley	Process / Mechanical	Hadley-P105	Instrument/Controls	Dry Well - First Floor	Automatic Water Sampler. American Sigma 900 Max.	Remove or Clean	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 200	≤5
Hadley	Process / Mechanical	Hadley-P110	Blowers	Dry Well - First Floor	Blowers. Roots / Dresser Industries, 3 HP. Not in Service.	Abandon or Demolish.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
Hadley	Process / Mechanical	Hadley-P111	Pumps	Dry Well - Pump Room	Simplex Sump Pump by Myer Pumps (Qty 2)	Replace in kind	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,700	≤5
Hadley	Structural/Architectural	Hadley-S102	Walls	Building Exterior - South Elev	Masonry Control Joint Sealant Has Failed	Remove and Replac Joint Sealant	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S103	Stairs	Building Exterior - North Elev	Concrete Stairs to Pump Room Are Deteriorated	Remove and Replace Concrete Stairs	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 8,000	≤5
Hadley	Structural/Architectural	Hadley-S104	Stairs	Building Exterior - North Elev	Concrete Stairs to wetwell Are Deteriorated	Replace Aluminum Windows (3)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 8,000	≤5
Hadley	Structural/Architectural	Hadley-S105	Sealants	Building Exterior	Joint Sealant Around Doors and louvers Failed	Remove and replace Joint Sealant	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Structural/Architectural	Hadley-S106	Doors	Building Exterior Door	Pump Room - Double Door Paint Deteriorated	Paint doors (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Hadley	Structural/Architectural	Hadley-S107	Doors	Building Exterior Door	Pump Room - Double Door Hardware Corroded	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S108	Doors	Building Exterior Door	Escape-Way Single Door Damaged At Lock	Remove and Replace Door	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Hadley	Structural/Architectural	Hadley-S109	Doors	Building Exterior Door	Escape-Way Single Door Hardware	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S110	Railing	Building Exterior Door	Escape-Way Door Landing Guardrail Missing	Install Aluminum Guardrail	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 3,000	≤5
Hadley	Structural/Architectural	Hadley-S111	Doors	Building Exterior Door	Wetwell - Single Door Paint Deteriorated	Paint door	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 800	≤5
Hadley	Structural/Architectural	Hadley-S112	Doors	Building Exterior Door	Wetwell - Single Door Hardware Corroded	Remove and Replace Door Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,200	≤5
Hadley	Structural/Architectural	Hadley-S113	Doors	Building Exterior Door	Wetwell - Double Door Paint Deteriorated	Paint doors (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,000	≤5
Hadley	Structural/Architectural	Hadley-S114	Doors	Building Exterior Door	Wetwell - Double Door Hardware Corroded	Remove and Replace Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,500	≤5
Hadley	Structural/Architectural	Hadley-S115	Sealants	Building Interior - Pump Roo	Intermed Level - Wall Mech Seals Leaking 6" & 8"	Repair Link Seals (2)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 4,000	≤5
Hadley	Structural/Architectural	Hadley-S116	Sealants	Building Interior - Pump Roo	Lower Level - Wall Mech Seals Leaking 10"	Repair Link Seals (1)	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,000	≤5
Hadley	Structural/Architectural	Hadley-S117	Walls	Building Interior - Pump Roo	Lower Level - Paint Peeling From Walls	Paint Lower Level Walls	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 6,000	≤5
Hadley	Structural/Architectural	Hadley-S118	Stairs	Building Interior - Wet Well	Concrete Stair and nosings are deteriorated	Repair concrete stairs and nosings	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 5,000	≤5
Hadley	Structural/Architectural	Hadley-S119	Beams	Building Interior - Wet Well	Monorail Beam & Supports are Deteriorated	Paint Monorail beam and Supports	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C403	Manhole	Building Exterior	Wetwell Manhole Cover	Replace Cracked Manhole Cover	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 700	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E406	Electrical Equipment	Indoors	No surge protection provided	Provide a surge protection on the main service to protect electrical equipment	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E408	Conduit/Wiring	Outdoors	Electric Service conduit support corroded	Replace support (conduit strap)	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E410	Electrical Equipment	Outdoors	Lighting is old and seems to be inoperable	Replace lighting with new LED fixture (with motion detectors to help increase safety)	≤5	High	3	Significant	3	Low	1	In compliance	1	2.00	0.33	1.00	2.00	6.00	Low Risk	$ 500	≤5
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E411	Conduit/Wiring	Outdoors	Coupling for generator power conduit (near ground) is rusting.	Sand and coat coupling to prvent extensive corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
Jaffrey Ctr	HVAC / Plumbing	Jaffrey Ctr-H401	outdoors	Jaffrey Center PS	wall fan with penetration to outdoors	no screen in place, age unknown - estimated beyond 10years, still operating, rusty sleeve, study temperature in pump station to determine adequate inlet size	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Jaffrey Ctr	HVAC / Plumbing	Jaffrey Ctr-H402	heater	Jaffrey Center PS	wall mount electric unit heater	age unknown - estimated to be beyond 10years, appears to be operating, bend grille, dirty, size estimate at 1.5kW	≤5	High	3	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	4.00	Low Risk	$ 1,400	≤5
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I404	Instrument/Controls	Building Interior	Flow Meter	Install a 4" magnetic flow meter on discharge pipe	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 4,100	≤5
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P401	Motor	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B. 5 HP, 1730 RPM Gorman-Rupp Motor	Replace in kind	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P402	Motor	Building Interior	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T4A3-B. 5 HP, 1730 RPM Gorman-Rupp Motor	Repalce in kind	≤5	High	3	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S401	deterioration	Building Exterior - East Eleva	Door and frame show signs of deterioration	Remove & Replace Door, Frame and Hardware	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S402	roof	Building Exterior - South Elev	Tree branches are growing over the roof	Trim tree branches	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 2,500	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S403	deteriorated	Building Exterior - Roof	The roof shinglesare deteriorated	Remove and Replace Roof Shingles	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 5,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S404	deteriorated	Building Exterior	Concrete Block (CMU) Paint is deteriorated	Paint CMU	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 3,000	≤5
Jaffrey Ctr	Structural/Architectural	Jaffrey Ctr-S405	access	Building Interior	The ceiling doesn't have attic access	Provide 20"x30" Attic Access Per IBC1209.2	≤5	High	3	Low	1	Severe	4	In compliance	1	0.67	1.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
WWTF	Electrical / Emergency Power	WWTF-E1	Electrical Equipment	Influent Channel / Grit Tank Area	3 signal conduits on top of the North side (cast into concrete) are severely rusted.	Replace fittings on top; remove rust from conduits and coat with PVC coating	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E10	Electrical Equipment	Process Building - Sludge Loading Bay P-110	Conduit supports straps on the ceiling are rusting	Replace with PVC coated conduit straps	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5
WWTF	Electrical / Emergency Power	WWTF-E12	Electrical Equipment	Process Building - Electrical Room P-103	The flex conduit connection to the AC-2 Blower enclosure is very loose.	Tighten connection; this may require new locknuts	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E13	Electrical Equipment	Process Building - Electrical Room P-103	The VFD for the Aerator MA-1 is louder than expected. This may or may not be normal for this drive under these circumstances.	Compare the sound level of this drive to that of another Aerator. If it is significantly louder, check with the VFD manufacturer to determine if there may be a problem.	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ -	≤5
WWTF	Electrical / Emergency Power	WWTF-E14	Electrical Equipment	Process Building - Pump Room P-001	The conduit between the CFP-1 disconnect switch and motor is not fastened to the strut support.	Fasten the conduit to the strut support	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E15	Electrical Equipment	Process Building - Pump Room P-001	There are a number of field threads on conduits that are rusting.	Provide galvanizing coating on these rusted threads to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E16	Electrical Equipment	Process Building - Pump Room P-001	The floor anchors supporting the RAS pump disconnect switches are rusting.	Remove rust and coat with galvanizing coating to prevent further corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E17	Electrical Equipment	Process Building - Boiler Room P-002	There are a number of field threads on conduits that are rusting.	Provide galvanizing coating on these rusted threads to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E18	Electrical Equipment	Outdoors - Generator	The generator enclosure door does not properly close and cannot be locked.	Fix door.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 500	≤5

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
WWTF	Electrical / Emergency Power	WWTF-E19	Electrical Equipment	UV Disinfection - UV Room D-102	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E2	Electrical Equipment	Process Building - Exterior	The exterior lighting on the building remains on all day.	Provide a photocell on the lighting circuit to turn the lights off during daylight hours.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 500	≤5
WWTF	Electrical / Emergency Power	WWTF-E22	Electrical Equipment	Polymer Room	A receptacle cover is missing.	Provide a "weatherproof-while-in-use" cover.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E23	Electrical Equipment	Polymer Building Basement	There are a number of field threads on conduits that are rusting.	Coat the rusted threads with galvanizing coating on the non-PVC coated conduit and with PVC coating (rated for the application) on PVC coated conduits to prevent further corrosion.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E3	Electrical Equipment	Process Building - Dewatering Room	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 300	≤5
WWTF	Electrical / Emergency Power	WWTF-E5	Electrical Equipment	Process Building - Dewatering Room	The Polymer Control Panel has open holes on the bottom.	Provide hole plugs for the panel to help prevent corrosion inside the panel.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E6	Electrical Equipment	Process Building - Grit Removal Room	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E7	Electrical Equipment	Process Building - Corridor P-107	The conduit at the door security contact is not fastened to the wall.	Fasten conduit to the wall	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Electrical / Emergency Power	WWTF-E8	Electrical Equipment	Process Building - Chem Room P-108	The threaded ends of the PVC coated conduits are not coated	Provide PVC coating (rated for the application) on all conduit threads to prevent rusting.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 200	≤5
WWTF	Electrical / Emergency Power	WWTF-E9	Electrical Equipment	Process Building - Sludge Loading Bay P-110	The two disconnect switches on the SW wall each have a conduit entering the bottom that appear to be missing gaskets	Provide gaskets on these conduit entries to reduce internal corrosion	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 100	≤5
WWTF	Instrumentation & Controls	'WTF-IAE/AI-40A8	SC200 Controller.	Oxidation Ditch	Dissolved Oxygen Sensor by Hach	Properly Store offline DO probe. Replace in kind at end of useful life. Replace both SC100 Controllers with one SC200 Controller.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 11,000	≤5
WWTF	Instrumentation & Controls	'WTF-IAE/AI-40C8	SC200 Controller.	Oxidation Ditch	pH Sensor by Hach	Address warning / error messages in both probes (replace both salt bridges and calibrate). Properly store offline pH probe. Replace sensor in kind at end of useful life. Replace both SC100 Controllers with one SC200 Controller.	≤5	High	3	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	3.00	Low Risk	$ 8,000	≤5
WWTF	Instrumentation & Controls	WWTF-ILSHH-50A	Warning Alarm	Process Building - Pump Roo	Float Switch Flood Warning Alarm	Provide Backup Pump Room Flood Warning Alarm	≤5	High	3	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	4.00	Low Risk	$ 2,500	≤5
WWTF	Process / Mechanical	WWTF-P113	Edgechanical M	Sludge Holding and Dewateri	Sludge Holding Tanks No. 1 & No. 2	Repair cracked concrete on tank exterior	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 9,000	≤5
WWTF	Process / Mechanical	WWTF-P114	Qty 2)	Process Building - Pump Roo	Sump Pumps (Qty 2)	Replace in kind at end of useful life	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 4,100	≤5
WWTF	Process / Mechanical	WWTF-P123	Valves	Sludge Holding and Dewateri	Centrifuge Feed Pump Discharge Line Check Valve	Install check valve on discharge line of centrifuge feed pumps.	≤5	High	3	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	3.00	Low Risk	$ 3,300	≤5
WWTF	Process / Mechanical	WWTF-PGT-1	Pump	Process Building - Pump Roo	Grit Pump	Install hand guard around shaft. Consider providing a backup grit pump. Replace in kind at end of useful life.	≤5	High	3	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	6.00	Low Risk	$ 46,000	≤5
WWTF	Structural/Architectural	WWTF-S501	Corrosion	Influent Channel / Grit Tank ,	Influent Channel Concrete - Spalling , corrosion, deterioration	Repair damaged concrete and apply protective epoxy coating.	≤5	High	3	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	4.00	Low Risk	$ 12,000	≤5
WWTF	Structural/Architectural	WWTF-S502	afflorescence	Influent Channel / Grit Tank ,	Grit Chamber Tank Concrete Exterior - Cracking and efflorescence	Repairing cracked concrete and water leaks in concrete.	≤5	High	3	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	3.00	Low Risk	$ 1,800	≤5
																				Asset Class Total		**$ 521,500**	
Low Risk Assets Improvements - Remaining Life 6-10 Years																							
Cross	Civil / Site Safety & Security	Cross-C301	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
Cross	Civil / Site Safety & Security	Cross-C304	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 5,100	6-10
Cross	Instrumentation & Controls	Cross-I302	Alarm system	Building Interior	Remote Alarm Dialing Monitor	Replace with SCADA system	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Cross	Instrumentation & Controls	Cross-I303	Instrument/Controls	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Repalce with Ultrasonic Level Indicator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
Cross	Instrumentation & Controls	Cross-I304	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
Erin	Civil / Site Safety & Security	Erin-C201	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 11,000	6-10
Erin	Civil / Site Safety & Security	Erin-C202	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Erin	Electrical / Emergency Power	Erin-E201	Electrical Equipment	Indoors	Panelboards are approaching the end of their useful life	Replace panelboards	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,500	6-10
Erin	Electrical / Emergency Power	Erin-E202	Electrical Equipment	Indoors	The generator is approaching the end of its useful life	Replace generator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 25,000	6-10
Erin	Electrical / Emergency Power	Erin-E203	Electrical Equipment	Indoors	The automatic transfer switch is approaching the end of its useful life	Replace automatic transfer switch	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 4,000	6-10
Erin	Electrical / Emergency Power	Erin-E204	Electrical Equipment	Indoors	The fire alarm and security panels are approaching the end of their useful lives	Replace the panels and devices	6-10	Medium	2	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	4.00	Low Risk	$ 5,000	6-10
Erin	Electrical / Emergency Power	Erin-E205	Electrical Equipment	Bottom level	Disconnect switches are rusted	Replace disconnect switches	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 2,000	6-10
Erin	HVAC / Plumbing	Erin-H203	Ducts	Erin Lane PS	Generator Air Exhaust Duct - 1st floor	repainting (price for 5hr @ $90.-; no mark-up, assumed maintenance job)	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,400	6-10
Erin	HVAC / Plumbing	Erin-H205	Piping	Erin Lane PS	Generator Engine Exhaust pipe - 1st floor	rusty in places, clean and repaint/rust protect (2hr @ $90.-; no mark-up, assumed maintenance job; replace if needed "C")	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 5,200	6-10
Erin	HVAC / Plumbing	Erin-H206	manhole	Erin Lane PS	Air Exhaust Fan - bottom of manhole	good contition, slight rust, expected life 20yr, unknown age	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 700	6-10
Erin	Instrumentation & Controls	Erin-I201	Air Bubbler	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Repalce with Ultrasonic Level Indicator	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
Erin	Instrumentation & Controls	Erin-I202	Instrument/Controls	Wet Well & Controls Cabinet	Float Backup Wet Well and Alarm Level Indicators	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
Erin	Instrumentation & Controls	Erin-I203	Instrument/Controls	Building Interior	Remote Alarm Dialing Monitor	Replace with SCADA system	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Erin	Instrumentation & Controls	Erin-I205	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
Hadley	Civil / Site Safety & Security	Hadley-C101	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 17,000	6-10
Hadley	Civil / Site Safety & Security	Hadley-C103	Alarm system	Building Exterior	Site Security - Alarm System	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Hadley	Electrical / Emergency Power	Hadley-E101	Lighting	All of Dry Well	Lighting is old and inefficient	Replace fixtures with LED type	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 4,900	6-10
Hadley	Electrical / Emergency Power	Hadley-E102	Fire Alarm	Dry Well Ground Floor	Fire Alarm Panel Old and becoming unreliable	Replace panel	6-10	Medium	2	Severe	4	Moderate	2	In compliance	1	2.67	0.67	1.00	2.67	5.33	Low Risk	$ 2,500	6-10
Hadley	Electrical / Emergency Power	Hadley-E103	Instrument/Controls	Dry Well Ground Floor	Security Control Panel Old and becoming unreliable	Replace panel	6-10	Medium	2	Significant	3	Moderate	2	In compliance	1	2.00	0.67	1.00	2.00	4.00	Low Risk	$ 1,500	6-10
Hadley	Electrical / Emergency Power	Hadley-E106	Electrical Equipment	Dry Well Ground Floor	Panelboards in fair physical condition, but is old and becoming unreliable	Replace the panelboard	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 2,000	6-10
Hadley	Instrumentation & Controls	Hadley-I101	Instrument/Controls	Wet well	Submersible Pressure Transducers	Replace in kind at end of useful life. Ensure bottom portion of wet well tanks are cleaned, not just the top portion of the tanks.	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Hadley	Instrumentation & Controls	Hadley-I103	Meter	Wet well	Ultrasonic Flow Meter	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 3,300	6-10

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Hadley	Process / Mechanical	Hadley-PINF-1	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3s-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	Hadley-PINF-2	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	Hadley-PINF-3	Pump	Dry Well - Pump Room	Self-Priming Centrifugal Pump by Gorman Rupp. T-Series Model #T8A3s-B/F. 30 HP, 1765 RPM.	Replace wear plate every 1-2 years. Consider replacing rotating parts every 5-10 years. Replacepump in kind at end of useful life.	6-10	Medium	2	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	2.67	Low Risk	$ 22,000	6-10
Hadley	Process / Mechanical	ley-PSTG-1,3,4,5,7	Gates	Wet Well	Slide Gates by Waterman Industries (Qty 7)	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 67,000	6-10
Hadley	Structural/Architectural	Hadley-S101	Roofing	Building Exterior	Roof Aspahalt Shingles Are Worn	Remove and Replace Asphalt Shingles	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 15,000	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C401	Pavement	Building Exterior	Bituminous Concrete Driveway & Access Road	Replace / Repave Driveway (Patch Cracks in Short Term)	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 13,000	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C402	Fences	Building Exterior	Perimeter Fencing and Barbed Wire	Repair or replace damaged fencing and barbed wire	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Jaffrey Ctr	Civil / Site Safety & Security	Jaffrey Ctr-C406	Alarm system	Indoors	Site Security - Alarm Systm	Install a building alarm system	6-10	Medium	2	Moderate	2	Low	1	In compliance	1	1.33	0.33	1.00	1.33	2.67	Low Risk	$ 6,400	6-10
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E401	Counduit/wiring	Indoors	Panelboard is in fair physical condition, but is old and becoming unreliable	Replace the panelboard	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 2,500	6-10
Jaffrey Ctr	Electrical / Emergency Power	Jaffrey Ctr-E402	Counduit/wiring	Indoors	Transfer Switch (ATS will be approaching the end of its useful life	Replace the ATS	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 4,000	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I401	Monitor	Building Interior	Remote Alarm Dialing Monitor	Repalce with SCADA System	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ -	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I402	Btion &la	Wet Well & Controls Cabinet	Air Bubbler Wet Well Level Indicator System	Repalce with Ultrasonic Level Indicator	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 3,300	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I403	Instrument/Controls	Wet Well & Controls Cabinet	Float Backup Wet Well Level Indicators.	Replace in kind at end of useful life	6-10	Medium	2	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	2.67	Low Risk	$ 600	6-10
Jaffrey Ctr	Instrumentation & Controls	Jaffrey Ctr-I405	Instrument/Controls	Building Interior	SCADA System and Transmitter	Install SCADA system and radio antenna for recording and transmitting data to WWTF	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 25,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB10	Laboratory Equipment	Administration Building	Mettler AE 160 Analytical Balance Scale	Replace with comparable analytical balance	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 4,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB11	Laboratory Equipment	Administration Building	Ohaus Explorer Pro Balance Scale	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 700	6-10
WWTF	Instrumentation & Controls	WWTF-AB12	Laboratory Equipment	Administration Building	Precision Gravity Convection Oven	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB13	Laboratory Equipment	Administration Building	Quincy Lab Gravimetric Oven	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,400	6-10
WWTF	Instrumentation & Controls	WWTF-AB14	Laboratory Equipment	Administration Building	Welch Vacuum Pump	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB15	Laboratory Equipment	Administration Building	Westover Electron Microscope	Replace with similar at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-AB16	Laboratory Equipment	Administration Building	Thermo Scientific Magnetic Stir Plate	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 500	6-10
WWTF	Instrumentation & Controls	WWTF-AB17	Laboratory Equipment	Administration Building	Hach DR 2800 Spectrophotometer	Replace with Hach DR3900	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB18	Laboratory Equipment	Administration Building	Hach DRB 200 digestion block	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-AB19	Laboratory Equipment	Administration Building	Thermolyne muffle furnace	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 4,300	6-10
WWTF	Instrumentation & Controls	WWTF-AB20	Laboratory Equipment	Administration Building	Lab-Line Ambi Hi-Lo incubator	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 8,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB21	Laboratory Equipment	Administration Building	Kenmore lab refrigerator	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB22	Laboratory Equipment	Administration Building	Kenmore freezer	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,300	6-10
WWTF	Instrumentation & Controls	WWTF-AB23	Laboratory Equipment	Administration Building	GE Dishwasher	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,200	6-10
WWTF	Instrumentation & Controls	WWTF-AB24	Laboratory Equipment	Administration Building	YSI 550A dissolved oxygen meter	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,400	6-10
WWTF	Instrumentation & Controls	WWTF-AB8	Laboratory Equipment	Administration Building	Thermo Scientific Orion 3 Star pH Meter	Replace Thermo Scientific Oriion Star A211 pH Meter & Probe	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 2,000	6-10
WWTF	Instrumentation & Controls	WWTF-AB9	Laboratory Equipment	Administration Building	Hach Sension 3 pH meter	Replace in kind at end of useful life	6-10	Medium	2	low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 1,600	6-10
WWTF	Electrical / Emergency Power	WWTF-E21	Electrical Equipment	Outdoors - Various	The epoxy coating on many of the strut supports is pealing off.	Recoat	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 100	6-10
WWTF	Instrumentation & Controls	WWTF-IAE/AIT-21/	Hausser	Influent Channel / Grit Tank /	Millipore Influent - pH Sensor by Endress-Hausser	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 1,900	6-10
WWTF	Instrumentation & Controls	WWTF-IAE/AIT-22/	Hausser	Influent Channel / Grit Tank /	Millipore Influent - ORP Sensor by Endress-Hausser	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 2,100	6-10
WWTF	Instrumentation & Controls	WWTF-IFE/FIT-23/	HydroRanger2000	Influent Channel / Grit Tank /	Millipore Influent - Ultrasonic Flow Meter by Siemens, HydroRanger2000	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Low	1	In compliance	1	0.67	0.33	1.00	1.00	2.00	Low Risk	$ 3,300	6-10
WWTF	Instrumentation & Controls	WWTF-IFE-50A & FE-	Krohne	Process Building - Pump Roo	RAS & WAS Electromagnetic 8-inch Flow Meters (Qty 2) by Krohne	Replace in kind at end of service life.	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 5,500	6-10
WWTF	Instrumentation & Controls	WWTF-IFE-55A	Krohne	Process Building - Pump Roo	WAS Electromagnetic 4-inch Flow Meter by Krohne	Replace in kind at end of service life. Ensure calibrations are kept up to date.	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 4,100	6-10
WWTF	Instrumentation & Controls	WWTF-ILE/LIT-35/	Transducer	Septage Receiving	Level Pressure Transducer	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 1,800	6-10
WWTF	Process / Mechanical	WWTF-P.SEP-1	Wemco	Septage Receiving	Septage Transfer Pump by Wemco	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 36,000	6-10
WWTF	Process / Mechanical	WWTF-P112	rack	Septage Receiving	Manually raked bar rack	Replace at end of useful life / Install mechanically cleaned bar rack.	6-10	Medium	2	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	2.67	Low Risk	$ 1,700	6-10
WWTF	Process / Mechanical	WWTF-P115	DynaBLEND	Process Building - Dewaterin	Polymer Feed System by DynaBLEND	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	2.00	Low Risk	$ 31,000	6-10
WWTF	Process / Mechanical	WWTF-PCM-1,2	mixer	ACTIFLO System	Coagulation tank mixer	Replace / maintain failed bearing. Replace mixer in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 110,000	6-10
WWTF	Process / Mechanical	WWTF-PHC-1,2,3,4	Mechanism	ACTIFLO System	Hydrocyclone (Qty 4)	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 15,000	6-10
WWTF	Process / Mechanical	WWTF-PIM-1,2	mixer	ACTIFLO System	Injection tank mixer	Touch-up paint. Address mixer vibration and humming sound. Replace mixer in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 110,000	6-10
WWTF	Process / Mechanical	WWTF-PMAG-1,2	Injection point.	Process Building - Chemical S	Magnesium Hydroxide Chemical Feed Pumps (Qty 2) by Masterflex	Replace in kind at end of useful life. Repair and clean MAG leak at RAS header injection point.	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 9,000	6-10
WWTF	Process / Mechanical	WWTF-PPAC-1,2	Useful life	Process Building - Chemical S	Ferric Chemical Feed Pumps (Qty 2) by Masterflex	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 9,000	6-10
WWTF	Process / Mechanical	WWTF-PSTS-1,2	Mechanism	ACTIFLO System	Settling Tank Scraper Mechanism	Replace in kind at end of useful life	6-10	Medium	2	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	2.00	Low Risk	$ 66,000	6-10
WWTF	Process / Mechanical	F-PUV-1A,B & UV	Useful life	UV Disinfection Building	UV3000Plus Ultraviolet Disinfection System by Trojan	Replace in kind at end of useful life	6-10	Medium	2	Moderate	2	Severe	4	Multiple offenses	4	1.33	1.33	4.00	4.00	8.00	Crit-Mon	$ 884,000	6-10
																				Asset Class Total		**$ 1,720,800**	
Low Risk Assets Improvements - Remaining Life >10 Years																							
Erin	HVAC / Plumbing	Erin-H202	Louver	Erin Lane PS	Air intake louver - 1st floor	good conditions, age unknown, actuator operational	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Erin	HVAC / Plumbing	Erin-H204	Louver	Erin Lane PS	Generator Air Exhaust Louver - 1st floor	good conditions, age unknown, actuator operational	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Hadley	HVAC / Plumbing	Hadley-H101	Louver	Hadley Road PS - dry well	air inlet louver - above door	good conditions, age unknown	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Hadley	HVAC / Plumbing	Hadley-H103	Ducts	Hadley Road PS - dry well	Generator Air Exhaust Duct - 1st floor	good conditions, clean, insect screen good, install date 2009	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 5,400	>10
Hadley	HVAC / Plumbing	Hadley-H104	Louver	Hadley Road PS - dry well	Generator Air Exhaust Louver - 1st floor	good conditions, clean, install date 2009	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 4,200	>10
Hadley	HVAC / Plumbing	Hadley-H107	Fan	Hadley Road PS - dry well	exhaust fan - middle floor	appears to be in good conditions, age unknown	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 3,800	>10
Hadley	HVAC / Plumbing	Hadley-H108	Ducts	Hadley Road PS - dry well	exhaust duct & louvers	appears to be in good conditions, age unknown, duct to attic and sidewall louvers	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 9,000	>10
Hadley	Process / Mechanical	Hadley-P10	Valves	Wet Well	12-inch Knife Gate Valves (Qty 2)	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 10,000	>10
Hadley	Process / Mechanical	Hadley-P104	Piping and Valves	Dry Well	10" Plug Valves (Qty 3), 8" Plug Valves (Qty 3), 8" Check Valves (Qty 3)	Replace in kind at end of useful life	>10	Low	1	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	1.33	Low Risk	$ 31,000	>10
Hadley	Process / Mechanical	Hadley-P107	Service Water System	Dry Well Storage Room Level	Service Water System. Two 50 gallon storage tanks, One Goulds 1/2 HP Pump, and Piping.	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 18,000	>10

Table A-4 Facilities Sorted by Recommended Projects and Remaining Life

Tighe&Bond

General Information										Consequence Factors (unweighted)						Consequence Factors (weighted)							
Facility	System	AssetID	Asset Type	Location	Asset / Defect Description	Proposed Improvement	Remaining Service Life (yrs)	Likelihood of Failure	LoF (Num)	Health & Safety (Desc)	Health & Safety Rating	Operations & Economic (Desc)	Operations & Economic Rating	Environmental/ Regulatory Compliance (Desc)	Environmental/ Regulatory Compliance Rating	Health & Safety (weighted)	Operations & Economic (weighted)	Environmental/ Regulatory Compliance (weighted)	Criticality Score	Risk Score	Quadrant	Estimated Capital Cost	Project
Hadley	Process / Mechanical	Hadley-P109	Grinder	Wet Well	Manual Bar Racks (Qty 2). One @ 2.5 inch bar spacing. One @ 1.5 inch bar spacing, located in screenings grinder bypass channel.	Replace in kind at end of useful life. Supplement with Mechanically Cleaned Fine Bar Screen (See Item P106)	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 2,100	>10
Hadley	Process / Mechanical	Hadley-PSTG-2,6,1	Gates	Wet Well	Channel Stop Gates (Qty 3)	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 9,000	>10
Jaffrey Ctr	Process / Mechanical	Jaffrey Ctr-P403	Valves	Building Interior	Check Valves (Qty 2)	Replace valves at end of service life. Touch up paint on discharge piping in short term.	>10	Low	1	Moderate	2	Significant	3	In compliance	1	1.33	1.00	1.00	1.33	1.33	Low Risk	$ 3,300	>10
WWTF	Electrical / Emergency Power	WWTF-AB3	Emergency Power	Administration Building	CAT 06 kW Emergency Generator	Replace in kind at end of service life	>10	Low	1	Low	1	Significant	3	Minor offense	2	0.67	1.00	2.00	2.00	2.00	Low Risk	$ 62,000	>10
WWTF	HVAC / Plumbing	WWTF-AB4	Water Heater	Administration Building	Hot Water Boiler	Replace in kind at end of service life	>10	Low	1	Moderate	2	Moderate	2	In compliance	1	1.33	0.67	1.00	1.33	1.33	Low Risk	$ 25,000	>10
WWTF	Process / Mechanical	WWTF-P116	Piping	Plant & Well Water System	Plant Water System Piping in process building pump room	Further evaluate and reinforce DI to PVC pipe interface. Replace valves at end of useful life.	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 2,100	>10
WWTF	Process / Mechanical	WWTF-P118	Sanitaire	Post Aeration System	Post Aeration Tank & Fine Bubble Diffused Aeration System by Sanitaire	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 23,000	>10
WWTF	Process / Mechanical	WWTF-P119	EasyAir	UV Disinfection Building	Rotary Lobe Blowers by Roots-EasyAir	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 62,000	>10
WWTF	Process / Mechanical	WWTF-P120	NsationtechanicaleM	Plant & Well Water System	Plant Water Pressure Tank & Pumps in UV Disinfection Building	Remove condensation rust and repaint. Replace in kind at end of useful life	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 12,000	>10
WWTF	Process / Mechanical	WWTF-P121	Ind echanicaleM	Plant & Well Water System	Potable Water Well Pumping System	Replace in kind at end of useful life	>10	Low	1	Moderate	2	Severe	4	In compliance	1	1.33	1.33	1.00	1.33	1.33	Low Risk	$ 7,000	>10
WWTF	Process / Mechanical	WWTF-PALK-3	Useful life	Process Building - Chemical S	Magnesium Hydroxide Mechnical Mixer	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 3,800	>10
WWTF	Process / Mechanical	WTF-PANM-1,2,3	EIMCO	Oxidation Ditch	Anaerobic Reactor Mixers (Qty 4) by EIMCO	Replace in kind at end of useful life / Replace with surface mixers	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 98,000	>10
WWTF	Process / Mechanical	WWTF-PAXM-1,2	EIMCO	Oxidation Ditch	Anoxic Reactor Mixers (Qty 2) by EIMCO	Replace in kind at end of useful life / Replace with surface mixers	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 49,000	>10
WWTF	Process / Mechanical	WWTF-PC-1	Useful life	Process Building - Dewaterin	Caked Sludge Screw Conveyor by Spirac	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 62,000	>10
WWTF	Process / Mechanical	WWTF-PCEN-1	Separator	Process Building - Dewaterin	Centrifuge by Westfalia Separator	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 410,000	>10
WWTF	Process / Mechanical	WTF-PCFP-1 & CFI	Useful life	Sludge Holding and Dewateri	Centrifuge Feed Pumps (Qty 2) by Moyno in Process Building Pump Room	Install check valve on discharge side. Replace pump in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 103,000	>10
WWTF	Process / Mechanical	WWTF-PGC-1	Classifier	Process Building - Grit Remo	Grit Classifier Structure	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 320,000	>10
WWTF	Process / Mechanical	WWTF-PGPW-1	Wheel	Influent Channel / Grit Tank	Grit Paddle Wheel	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk		>10
WWTF	Process / Mechanical	WTF-PGR-1 & GR	Useful life	Sludge Holding and Dewateri	Sludge Grinders (Qty 2) by Moyno in Process Building Pump Room	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 66,000	>10
WWTF	Process / Mechanical	WWTF-PMA-1, 2,3,	EIMCO	Oxidation Ditch	Mechanical Surface Aerators by EIMCO	Repaint. Address oil site cracks and any oil leaks. Replace in kind at end of useful life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 488,000	>10
WWTF	Process / Mechanical	WWTF-PMM-1,2	Mixer	ACTIFLO System	Maturation Mixer	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 169,000	>10
WWTF	Process / Mechanical	WTF-PMRP-1,2,3,	Pumps	ACTIFLO System	Microsand Recirculation Pumps (Qty 5) by McLanahan	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 117,000	>10
WWTF	Process / Mechanical	WWTF-PRS-1,2,3	Hidrostal	Process Building - Pump Roo	Return Sludge Pumps (Qty 3) by Wemco-Hidrostal	Touch up chipped paint on discharge piping. Replace in kind at end of service life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 101,000	>10
WWTF	Process / Mechanical	WWTF-PSC-1	Wemco	Secondary Calrifiers	Chop-Flow Scum Pump by Wemco	Replace in kind at end of useful life	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 36,000	>10
WWTF	Process / Mechanical	WTF-PSCD-1 & SC	Drives. Replace Intechar	Secondary Calrifiers	50 ft Diameter Secondary Clarifier System by EIMCO	Clean and repaint drives. Replace in kind at end of useful life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 412,000	>10
WWTF	Process / Mechanical	WTF-PSTB-1 & STI	EasyAir	Sludge Holding and Dewateri	Sludge Tank Blowers by Roots-EasyAir	Replace in kind at end of useful life	>10	Low	1	Low	1	Moderate	2	In compliance	1	0.67	0.67	1.00	1.00	1.00	Low Risk	$ 98,000	>10
WWTF	Process / Mechanical	WTF-PWS-1 & WS	Hidrostal	Process Building - Pump Roo	Waste Sludge Pumps (Qty 2) by Wemco-Hidrostal	Replace in kind at end of service life.	>10	Low	1	Low	1	Significant	3	In compliance	1	0.67	1.00	1.00	1.00	1.00	Low Risk	$ 68,000	>10
																					Asset Class Total	**$ 2,902,300**	

Appendix B
Facility Photographs

Hadley Road Pump Station
- Process/Mechanical
- Structural
- Electrical/Instrumentation
- Civil/Security

Erin Lane Pump Station
- Process/Mechanical
- Structural
- Electrical/Instrumentation
- Civil/Security

Cross Street Pump Station
- Process/Mechanical
- Structural
- Electrical/Instrumentation
- Civil/Security

Jaffrey Center/Main Street Pump Station
- Process/Mechanical
- Structural
- Electrical/Instrumentation
- Civil/Security

Wastewater Treatment Facility
- Influent/Primary Treatment
- Secondary Treatment/Solids Handling
- Chemical Addition
- Tertiary Treatment/UV System/Plant Water System

Hadley Road Pump Station

PROCESS/MECHANICAL

Hadley-PINF-1, 2, & 3. Influent Pumps

Hadley-P106. Inoperable Auger Monster

Hadley-PSTG- 1-7&10. Headworks Stop & Slide Gates

Hadley-P111. Simplex Sump Pump

STRUCTURAL

Hadley-S103. Stairs, aluminum railing, and door to dry well

Hadley-S116. Wall mechanical seal leaking

Hadley-S119. Monorail beam and supports deteriorated

Hadley-S102. Masonry join sealant failure

ELECTRICAL / INSTRUMENTATION

Hadley PS Motor Control Center

Hadley-E104. Broken receptacle behind fuel day tank

CIVIL/SECURITY

Building exterior, driveway, concrete parking pad

H-C105 Dry well motor hatch fall protection

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Erin Lane Pump Station

PROCESS/MECHANICAL

Erin-P201, 202 & 203. Pumps, piping and valve

Erin-P204. Simplex Sump Pump

Erin-P201. Pump No. 1 and check valve

Erin-P202. Pump No.2 and check valve

STRUCTURAL

Erin-S202 & 203. Door paint and hardware deteriorated

Erin-S201. Paint on wood trim deteriorating

ELECTRICAL / INSTRUMENTATION

Erin-E202. Pump chamber receptacles not GFCI

Erin-I201. Air bubbler level system

CIVIL/SECURITY

Erin-C204. Pump chamber tube safety harness

Erin-C205. Missing fire extinguisher

Erin-C201. Driveway and parking area

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Cross Street Pump Station

PROCESS/MECHANICAL

Cross-P301. Pump and Motor No. 1

Cross-P302 & P304. Pump No. 2 and check valve

Cross-P303. Pump Watchdog backup motor

Cross-H301. Faulty cooling air inlet louver

STRUCTURAL

Cross-S301. Concrete slab is undermined

Cross-S303,304. Concrete stairs deteriorated, no handrails

ELECTRICAL / INSTRUMENTATION

Cross-E301. Heat damaged wire and conduit is sagging

Cross-I201. Sonic transducer flow meter

CIVIL/SECURITY

Cross-C301. Driveway and parking area

Cross-C304 & C305. Install alarm system & motion lights

Cross-C302. Damaged Fence

Rodent nest on backup motor propane tank

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Jaffrey Center / Main Street Pump Station

PROCESS/MECHANICAL

Jaffrey Ctr-P401,402. Pump motors and control panel

Jaffrey Ctr-P401,402. Pump No. 1 and Pump No. 2

Jaffrey Ctr-P403. Process piping and valves

Jaffrey Center Pump Station wet well

STRUCTURAL

Jaffrey Ctr-S401. Door and frame deterioration

Jaffrey Ctr-S403. Roof shingle deterioration

ELECTRICAL / INSTRUMENTATION

Jaffrey Ctr-I401,E403. Remote alarm exposed wire

Jaffrey Ctr-I402. Level control air bubbler system

CIVIL/SECURITY

Jaffrey Ctr-401. Driveway and parking area

Jaffrey Ctr-C402. Perimeter fencing and barbed wire

Jaffrey Ctr-404. No seal between wet well and pump room

Jaffrey Ctr-C405. Missing fire extinguisher

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Wastewater Treatment Facility

INFLUENT/PRELIMINARY TREATMENT

WWTF-S501. Influent channel concrete deterioration

WWTF-PGPW-1. Grit paddle wheel and stop gates

WWTF-S502. Grit tank concrete cracking and efflorescence

WWTF-PGT-1. Grit pump

WWTF-PGC-1. Grit classifier

WWTF Septage receiving station and manual bar rack

SECONDARY TREATMENT / SOLIDS HANDLING

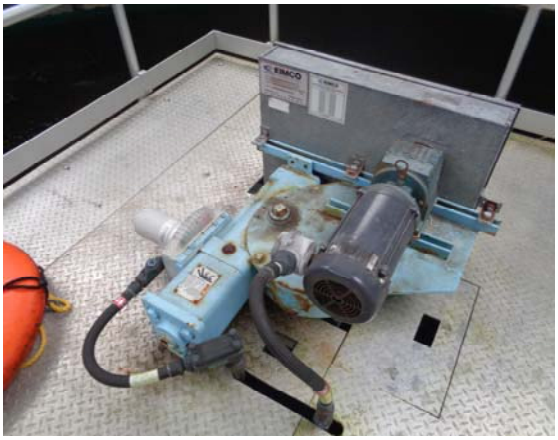
WWTF-PANM3,4. Anaerobic basin and mixers (Typ. 4)

WWTF-PAXM-2. Anoxic basin and basin mixer (Typ. 2)

WWTF Oxidation ditches

WWTF-PMA-1,3. Oxidation ditch surface aerators (Typ. 4)

WWTF Secondary clarifier No. 1



WWTF-SCD-2. Secondary clarifier No. 2 drive and motor

WWTF-PRS1,2,3 & PWS1,2. RAS and WAS pumps

WWTF-PCFP1,2 & PGR1,2. Sludge grinder and centrifuge feed pumps

WWTF-PSTB-1,2. Sludge storage tank blowers

WWTF-PCEN-1. Centrifuge

WWTF-PC-1. Sludge screw conveyor

CHEMICAL ADDITION

WWTF-P115. Polymer feed system

WWTF-PMAG-1,2. Magnesium hydroxide storage & pumps

WWTF-P117. Ferric storage and pumps

WWTF RAS line chemical injection point

WWTF Process building basement chemical feed

TERTIARY TREATMENT / UV SYSTEM / PLANT WATER SYSTEM

ACTIFLO System coagulation and injection tanks, and Hydrocyclone building

ACTOFLO System maturation and settling tanks

WWTF-PMRP-1,2,3,4,5. Microsand recirculation pumps

WWTF-PUV-1A,B&2A,B. UV disinfection system

WWTF-P120. Plant water pumps

WWTF Plant water line tee

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