Wastewater System
Asset Management Program
Henniker, New Hampshire

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2336

Prepared by:

UNDERWOOD engineers

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1. Introduction

The Town of Henniker engaged Underwood Engineers to develop an asset management program (AMP) for its sanitary sewer collection and treatment system. The project has been funded by a $30,000 CWSRF loan, including $30,000 in principal forgiveness upon completion.

The framework of this AMP includes the following core components.

- Asset Inventory and Condition Assessment
  - What sewer assets is the Town responsible for maintaining?
  - Which are able to serve their purpose? Which are not?
  - What is their condition?
- Level of Service (LOS)
  - What are the Town's goals in operating and maintaining the system?
  - Goals should be specific, measurable, attainable, realistic, timely (SMART)
- Criticality
  - Prioritize assets by their overall condition score versus their impact of malfunction.
- Minimum Life Cycle Cost (Practices)
  - Estimate costs needed to properly inspect and repair assets in order to maintain the desired LOS.
- Long-Term Funding Strategy (Budget)
  - Schedule estimated replacement/refurbishment costs out over the life of the assets.
- Implementation and Communication Plan
  - Data collection
  - Planning tools
  - Management reporting
- Recommendations and next Steps

2. Asset Inventory and Condition Assessment

The Town's sewer system, including the two (2) pumping stations and the wastewater treatment facility (WWTF) serves approximately 300 customers. Most of the system was built in the mid-1970's. However, there have been collection system extensions built to serve new development and upgrades to the pumping stations and wastewater treatment facility. A list of historical highlights is shown below.

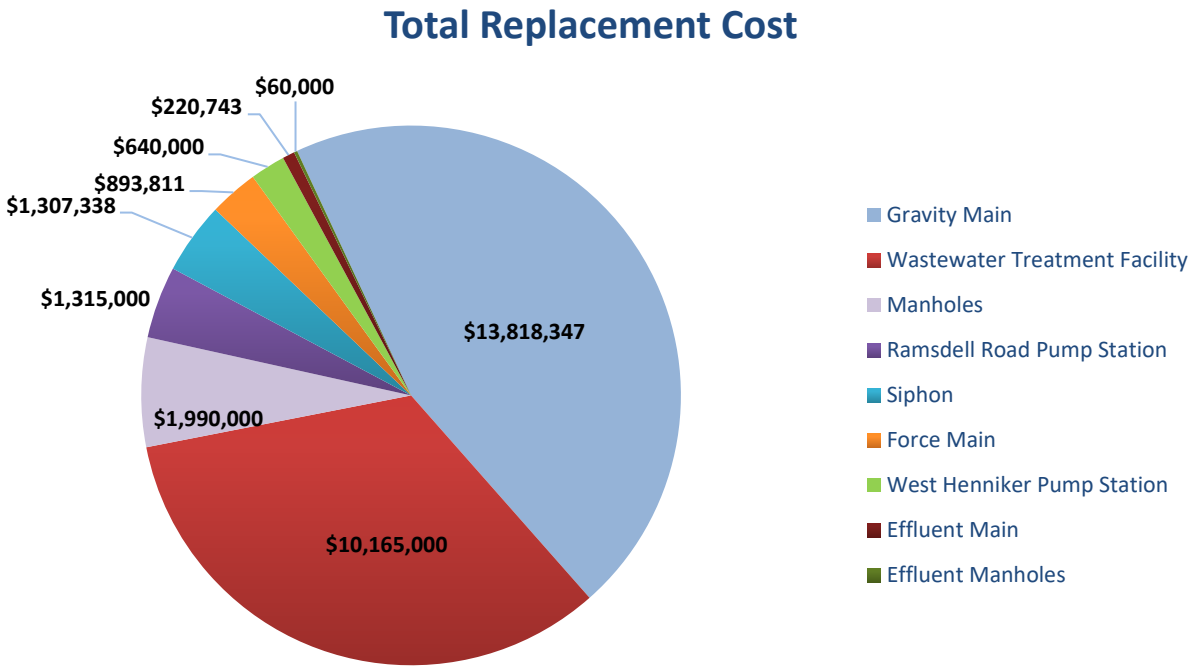
- 1975 – Wastewater Treatment Facility was constructed, as well as the two pumping stations (Ramsdell Road Pumping Station and West Henniker Pumping Station), and much of the gravity collection system.
- 1988-1990 – Septage receiving and sludge handling upgrades at WWTF.
- 1994 – A building was constructed over the West Henniker Pumping Station for enhanced accessibility and operator safety.
- 2006 – Improvements to the WWTF aeration system, including new blowers and a new building; and a new distribution box for the settling tanks.
- 2014 – A new WWTF UV disinfection unit, and other improvements to the effluent handling system.
- 2017 – Major repairs to Ramsdell Road Pumping Station damaged by flood.

The replacement cost of the Town's combined wastewater assets is over $30 million. That investment is summarized below.

Table 1. Summary of Wastewater System Replacement Cost

Asset Category	Estimated Replacement Cost
Gravity Main	$13,818,347
Wastewater Treatment Facility	$10,165,000
Manholes	$1,990,000
Ramsdell Road Pump Station	$1,315,000
Siphon	$1,307,338
Force Main	$893,811
West Henniker Pump Station	$640,000
Effluent Main	$220,743
Effluent Manholes	$60,000
Grand Total	**$30,410,239**

Figure 1. Summary of Wastewater System Replacement Cost



The Town conducts closed-circuit televised inspection (CCTV) of approximately one-third of its gravity mains each year. Therefore, there is ample and recent information regarding the condition of the collection system. The three-year inspection schedule allows for scheduling of repairs and maintenance of damaged or trouble-prone areas.

The Town has a paper map of the sewer collection area, which was prepared some time ago. This map, along with available record drawings served as the basis of a new GIS-based collection system map. The service area can be divided into two collection basins as shown on the map provided in Appendix E, Basin 1 and Basin 2. Basin 1, which includes the Ramsdell Road Pumping Station, collects wastewater from the entire service area, including that which is transmitted to the interceptor along Western Avenue via a force main from the West Henniker Pumping Station. It also includes an area south of the Contoocook River where wastewater is routed to the pumping station via two siphons. Basin 2 is served by the West Henniker Pumping Station, which accepts flow from an area starting just west of Juniper Ridge Road and ending Old Hillsboro Road.

The Town owns 199 sanitary sewer manholes including six (6) effluent manholes and one (1) siphon inlet chamber. Town-owned sewer piping is summarized in **Table 2**.

Table 2. Sanitary Sewer Pipe by Type and Material

Material	Gravity Main	Force Main	Siphon	Grand Total
AC	36,497			36,497
CI	10	2,750	872	3,632
DI	407			407
PVC	1,618			1,618
VC	310			310
Unknown	638			638
Grand Total	**39,480**	**2,750**	**872**	**43,102**

As mentioned above, the Town's entire gravity system, with the exception of the siphons, has been inspected within the past three years (2016-2018). The system is in good condition overall. However, some repairs are needed. The inspections were performed by various contractors, who video recorded the inspections and provided detailed reports including database tables. Fortunately, they all use a similar grading system. A general description of the grading system is provided in **Table 3** below.

Table 3. Gravity Main Inspection Grading System

Defect Grade	General Description
5 – Severe; repair within one year	Severe structural defects (hole or void), blockage > 30%, infiltration gusher
4 – Significant; attention needed within two years	Multiple fractures, blockage between 20%-30%, infiltration runner
3 – Fair; moderate; monitor and repair when needed	Multiple cracks, blockages <20%, infiltration weeper or signs of previous leakage
2 - Good; no deterioration observed	Ductile iron or asbestos cement pipe in good condition
1 - Excellent; minor defects	PVC pipe in good condition

Defects Grade 3 or greater observed during the last three years of inspections are listed in **Table 4** below. A complete list of defects is included in **Appendix C**, and a map of defects is provided in **Appendix E**.

Table 4. Significant Defects Found Within the Last Three Years of Inspections

Asset ID	Defect Description
Grade 5 – Severe; repair within one year	
106-105	Hole, at 12 o'clock, within 8 inches of joint
135-Siphon Inlet Chamber	Infiltration Gusher Joint
46-44	Infiltration Gusher, at 6 o'clock, within 8 inches of joint
58-57	Broken Pipe Void Visible
59-58	Hole Soil Visible
M5-M4	Broken Pipe Void Visible

Asset ID	Defect Description
Grade 4 -Significant; attention needed within two years	
106-105	Broken, at 03 o'clock, within 8 inches of joint
18-17	Infiltration Runner, at 05 o'clock, within 8 inches of joint
35-34	Broken, at 11 o'clock, within 8 inches of joint
36-35	Broken, at 01 o'clock, within 8 inches of joint
47-46	Infiltration Runner, at 03 o'clock, within 8 inches of joint
48-47	Broken, at 02 o'clock, within 8 inches of joint
73A-73	Roots Ball Joint
85-84	Broken, at 07 o'clock, within 8 inches of joint
G2-G1	Fracture Multiple
Grade 3 -Fair, moderate; monitor and repair when needed	
112-111	Infiltration Dripper, at 12 o'clock, within 8 inches of joint
122-121	Tap Factory Made Defective
132-131	Roots Medium Joint
M4-M2	Fracture Longitudinal

Several refurbishments and upgrades have been completed at the wastewater treatment facility and pumping stations over the years. A walkthrough of these facilities indicated that most assets are in serviceable condition overall, despite being aged. One item of immediate concern is the sludge dewatering equipment. The belt filter press was bought used in 1988. While it is still operational, it has exceeded its estimated useful life, parts are no longer available, and it requires excessive staff time in order to keep it in service. The grit handling equipment is another item of concern. Key components of the grit handling system are original from 1975 and have exceeded their estimated useful life. A third item of concern is the lack of mechanical screening. Only a coarse manual bar rack currently exists, which is not adequate to properly protect downstream equipment.

The aeration basins, diffusers, and blowers were upgraded in 2006. While the facilities are relatively new, short-lived components such as the variable frequency drives (VFDs) for the blowers, are nearing the end of their estimated useful lives.

The settling tanks have not yet exceeded their useful life, and the drives have been replaced as needed. The sludge tanks are original and have not exceeded their estimated useful life. The diffusers have been replaced by Wastewater Department staff within the last five (5) years. The UV disinfection unit was replaced in 2014.

The plant standby generator was replaced in 2011 and the plant boiler was also replaced in 2011.

The Ramsdell Road Pumping Station was flooded in 2017 due to a broken water service. Repairs cost nearly $270,000. Fortunately, the cost was covered by insurance. The three pumps, which transmit all wastewater collected within the service area to the wastewater treatment facility, were all rebuilt. New VFD's were provided. All electrical equipment and controls were replaced.

The West Henniker Pumping Station was originally built in 1975. In 1994 the exposed wet well and dry well structures were enclosed. The generator and transfer switch were replaced in 2012.

3. Level of Service

The Level of Service (LOS) provides specific goals for the operation, maintenance and performance of sewer and wastewater system assets. The first step in formulating the LOS was to review problems identified during the Asset Inventory and Condition Assessment process.

3.1. General Operations

Overall the operation of the wastewater treatment and collection system is organized and well-documented. The Town's three Wastewater Department employees include an experienced superintendent and two operators. Staffing appears to be adequate. Facilities are well-maintained.

3.2. Inspection and Routine Maintenance Goals

The Town has an established inspection and maintenance system which should continue to be implemented. Aside from daily tasks, operators have a list of monthly, seasonal, and annual tasks to be completed. As mentioned in **Section 2**, one-third of the collection system is video inspected each year.

As part of this asset management effort, the results of those inspections were mapped and exported into tabular format to assist the Town in planning and budgeting for necessary repairs going forward.

3.3. Data Collection and Follow-up

The Town currently has an effective paper-based data collection system. The forms currently used by the Town are provided in **Appendix A.** These can be adapted for later use in a computerized system as the Town expands its asset management program.

3.4. Capital Planning and Funding

The Town has been paying down long-term debt on improvements at the wastewater treatment facility, including the new UV disinfection system installed in 2014 and the upgrades to the aeration system completed in 2006. However, additional upgrades to the sludge handling system and grit handling equipment will be required in the near term as well.

A Level of Service Matrix is provided in **Appendix B**.

4. Critical Assets and Priority Projects

In order to allocate scarce financial and physical resources in the most efficient way, it is necessary to systematically prioritize projects. For the purposes of this AMP, assets will be ranked by their criticality. Criticality is defined as Overall Performance versus Impact of Malfunction.

Overall Performance is evaluated based on numerous factors including functionality, capacity, condition, or remaining useful life. In general, if information on the condition of the Town's wastewater assets was available, that was used to assign an Overall Performance score. Otherwise, the score was based on remaining useful life.

Table 5. Overall Performance Score

Overall Performance	
1. Very Low Risk	Asset is extremely reliable, condition of asset is excellent. Remaining useful life is greater than 50 years.
2. Low Risk	Failures unlikely, condition of asset is very good. Remaining useful life is between 30 and 50 years.
3. Moderate Risk	Failure of asset is possible, moderate defects present. Remaining useful life is between 10 and 30 years.
4. High Risk	Asset sometimes fails to meet performance requirements, significant defects noted. Remaining useful life is between 0 and 10 years.
5. Very High Risk	Asset is likely to fail or has failed to meet performance requirements, serious defects noted. Asset has exceeded its remaining useful life.

Impact of Malfunction was assigned with the following points in mind.

- The siphons and collection facilities within close proximity to the Contoocook River were considered to have a high Impact of Malfunction due to the potential effect on a surface water body.
- Facilities which serve a high number of customers were assigned a higher impact score. The 10-inch interceptor along Western Avenue was also considered to have a high impact because of the potential to affect a large number of customers, and because of its depth, emergency repairs could be difficult and expensive.
- Facilities lacking redundancy, such as the belt filter press, were assigned a higher Impact of Malfunction score.

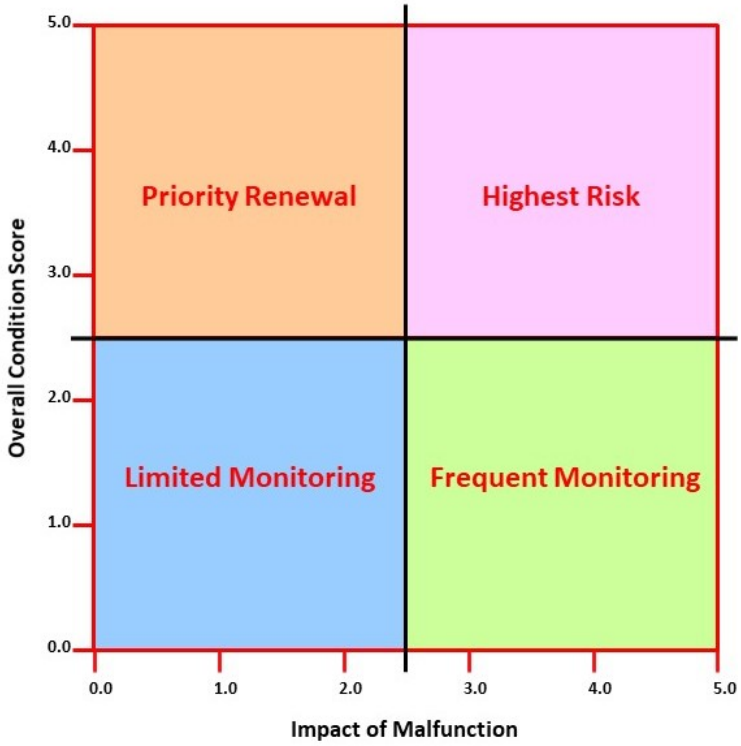
Impact of Malfunction scoring is detailed in **Table 6** below.

Table 6. Impact of Malfunction

Impact of Malfunction	
1. Very Low Impact	Unlikely to affect a surface water or large number of customers.
2. Low Impact	Unlikely to affect a surface water, may impact a moderate number of customers.
3. Moderate Impact	Unlikely to affect a surface water. May impact a moderate number of customers or significant customers (school, hospital, business district).
4. High Impact	Likely to affect a surface water or a moderate to large number of customers.
5. Major Impact	Very likely to affect a surface water or a large number of customers.

The criticality of an asset can be thought of as a matrix as shown below. See **Figure 2** for a visual representation.

Figure 2. Criticality Matrix



Horizontal sanitary sewer collection system assets are mapped by overall performance (i.e. remaining useful life, condition), impact of malfunction and criticality in **Appendix E**. The same information for all vertical assets (pumping stations, wastewater treatment facility) are provided in **Appendix C**.

5. Minimum Life Cycle Cost (Practices)

The Town currently has a well-organized, paper-based maintenance and inspection program in place. Staff fills out daily check lists for the wastewater treatment facility and the two pumping stations. There is also an annual task schedule organized by month. See **Appendix A**.

The wastewater department is adequately staffed and has a sufficient operating budget. However, significant capital investments will need to be made in the near future. The sludge handling system and grit handling system will require the most immediate upgrades.

It should be noted that there are additional expenses associated with a failure of the sludge handling equipment. If the sludge handling equipment were to fail, it will take six months to one year to replace it. During that time, the Town will need to hire an outside contractor to process and dewater the sludge, which will cost an estimated $600 per dry ton. The Town produced 210 dry tons in 2018. If that number is typical, the Town will pay between $63,000 and $126,000 for onsite sludge dewatering. This is above and beyond what the Town will have to pay to replace the belt filter press, which is estimated to cost approximately $1,000,000.

The wastewater treatment facility is one of the largest users of energy in the Town; and aeration is typically the most energy-intensive process. The aeration system was upgraded in 2005, and the blowers were outfitted with variable frequency drives to maximize efficiency. The next system due for renewal is the sludge dewatering equipment. Sludge handling typically constitutes 10% of energy use at a wastewater treatment facility.

Recent inspections of the Town's gravity mains have found that although some maintenance and repairs are needed, the system is in good condition overall. While there are some significant defects, they have been caught in a timely manner and can be fixed cost-effectively. Typical repair costs are provided in the table below.

Table 7. Typical Gravity Main Repair Costs

Repair Description	Unit Cost
Root Removal	$500/EA
Mainline Point Repair for Actively Leaking Pipe	$2,000/EA
Mainline Point Repair for Other Mainline Defects	$2,000/EA
CIPP Line Pipe from MH to MH	$150/LF
Excavation Repair (min. 20 feet)	$350/LF
Lateral/Break- In Rehab	$2,500/EA

6. Long-Term Funding Plan (Budget)

Total wastewater system replacement costs have been scheduled out each year for the next ten years in **Table 8**. Because pipes and concrete structures are such long-lived assets, system-wide replacement costs have also been scheduled out each decade for the next one-hundred years in **Table 9** and **Figure 4**.

Cost estimates are in 2019 dollars and are based on full replacement cost, including engineering and design. Please note cost may be lower if refurbishment is feasible versus complete replacement. The largest imminent replacement cost is the belt filter press. Based on these order-of-magnitude estimates, the costs of asset renewals are expected to approach $3.6 million over the next ten years.

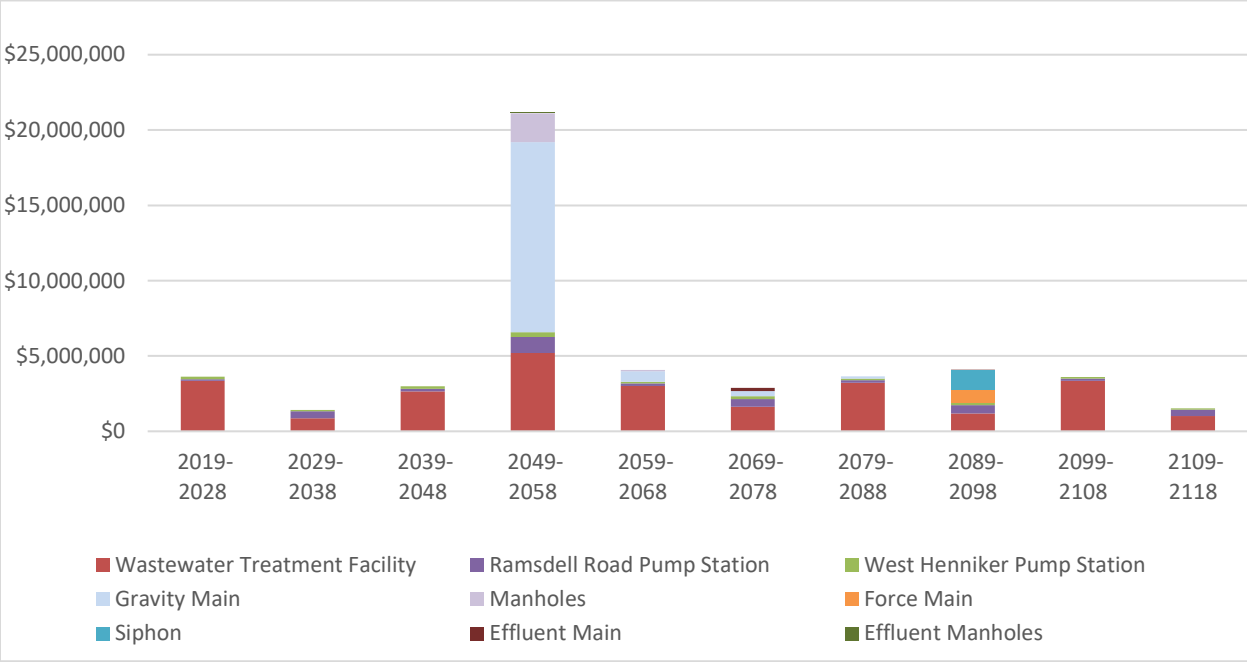
Table 8. Estimated Replacement Cost Next Ten Years

Year	Wastewater Treatment Facility	Ramsdell Road Pump Station	West Henniker Pump Station	Grand Total
2019	$1,975,000	$50,000	$90,000	$2,115,000
2020	$-	$-	$-	$-
2021	$270,000	$7,500	$-	$277,500
2022	$200,000	$-	$-	$200,000
2023	$-	$7,500	$-	$7,500
2024	$195,000	$-	$25,000	$220,000
2025	$125,000	$25,000	$50,000	$200,000
2026	$445,000	$7,500	$-	$452,500
2027	$-	$-	$-	$-
2028	$145,000	$7,500	$-	$152,500
2019-2028	**$3,355,000**	**$105,000**	**$165,000**	**$3,625,000**

Table 9. Estimated Replacement Cost Next One Hundred Years

Decade	Estimated Replacement Cost
2019-2028	$3,625,000
2029-2038	$1,425,000
2039-2048	$2,985,000
2049-2058	$21,171,742
2059-2068	$4,073,647
2069-2078	$2,883,724
2079-2088	$3,642,579
2089-2098	$4,103,547
2099-2108	$3,600,000
2109-2118	$1,530,000
2019-2118	**$49,040,239**

Figure 3. Replacement Costs – Next 100 Years



Full replacement costs for existing assets is estimated to be approximately $487,000 per year over the next 100 years. The largest chunk of that is nearly $14 million for full replacement of the gravity mains. If the Town continues its program of ongoing inspections and repairs, it is unlikely that the gravity mains will require full replacement at the same time. Under these circumstances, the more likely scenario is that linings and repairs will be completed as needed, which will extend the useful life of the pipe. A structural CIPP liner is expected to extend pipe life by 20 to 50 years, and costs one-half to one-third the cost of a full replacement.

According to data from the Town, a typical monthly wastewater bill for a single-family home is approximately $480 per year. The Town's median household income is $69,609 per year, according to the 2017 American Community Survey available at the Census Bureau. This means that the affordability ratio is approximately 0.69%. The Town should consider the impact of its rates on its ability to obtain SRF loans and possible loan forgiveness.

Going forward, the Town will have to decide which projects to prioritize in order to schedule capital spending and ensure that financial resources are available without having to impose large rate increases.

Replacements were prioritized as discussed in **Section 4**. **Table 10** lists the asset renewals due in the next ten years by criticality. **Table 11** orders them by risk score. The WWTF belt filter press and the degritting classifier are the two highest priority items.

Table 10. Estimated Replacement Costs by Criticality – Next Ten Years

Year	Highest Risk	Priority Renewal	Frequent Monitoring	Limited Monitoring	Grand Total
2019	$1,575,000	$540,000	$-	$-	$2,115,000
2020	$-	$-	$-	$-	$-
2021	$270,000	$7,500	$-	$-	$277,500
2022	$200,000	$-	$-	$-	$200,000
2023	$7,500	$-	$-	$-	$7,500
2024	$30,000	$190,000	$-	$-	$220,000
2025	$100,000	$100,000	$-	$-	$200,000
2026	$265,000	$187,500	$-	$-	$452,500
2027	$-	$-	$-	$-	$-
2028	$27,500	$125,000	$-	$-	$152,500
2019-2028	**$2,475,000**	**$1,150,000**	**$-**	**$-**	**$3,625,000**

Table 11. Estimated Replacement Costs by Risk Score

Risk Score/Asset Category/Subcomponent	2019-2028
25	
Wastewater Treatment Facility	
Belt Filter Press	$1,000,000
20	
Wastewater Treatment Facility	
Degritting classifier	$75,000
Ramsdell Road Pump Station	
Process valves	$25,000
Make-up air unit - wetwell	$25,000
16	
Wastewater Treatment Facility	
Aeration tank submersible mixer #2	$15,000
Aeration tank submersible mixer #1	$15,000
Ramsdell Road Pump Station	
Process piping	$25,000
West Henniker Pump Station	
Pump #2	$30,000
Pump #1	$30,000
15	
Wastewater Treatment Facility	
HVAC unit and ducts	$100,000
Pad mounted transformer	$50,000
Corrugated Metal Building - HVAC	$50,000
Yard piping - valves	$50,000
Corrugated Metal Building - Controls	$25,000

Risk Score/Asset Category/Subcomponent	2019-2028
Return activated sludge pump #2	$20,000
Belt Filter Press feed pump	$20,000
Grit pump #1	$20,000
Grit pump #2	$20,000
NaOH feed pump #1	$5,000
West Henniker Pump Station	
Heater & Vents	$30,000
12	
Wastewater Treatment Facility	
Secondary settling tanks - metal troughs and weirs	$200,000
Secondary settling tank fiberglass cover #1	$100,000
Secondary settling tank fiberglass cover #2	$100,000
Probes/sensors/controls	$50,000
Sludge blower unit #1	$40,000
Sludge blower unit #2	$40,000
Blower VFD #3	$30,000
Blower VFD #2	$30,000
Blower VFD #1	$30,000
Blower Building - HVAC	$25,000
Operations building piping/plumbing	$25,000
Frac tank	$20,000
Effluent flow metering system	$20,000
Return activated sludge VFD #2	$20,000
Return activated sludge VFD #1	$20,000
NaOH feed pump #2	$5,000
Ramsdell Road Pump Station	
Comminutor (Muffin Monster)	$15,000
West Henniker Pump Station	
Process piping	$50,000
Pump station - wood truss, asphalt shingles	$25,000
10	
Wastewater Treatment Facility	
Operations building electrical	$300,000
Site lighting	$75,000
Graphics panel/PLC/alarms/controls	$50,000
Secondary setting tanks - scum drives	$50,000
Exhaust fan #4	$7,500
Exhaust fan #3	$7,500
Exhaust fan #5	$7,500
Exhaust fan #2	$7,500
Exhaust fan #6	$7,500
Exhaust fan #1	$7,500

Risk Score/Asset Category/Subcomponent	2019-2028
8	
Wastewater Treatment Facility	
Septage acceptance plant	$150,000
Operations building process piping	$100,000
Sludge conveyor to roll-off	$75,000
Aeration blower #2	$60,000
Aeration blower #3	$60,000
Aeration blower #1	$60,000
Corrugated Metal Building - Electrical	$50,000
Septage receiving mixer #2	$20,000
Septage receiving mixer #1	$20,000
Ramsdell Road Pump Station	
Comminutor (Muffin Monster)	$15,000
5	
Wastewater Treatment Facility	
Septage receiving plunger pump	$20,000
Grand Total	**$3,625,000**

In addition to routine inspections and repairs, the Town will need to begin planning for ongoing asset renewals. A review of the Town's annual reports over the past five (5) years indicates the ending fund balance for the Wastewater Department has been trending slightly upward. However, under the current rate structure, the total current capital need is only 13.7% funded. A rate analysis completed by the Town in April 2019 indicates fully funding capital needs would increase the base charge by $20/per year; and would increase the revenue from overage charges by $153,000. On a per gallon basis, this is an increase of two cents.

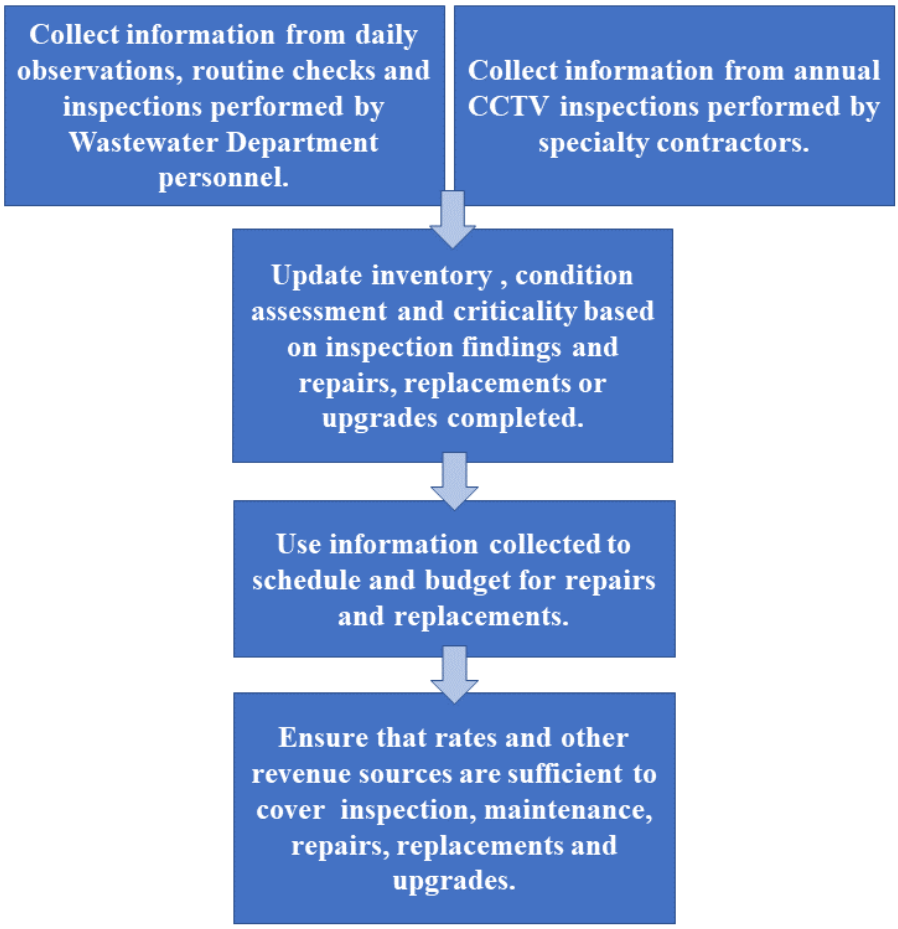
Capital needs will only increase in the coming years unless necessary replacements and refurbishments are completed in a timely manner. Assuming, no replacements or refurbishments occur in the next five (5) years, the total capital need will increase to $4,335,000 in today's dollars.

7. Implementation and Communication

The Town already has a well-functioning paper-based data collection system for its wastewater treatment and collection system. As part of this current asset management effort, some of those existing forms have been converted to an electronic format. However, the Town does not currently have the infrastructure to deploy those forms. As the Town continues to build its asset management program, that infrastructure can be better developed.

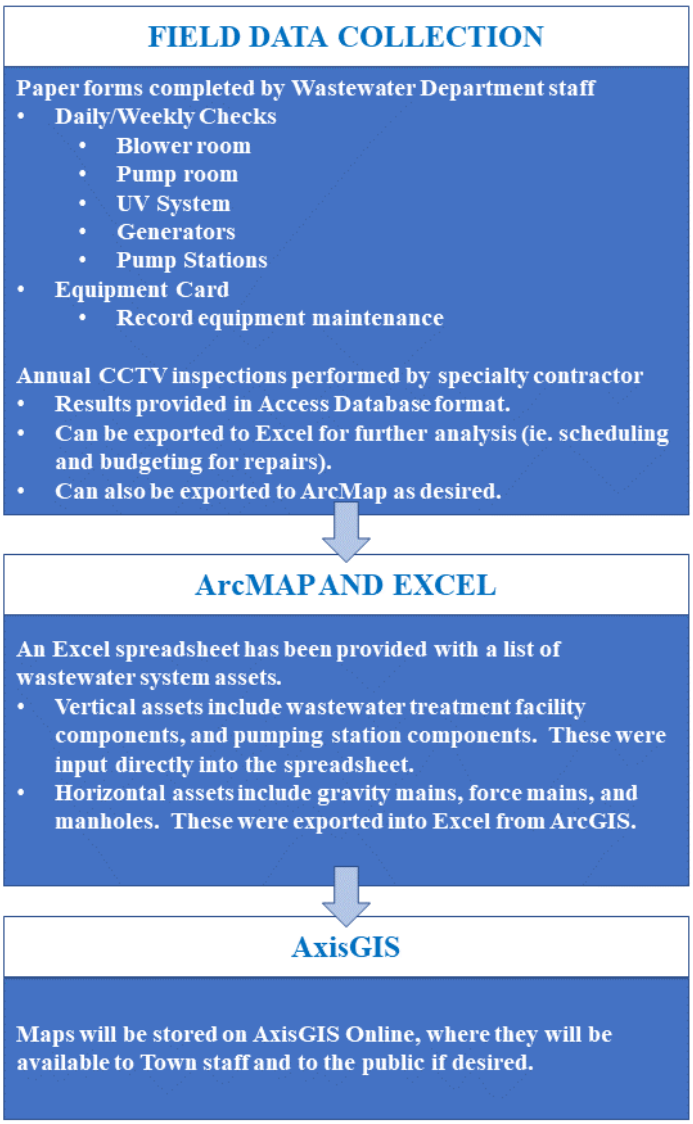
The Town does have the ability to post its sanitary sewer system maps online. Those maps can be made viewable to staff and to the public. An information flow chart has been provided in **Figure 5**, which illustrates how the asset management effort can be incorporated into the budgeting and planning process.

Figure 4. Planning and Budgeting Flow Chart



The information assembled can be used as the basis for a staffing plan, operating budget and capital budget. It can also be used to generate reports, which can be used to educate and inform the Select Board and the public. A data processing flow chart has been provided in **Figure 6**.

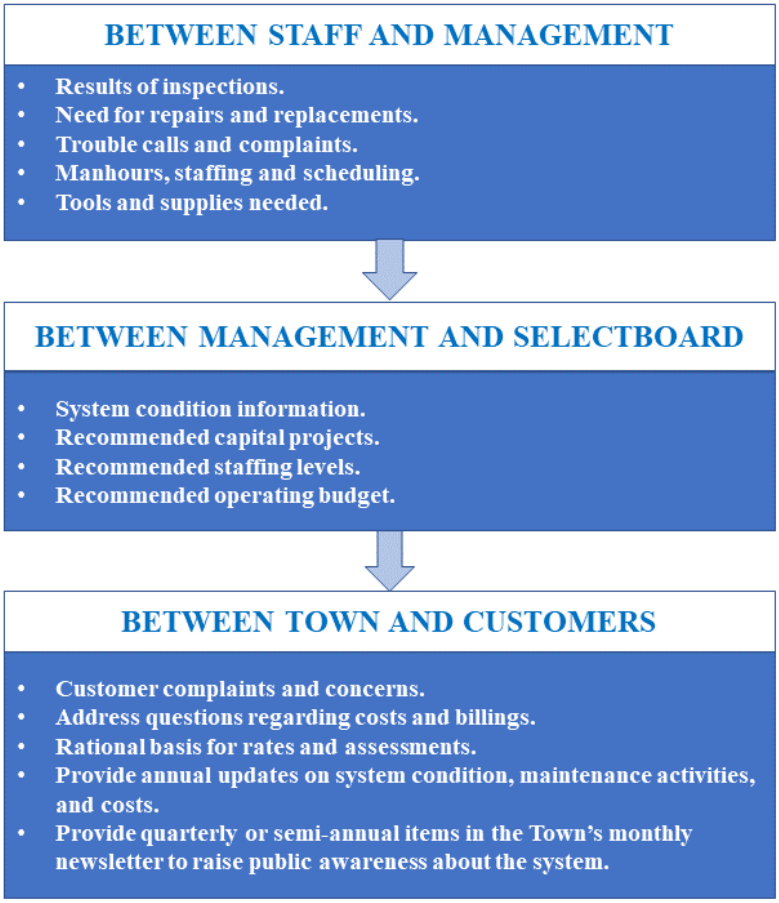
Figure 5. Data Processing Flow Chart



As information is being collected, it needs to be shared between Wastewater Department staff, Town management, the Select Board, and the public. Staff keeps tabs on the condition of the system. They know best what needs to be repaired or replaced, what capital projects are required, what services are needed, and what staffing levels are appropriate. The Town Administrator and Select Board are responsible to the public when it comes to providing oversight and securing the financial resources needed to maintain the system, which has an estimated replacement value of over $30 million.

Billing time is typically the only time that customers are reminded of the valuable service they receive. The Wastewater Department contributes information for the annual report, but it might also be helpful to provide quarterly reminders about the sewer system in the Town's newsletters.

Figure 6. Communication Flow Chart



8. Conclusions and Recommendations

Horizontal Assets

Short-term repairs needed in the collection system are summarized in **Table 4**. Due to the young age of the collection system, there are no complete dig and replace pipeline projects anticipated for several decades.

Vertical Assets

Due to the shorter life span of vertical assets (WWTF and pump stations), there are immediate funding needs; approximately $3.7M over the next 10 years. These are enumerated in **Table 10**.

The Town has a good paper-based data collection system in place. As part of this asset management effort, maps will be provided to the Town in GIS format. The maps can then be made available to Town staff to view on the Town's AxisGIS system. This will also allow staff to access information associated with each horizontal asset, such as installation date, material, diameter, etc.

Information on all horizontal and vertical assets has been combined into one Microsoft Excel-based spreadsheet for the purposes of financial planning and forecasting going forward. That spreadsheet has been provided to the Town and is available for reference and future editing.

In addition, the results of the CCTV inspections performed on the gravity mains over the past three years have been mapped and exported into GIS files and a spreadsheet usable by the Town. As replacements and repairs are completed, the installation date and/or remaining useful life in the inventory GIS file should be updated and exported to the financial planning spreadsheet.

As the Town expands its asset management program, it can continue to develop and refine its data collection, analysis and sharing processes. It is recommended that the Town build in-house GIS data processing capability. While the paper-based data collection system currently in use for the wastewater system is effective for the time being, the Town should incorporate electronic data collection forms and GIS capability into the system at some point in the future.

The tools provided as part of this current asset management effort can be used to do the following:

1. Refine and update criticality.
2. Refine and update replacement costs.
3. Refine and update Level of Service Matrix

Finally, financial planning is a key goal of Asset Management. Based on the analyses conducted during preparation of this Program. If the Town wishes to perform the majority of future replacement/refurbishment of the wastewater system without incurring long-term bonds/loans, annual contributions to Capital Reserves should be set at $365,000 and adjusted over time based on inflation and the longevity of collection system refurbishment.

APPENDIX A

Data Collection Forms

HENNIKER, NH WWTF - BLOWER BUILDING DAILY CHECKLIST

DATE: START _____ END _____

	SUN	MON	TUE	WED	TH	FRI	SAT
LEAD BLOWER NO. 1 / 2 / 3							
HAND							
OFF							
AUTO							
SPEED (Hz)							
MOTOR AMPS							
INLET FILTER READING							
DISCHARGE PRESSURE							
OIL LEVEL 1							
OIL LEVEL 2							
ELASPED TIME METER							
LAG BLOWER NO. 1 / 2 / 3							
HAND							
OFF							
AUTO							
SPEED (Hz)							
MOTOR AMPS							
INLET FILTER READING							
DISCHARGE PRESSURE							
OIL LEVEL 1							
OIL LEVEL 2							
ELASPED TIME METER							
DISSOLVED OXYGEN ANALYZER							
TANK 1 / 2 PROBE READING							
PREV. DAY AVG DO							
PREV. DAY MIN DO							
PREV. DAY MAX DO							
HVAC STATUS							
HEATING SYSTEM							
ON							
OFF							
VENTILATION SYSTEM							
ON							
OFF							
BLOWER BLDG TEMP							
OTHER							
TANK 1 / 2 SELECTOR MIXER							
ON							
OFF							
TIME OF DAY SHEET FILLED IN							

GENERAL COMMENTS: _____

_____

_____

_____

Pump Room Daily Check

Month Year

Date	#1 Sludge	#2 Sludge	#1 Scum	#2 Scum	Blower #	Temp.	HZ	Remarks
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								

Month _____

UV Disinfection

Date	Bank	Intensity	Lamp Hrs.	Remarks
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Press Operations Log

Month _____

Date	Hours	Polyblend		Feed Pump	Comments
		Speed	Stroke	Speed	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Plant Generator

Date	Eng. Temp.	Oil Temp.	Oil Pres.	Gen.	Oil Level	Rad.	Auto Start	Bat.	Hours	Serviced By	Remarks

Ramsdell Road Pump Station

Month **Year**

Date	Pump #1	Pump #2	Pump #3	Seq.	Time	H2O Meter	Remarks
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

West Henniker Pump Station

Month Year

Date	Pump #1	Pump #2	Compressors #1	Compressors #2	Wet Well	Time	Remarks
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

West Henniker Generator
Weekly Operations Log

Date	# of Starts	Engine Hours	KW Hours	Coolant Temp.	Oil Temp.	Oil Level	Radiator Level	Battery Cond.	Fuel Tank	Check Leaks	Operator	Run on load

NOMENCLATURE (SIDE 1)

EQUIPMENT | INVENTORY NO: | CARD NO:

REFERENCE:

MANUFACTURER: | SALES & SERVICE:

DATE OF MANUF: | DATE PUT INTO SERVICE: | DATE REPLACED: | LENGTH OF SERVICE:

NAMEPLATE DATA – MODEL | SERIAL NO. | SIZE | RPM | TYPE

MOTOR DATA – MODEL | SERIAL NO. | FRAME | TYPE | CODE LETTER

H.P. | VOLTS | AMPS | RPM | HERTZ | PHASE | RATING | NEMA DESIGN

INSULATION CLASS | SERVICE FACTOR

REMARKS:

SPARE PARTS

PARTS DESCRIPTION	UNITS RECOMMENDED	INVENTORY RECORD (NO. IN STOCK & DATE)							

COMMENTS (SIDE 4)

DATE		INITIAL

PREVENTIVE MAINTENANCE RECORD (SIDE 3)

CODE	TYPE MAINTENANCE PERFORMED	CODE	TYPE MAINTENANCE PERFORMED	CODE	TYPE MAINTENANCE PERFORMED

DATE	CODE	BY WHOM	REMARKS	DATE	CODE	BY WHOM	REMARKS	DATE	CODE	BY WHOM	REMARKS

REPAIR RECORD (SIDE 2)

DATE:	DESCRIPTION OF REPAIR:

PARTS REPAIRED OR REPLACED		COST	BY WHOM	MANHOURS	COST	REMARKS
TOTAL COST:	PARTS TOTAL		LABOR TOTAL			DOWNTIME:

DATE:	DESCRIPTION OF REPAIR:

PARTS REPAIRED OR REPLACED		COST	BY WHOM	MANHOURS	COST	REMARKS
TOTAL COST:	PARTS TOTAL		LABOR TOTAL			DOWNTIME:

DATE:	DESCRIPTION OF REPAIR:

PARTS REPAIRED OR REPLACED		COST	BY WHOM	MANHOURS	COST	REMARKS
TOTAL COST:	PARTS TOTAL		LABOR TOTAL			DOWNTIME:

DATE:	DESCRIPTION OF REPAIR:

PARTS REPAIRED OR REPLACED		COST	BY WHOM	MANHOURS	COST	REMARKS
TOTAL COST:	PARTS TOTAL		LABOR TOTAL			DOWNTIME:

APPENDIX B

Level of Service Matrix

APPENDIX B: LEVEL OF SERVICE MATRIX

Goal	Actions	Numerical Target and Timeframe
Collect comprehensive condition information on the horizontal sewer collection system assets (pipes and structures).	The Town has inspected one-third of its gravity mains each year for the last three years. That data has been organized and assembled into a usable format as part of the asset management effort.	Budgeting and scheduling of needed repairs identified in first round of inspections to be completed by December 2020.
Alternate inspections and repairs to optimize staff time and effort.	Since the Town inspects one-third of its system at a time, it is not necessary to conduct inspections every year. Non-urgent repairs can be scheduled for off-years.	Planning next round of inspections to be completed by December 2020.
Review inspection schedule based on findings from initial round of inspections.	Gravity mains which were found to have significant blockages due to roots or accumulated grease (ie. >20%) should be inspected on a more frequently (once per year). Others can remain on the Town's current schedule or be inspected less frequently.	Determine inspection schedule once per year.
Collect, review and summarize data regarding condition and performance of vertical assets (pumping station components, wastewater treatment facility components)	Record information from daily/weekly rounds. Review on a weekly basis to schedule repairs and servicing needs. Keep on file to support annual or as-needed funding and staffing requests.	Weekly.
Keep the Selectboard and Public informed about the needs of the wastewater treatment and collection system.	Combine information collected throughout the year into a management report.	Quarterly or as needed for Town Manager and Select Board. Annually or quarterly for the general public.
Use Asset Management Program as the basis for ongoing long-term financial planning.	Routinely re-evaluate the true cost of providing wastewater service, including comprehensive operating costs and funding capital needs.	Annually. The initial true cost of service is currently $836,500 - $570,500 for operating costs and $365,000 for ongoing capital needs.
Transition to a computer-based asset management system.	Research the hiring of an employee with knowledge of GIS software. This would be helpful in ensuring that the asset management program is continually revised and updated. Such skills would also be useful in managing other Town-owned assets – such as roads and drainage facilities.	A starting level salary for a GIS Technician is typically around $45,000.

Appendix C

Inventory and Financial Planning Spreadsheets

Year 1 =
2019

Cells outlined in red are spreadsheet formulas =
Cells outlined in blue are imported from ArcMap =

HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Estimated Year Installed	Replacement Cost	Useful Life	End Useful Life	Remaining Useful Life	Replacement Year
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Channel - Concrete	1975	$ 50,000	75	2050	31	2050
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Sampler	2019	$ 7,500	15	2034	15	2034
Wastewater Treatment Facility	Grit Handling/Headworks	Metals - stop gates/grating/rails/stairs	1999	$ 25,000	40	2039	20	2039
Wastewater Treatment Facility	Grit Handling/Headworks	Degritting classifier	1975	$ 75,000	20	1995	-24	2019
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber - concrete	1975	$ 50,000	75	2050	31	2050
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber collector and drive unit	2017	$ 75,000	20	2037	18	2037
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #1	1975	$ 20,000	20	1995	-24	2019
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #2	1975	$ 20,000	20	1995	-24	2019
Wastewater Treatment Facility	Grit Handling/Headworks	Standby grit channel & bypass - concrete	1975	$ 50,000	75	2050	31	2050
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #1	2004	$ 5,000	15	2019	0	2019
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #2	2009	$ 5,000	15	2024	5	2024
Wastewater Treatment Facility	Aeration	Aeration Tank floor and perimeter walls - concrete	1975	$ 2,000,000	75	2050	31	2050
Wastewater Treatment Facility	Aeration	Aeration Tank interior walls - concrete	2006	$ 500,000	75	2081	62	2081
Wastewater Treatment Facility	Aeration	Metals - railings/grating	2006	$ 50,000	40	2046	27	2046
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #1	2006	$ 15,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #2	2006	$ 15,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Blower Building - concrete foundation	2006	$ 50,000	100	2106	87	2106
Wastewater Treatment Facility	Aeration	Blower Building - concrete block walls	2006	$ 50,000	100	2106	87	2106
Wastewater Treatment Facility	Aeration	Blower Building - wood truss/ashpalt shingle roof	2006	$ 25,000	30	2036	17	2036
Wastewater Treatment Facility	Aeration	Blower Building - electrical	2006	$ 50,000	40	2046	27	2046
Wastewater Treatment Facility	Aeration	Blower Building - HVAC	2006	$ 25,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Blower Building - process piping	2006	$ 25,000	50	2056	37	2056
Wastewater Treatment Facility	Aeration	Probes/sensors/controls	2006	$ 50,000	15	2021	2	2021
Wastewater Treatment Facility	Aeration	Blower VFD #1	2006	$ 30,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Blower VFD #2	2006	$ 30,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Blower VFD #3	2006	$ 30,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Aeration blower #1	2006	$ 60,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Aeration blower #2	2006	$ 60,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Aeration blower #3	2006	$ 60,000	20	2026	7	2026
Wastewater Treatment Facility	Aeration	Hoist	2006	$ 5,000	40	2046	27	2046
Wastewater Treatment Facility	Settling Tanks	Distribution box with gates	2006	$ 50,000	75	2081	62	2081
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #1	2013	$ 50,000	30	2043	24	2043
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #2	2013	$ 50,000	30	2043	24	2043
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #1	2013	$ 50,000	20	2033	14	2033
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #2	2013	$ 50,000	20	2033	14	2033
Wastewater Treatment Facility	Settling Tanks	Secondary settling tanks - metal troughs and weirs	1991	$ 200,000	30	2021	2	2021
Wastewater Treatment Facility	Settling Tanks	Secondary setting tanks - scum drives	1991	$ 50,000	20	2011	-8	2019
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #1	1982	$ 100,000	40	2022	3	2022
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #2	1982	$ 100,000	40	2022	3	2022
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #1 concrete	1975	$ 500,000	75	2050	31	2050
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #2 concrete	1975	$ 500,000	75	2050	31	2050
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building	1988	$ 200,000	60	2048	29	2048
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Electrical	1988	$ 50,000	40	2028	9	2028
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - HVAC	1988	$ 50,000	20	2008	-11	2019
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Controls	1988	$ 25,000	15	2003	-16	2019
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Process Piping	1988	$ 25,000	50	2038	19	2038
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #1	2014	$ 20,000	20	2034	15	2034
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #2	1993	$ 20,000	20	2013	-6	2019
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #1	2006	$ 20,000	20	2026	7	2026
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #2	2006	$ 20,000	20	2026	7	2026

Year 1 =

2019

Cells outlined in red are spreadsheet formulas =

Cells outlined in blue are imported from ArcMap =

HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Impact of Malfunction	Overall Performance Score	Condition Score	Risk Score = Impact x Performance	Criticality	Quantity	Diameter	Material
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Channel - Concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Sampler	3	1	1	3	Frequent Monitoring			
Wastewater Treatment Facility	Grit Handling/Headworks	Metals - stop gates/grating/rails/stairs	3	2	2	6	Frequent Monitoring			
Wastewater Treatment Facility	Grit Handling/Headworks	Degritting classifier	4	5		20	Highest Risk			
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber - concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber collector and drive unit	3	3		9	Highest Risk			
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #1	3	5		15	Highest Risk			
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #2	3	5		15	Highest Risk			
Wastewater Treatment Facility	Grit Handling/Headworks	Standby grit channel & bypass - concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #1	3	5		15	Highest Risk			
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #2	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Aeration Tank floor and perimeter walls - concrete	4	2		8	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Aeration Tank interior walls - concrete	4	1		4	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Metals - railings/grating	4	2		8	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #1	4	4		16	Highest Risk			
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #2	4	4		16	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower Building - concrete foundation	4	1		4	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Blower Building - concrete block walls	4	1		4	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Blower Building - wood truss/ashpalt shingle roof	3	3		9	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower Building - electrical	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Aeration	Blower Building - HVAC	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower Building - process piping	1	2		2	Limited Monitoring			
Wastewater Treatment Facility	Aeration	Probes/sensors/controls	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower VFD #1	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower VFD #2	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Blower VFD #3	3	4		12	Highest Risk			
Wastewater Treatment Facility	Aeration	Aeration blower #1	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Aeration	Aeration blower #2	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Aeration	Aeration blower #3	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Aeration	Hoist	2	2		4	Limited Monitoring			
Wastewater Treatment Facility	Settling Tanks	Distribution box with gates	3	1		3	Frequent Monitoring			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #1	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #2	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #1	3	3		9	Highest Risk			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #2	3	3		9	Highest Risk			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tanks - metal troughs and weirs	3	4		12	Highest Risk			
Wastewater Treatment Facility	Settling Tanks	Secondary setting tanks - scum drives	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #1	3	4		12	Highest Risk			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #2	3	4		12	Highest Risk			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #1 concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #2 concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Electrical	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - HVAC	3	5		15	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Controls	3	5		15	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Process Piping	3	3		9	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #1	3	3		9	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #2	3	5		15	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #1	3	4		12	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #2	3	4		12	Highest Risk			

Year 1 =

2019

Cells outlined in red are spreadsheet formulas =

Cells outlined in blue are imported from ArcMap =

HENNIKER WASTEWATER DATA TABLE			COST OF CRITICAL ASSET REPLACEMENTS - FIRST TEN YEARS									
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Asset Description	Basin/Category	Subcomponent/Asset ID	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Channel - Concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Sampler	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Metals - stop gates/grating/rails/stairs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Degritting classifier	$ 75,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber - concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber collector and drive unit	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #1	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #2	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	Standby grit channel & bypass - concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #1	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #2	$ -	$ -	$ -	$ -	$ -	$ 5,000	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration Tank floor and perimeter walls - concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration Tank interior walls - concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Metals - railings/grating	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - concrete foundation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - concrete block walls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - wood truss/ashpalt shingle roof	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - electrical	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - HVAC	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower Building - process piping	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Probes/sensors/controls	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower VFD #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 30,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower VFD #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 30,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Blower VFD #3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 30,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration blower #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration blower #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Aeration blower #3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 60,000	$ -	$ -
Wastewater Treatment Facility	Aeration	Hoist	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Distribution box with gates	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tanks - metal troughs and weirs	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary setting tanks - scum drives	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #1	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #2	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #1 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #2 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Electrical	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - HVAC	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Controls	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Process Piping	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #2	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -

Year 1 =	Cells outlined in red are spreadsheet formulas =	2019	2029	2039	2049	2059	2069	2079	2089	2099	2109
2019	Cells outlined in blue are imported from ArcMap =	2028	2038	2048	2058	2068	2078	2088	2098	2108	2118

COST OF ASSET REPLACEMENTS - NEXT 100 YEARS

HENNIKER WASTEWATER DATA TABLE			0 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100	0 to 100
Asset Description	**Basin/Category**	**Subcomponent/Asset ID**	**2019-2028**	**2029-2038**	**2039-2048**	**2049-2058**	**2059-2068**	**2069-2078**	**2079-2088**	**2089-2098**	**2099-2108**	**2109-2118**	**2019-2118**
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Channel - Concrete	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Influent Sampler	$ -	$ 7,500	$ -	$ 7,500	$ 7,500	$ -	$ 7,500	$ 7,500	$ -	$ 7,500	**$ 45,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Metals - stop gates/grating/rails/stairs	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Degritting classifier	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	**$ 375,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber - concrete	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Grit chamber collector and drive unit	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	**$ 375,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #1	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Grit pump #2	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Grit Handling/Headworks	Standby grit channel & bypass - concrete	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #1	$ 5,000	$ 5,000	$ -	$ 5,000	$ 5,000	$ -	$ 5,000	$ 5,000	$ -	$ 5,000	**$ 35,000**
Wastewater Treatment Facility	Grit Handling/Headworks	NaOH feed pump #2	$ 5,000	$ -	$ 5,000	$ 5,000	$ -	$ 5,000	$ 5,000	$ -	$ 5,000	$ 5,000	**$ 35,000**
Wastewater Treatment Facility	Aeration	Aeration Tank floor and perimeter walls - concrete	$ -	$ -	$ -	$ 2,000,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 2,000,000**
Wastewater Treatment Facility	Aeration	Aeration Tank interior walls - concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ 500,000	$ -	$ -	$ -	**$ 500,000**
Wastewater Treatment Facility	Aeration	Metals - railings/grating	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 100,000**
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #1	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	**$ 75,000**
Wastewater Treatment Facility	Aeration	Aeration tank submersible mixer #2	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	**$ 75,000**
Wastewater Treatment Facility	Aeration	Blower Building - concrete foundation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	**$ 50,000**
Wastewater Treatment Facility	Aeration	Blower Building - concrete block walls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	**$ 50,000**
Wastewater Treatment Facility	Aeration	Blower Building - wood truss/ashpalt shingle roof	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -	**$ 75,000**
Wastewater Treatment Facility	Aeration	Blower Building - electrical	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 100,000**
Wastewater Treatment Facility	Aeration	Blower Building - HVAC	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	**$ 125,000**
Wastewater Treatment Facility	Aeration	Blower Building - process piping	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	$ -	**$ 50,000**
Wastewater Treatment Facility	Aeration	Probes/sensors/controls	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	**$ 350,000**
Wastewater Treatment Facility	Aeration	Blower VFD #1	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Aeration	Blower VFD #2	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Aeration	Blower VFD #3	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Aeration	Aeration blower #1	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Aeration	Aeration blower #2	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Aeration	Aeration blower #3	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	$ 60,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Aeration	Hoist	$ -	$ -	$ 5,000	$ -	$ -	$ -	$ 5,000	$ -	$ -	$ -	**$ 10,000**
Wastewater Treatment Facility	Settling Tanks	Distribution box with gates	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #1	$ -	$ -	$ 50,000	$ -	$ -	$ 50,000	$ -	$ -	$ 50,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank collector arm #2	$ -	$ -	$ 50,000	$ -	$ -	$ 50,000	$ -	$ -	$ 50,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #1	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	**$ 250,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank drive unit #2	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	**$ 250,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tanks - metal troughs and weirs	$ 200,000	$ -	$ -	$ 200,000	$ -	$ -	$ 200,000	$ -	$ -	$ 200,000	**$ 800,000**
Wastewater Treatment Facility	Settling Tanks	Secondary setting tanks - scum drives	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	**$ 250,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #1	$ 100,000	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank fiberglass cover #2	$ 100,000	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #1 concrete	$ -	$ -	$ -	$ 500,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 500,000**
Wastewater Treatment Facility	Settling Tanks	Secondary settling tank #2 concrete	$ -	$ -	$ -	$ 500,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 500,000**
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ 200,000	$ -	**$ 400,000**
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Electrical	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - HVAC	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	**$ 250,000**
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Controls	$ 25,000	$ 25,000	$ -	$ 25,000	$ 25,000	$ -	$ 25,000	$ 25,000	$ -	$ 25,000	**$ 175,000**
Wastewater Treatment Facility	Sludge Handling	Corrugated Metal Building - Process Piping	$ -	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #1	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	**$ 100,000**
Wastewater Treatment Facility	Sludge Handling	Return activated sludge pump #2	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #1	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Sludge Handling	Return activated sludge VFD #2	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**

Year 1 =
2019

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HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Estimated Year Installed	Replacement Cost	Useful Life	End Useful Life	Remaining Useful Life	Replacement Year
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press	1988	$ 1,000,000	20	2008	-11	2019
Wastewater Treatment Facility	Sludge Handling	Frac tank	1988	$ 20,000	40	2028	9	2028
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press feed pump	1988	$ 20,000	20	2008	-11	2019
Wastewater Treatment Facility	Sludge Handling	Metals - grating/rails/stairs	1998	$ 25,000	40	2038	19	2038
Wastewater Treatment Facility	Sludge Handling	Scum tank	1975	$ 50,000	75	2050	31	2050
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #1	2006	$ 40,000	20	2026	7	2026
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #2	2006	$ 40,000	20	2026	7	2026
Wastewater Treatment Facility	Sludge Handling	SS Sludge diffusers	2017	$ 100,000	30	2047	28	2047
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #1 concrete	1975	$ 250,000	75	2050	31	2050
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #2 concrete	1975	$ 250,000	75	2050	31	2050
Wastewater Treatment Facility	Sludge Handling	Sludge conveyor to roll-off	1988	$ 75,000	40	2028	9	2028
Wastewater Treatment Facility	Effluent Handling	Effluent flow metering system	2006	$ 20,000	15	2021	2	2021
Wastewater Treatment Facility	Effluent Handling	Effluent sampler	2019	$ 7,500	15	2034	15	2034
Wastewater Treatment Facility	Effluent Handling	Metals - stop gate/grating	2014	$ 25,000	40	2054	35	2054
Wastewater Treatment Facility	Effluent Handling	Outfall channel concrete	1975	$ 50,000	75	2050	31	2050
Wastewater Treatment Facility	Effluent Handling	UV disinfection system	2014	$ 350,000	20	2034	15	2034
Wastewater Treatment Facility	Operations Building	Operations building foundation concrete	1975	$ 200,000	100	2075	56	2075
Wastewater Treatment Facility	Operations Building	Operations building CMU walls	1975	$ 200,000	100	2075	56	2075
Wastewater Treatment Facility	Operations Building	Operations building concrete plank roof structure	1975	$ 100,000	75	2050	31	2050
Wastewater Treatment Facility	Operations Building	Operations building membrane roof	2015	$ 75,000	40	2055	36	2055
Wastewater Treatment Facility	Operations Building	Operations building windows	2014	$ 50,000	40	2054	35	2054
Wastewater Treatment Facility	Operations Building	HVAC unit and ducts	1975	$ 100,000	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #1	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #2	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #3	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #4	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #5	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Exhaust fan #6	1975	$ 7,500	20	1995	-24	2019
Wastewater Treatment Facility	Operations Building	Water heater boiler	2011	$ 50,000	20	2031	12	2031
Wastewater Treatment Facility	Operations Building	500 gal oil fuel storage tank	1995	$ 20,000	40	2035	16	2035
Wastewater Treatment Facility	Operations Building	Operations building electrical	1975	$ 300,000	40	2015	-4	2019
Wastewater Treatment Facility	Operations Building	Operations building process piping	1975	$ 100,000	50	2025	6	2025
Wastewater Treatment Facility	Operations Building	Operations building piping/plumbing	1975	$ 25,000	50	2025	6	2025
Wastewater Treatment Facility	Plant Wide	Graphics panel/PLC/alarms/controls	2004	$ 50,000	15	2019	0	2019
Wastewater Treatment Facility	Plant Wide	Yard piping	1975	$ 200,000	100	2075	56	2075
Wastewater Treatment Facility	Plant Wide	Yard piping - valves	1975	$ 50,000	25	2000	-19	2019
Wastewater Treatment Facility	Site Electrical	Site lighting	1975	$ 75,000	40	2015	-4	2019
Wastewater Treatment Facility	Septage Receiving	Septage acceptance plant	2004	$ 150,000	20	2024	5	2024
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #1	2004	$ 20,000	20	2024	5	2024
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #2	2004	$ 20,000	20	2024	5	2024
Wastewater Treatment Facility	Septage Receiving	Septage receiving plunger pump	1995	$ 20,000	20	2015	-4	2019
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #1 concrete	2004	$ 50,000	75	2079	60	2079
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #2 concrete	2004	$ 50,000	75	2079	60	2079
Wastewater Treatment Facility	Site Electrical	Pad mounted transformer	1975	$ 50,000	40	2015	-4	2019
Wastewater Treatment Facility	Standby Power	Standby generator & ATS	2011	$ 200,000	40	2051	32	2051

Year 1 =
2019

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HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Impact of Malfunction	Overall Performance Score	Condition Score	Risk Score = Impact x Performance	Criticality	Quantity	Diameter	Material
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press	5	5	5	25	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Frac tank	3	4		12	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press feed pump	3	5		15	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Metals - grating/rails/stairs	2	3		6	Priority Renewal			
Wastewater Treatment Facility	Sludge Handling	Scum tank	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #1	3	4		12	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #2	3	4		12	Highest Risk			
Wastewater Treatment Facility	Sludge Handling	SS Sludge diffusers	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #1 concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #2 concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Sludge Handling	Sludge conveyor to roll-off	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Effluent Handling	Effluent flow metering system	3	4		12	Highest Risk			
Wastewater Treatment Facility	Effluent Handling	Effluent sampler	3	3		9	Highest Risk			
Wastewater Treatment Facility	Effluent Handling	Metals - stop gate/grating	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Effluent Handling	Outfall channel concrete	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Effluent Handling	UV disinfection system	3	3		9	Highest Risk			
Wastewater Treatment Facility	Operations Building	Operations building foundation concrete	3	1		3	Frequent Monitoring			
Wastewater Treatment Facility	Operations Building	Operations building CMU walls	3	1		3	Frequent Monitoring			
Wastewater Treatment Facility	Operations Building	Operations building concrete plank roof structure	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Operations Building	Operations building membrane roof	3	2		6	Frequent Monitoring			
Wastewater Treatment Facility	Operations Building	Operations building windows	2	2		4	Limited Monitoring			
Wastewater Treatment Facility	Operations Building	HVAC unit and ducts	3	5		15	Highest Risk			
Wastewater Treatment Facility	Operations Building	Exhaust fan #1	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Exhaust fan #2	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Exhaust fan #3	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Exhaust fan #4	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Exhaust fan #5	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Exhaust fan #6	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Water heater boiler	3	3		9	Highest Risk			
Wastewater Treatment Facility	Operations Building	500 gal oil fuel storage tank	4	3		12	Highest Risk			
Wastewater Treatment Facility	Operations Building	Operations building electrical	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Operations building process piping	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Operations Building	Operations building piping/plumbing	3	4		12	Highest Risk			
Wastewater Treatment Facility	Plant Wide	Graphics panel/PLC/alarms/controls	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Plant Wide	Yard piping	2	1		2	Limited Monitoring			
Wastewater Treatment Facility	Plant Wide	Yard piping - valves	3	5		15	Highest Risk			
Wastewater Treatment Facility	Site Electrical	Site lighting	2	5		10	Priority Renewal			
Wastewater Treatment Facility	Septage Receiving	Septage acceptance plant	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #1	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #2	2	4		8	Priority Renewal			
Wastewater Treatment Facility	Septage Receiving	Septage receiving plunger pump	1	5		5	Priority Renewal			
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #1 concrete	1	1		1	Limited Monitoring			
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #2 concrete	1	1		1	Limited Monitoring			
Wastewater Treatment Facility	Site Electrical	Pad mounted transformer	3	5		15	Highest Risk			
Wastewater Treatment Facility	Standby Power	Standby generator & ATS	5	2		10	Frequent Monitoring			

Year 1 =

2019

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HENNIKER WASTEWATER DATA TABLE			COST OF CRITICAL ASSET REPLACEMENTS - FIRST TEN YEARS									
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Asset Description	Basin/Category	Subcomponent/Asset ID	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press	#########	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Frac tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press feed pump	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Metals - grating/rails/stairs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Scum tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40,000	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40,000	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	SS Sludge diffusers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #1 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #2 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Sludge Handling	Sludge conveyor to roll-off	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 75,000
Wastewater Treatment Facility	Effluent Handling	Effluent flow metering system	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Effluent Handling	Effluent sampler	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Effluent Handling	Metals - stop gate/grating	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Effluent Handling	Outfall channel concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Effluent Handling	UV disinfection system	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building foundation concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building CMU walls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building concrete plank roof structure	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building membrane roof	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building windows	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	HVAC unit and ducts	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #1	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #2	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #3	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #4	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #5	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Exhaust fan #6	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Water heater boiler	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	500 gal oil fuel storage tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building electrical	$ 300,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building process piping	$ -	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -
Wastewater Treatment Facility	Operations Building	Operations building piping/plumbing	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -
Wastewater Treatment Facility	Plant Wide	Graphics panel/PLC/alarms/controls	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Plant Wide	Yard piping	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Plant Wide	Yard piping - valves	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Site Electrical	Site lighting	$ 75,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	Septage acceptance plant	$ -	$ -	$ -	$ -	$ -	$ 150,000	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #1	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #2	$ -	$ -	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	Septage receiving plunger pump	$ 20,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #1 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #2 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Site Electrical	Pad mounted transformer	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wastewater Treatment Facility	Standby Power	Standby generator & ATS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Year 1 =	Cells outlined in red are spreadsheet formulas =	2019	2029	2039	2049	2059	2069	2079	2089	2099	2109
2019	Cells outlined in blue are imported from ArcMap =	2028	2038	2048	2058	2068	2078	2088	2098	2108	2118

			COST OF ASSET REPLACEMENTS - NEXT 100 YEARS										
HENNIKER WASTEWATER DATA TABLE			**0 to 10**	**10 to 20**	**20 to 30**	**30 to 40**	**40 to 50**	**50 to 60**	**60 to 70**	**70 to 80**	**80 to 90**	**90 to 100**	**0 to 100**
Asset Description	**Basin/Category**	**Subcomponent/Asset ID**	**2019-2028**	**2029-2038**	**2039-2048**	**2049-2058**	**2059-2068**	**2069-2078**	**2079-2088**	**2089-2098**	**2099-2108**	**2109-2118**	**2019-2118**
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press	$ 1,000,000	$ -	$ 1,000,000	$ -	$ 1,000,000	$ -	$ 1,000,000	$ -	$ 1,000,000	$ -	**$ 5,000,000**
Wastewater Treatment Facility	Sludge Handling	Frac tank	$ 20,000	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	$ -	**$ 60,000**
Wastewater Treatment Facility	Sludge Handling	Belt Filter Press feed pump	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Sludge Handling	Metals - grating/rails/stairs	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	**$ 75,000**
Wastewater Treatment Facility	Sludge Handling	Scum tank	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #1	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	**$ 200,000**
Wastewater Treatment Facility	Sludge Handling	Sludge blower unit #2	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	$ 40,000	$ -	**$ 200,000**
Wastewater Treatment Facility	Sludge Handling	SS Sludge diffusers	$ -	$ -	$ 100,000	$ -	$ -	$ 100,000	$ -	$ -	$ 100,000	$ -	**$ 300,000**
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #1 concrete	$ -	$ -	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 250,000**
Wastewater Treatment Facility	Sludge Handling	Sludge holding tank #2 concrete	$ -	$ -	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 250,000**
Wastewater Treatment Facility	Sludge Handling	Sludge conveyor to roll-off	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	**$ 225,000**
Wastewater Treatment Facility	Effluent Handling	Effluent flow metering system	$ 20,000	$ 20,000	$ -	$ 20,000	$ 20,000	$ -	$ 20,000	$ 20,000	$ -	$ 20,000	**$ 140,000**
Wastewater Treatment Facility	Effluent Handling	Effluent sampler	$ -	$ 7,500	$ -	$ 7,500	$ 7,500	$ -	$ 7,500	$ 7,500	$ -	$ 7,500	**$ 45,000**
Wastewater Treatment Facility	Effluent Handling	Metals - stop gate/grating	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Effluent Handling	Outfall channel concrete	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Effluent Handling	UV disinfection system	$ -	$ 350,000	$ -	$ 350,000	$ -	$ 350,000	$ -	$ 350,000	$ -	$ 350,000	**$ 1,750,000**
Wastewater Treatment Facility	Operations Building	Operations building foundation concrete	$ -	$ -	$ -	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	**$ 200,000**
Wastewater Treatment Facility	Operations Building	Operations building CMU walls	$ -	$ -	$ -	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	**$ 200,000**
Wastewater Treatment Facility	Operations Building	Operations building concrete plank roof structure	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 100,000**
Wastewater Treatment Facility	Operations Building	Operations building membrane roof	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	$ -	**$ 150,000**
Wastewater Treatment Facility	Operations Building	Operations building windows	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	**$ 100,000**
Wastewater Treatment Facility	Operations Building	HVAC unit and ducts	$ 100,000	$ -	$ 100,000	$ -	$ 100,000	$ -	$ 100,000	$ -	$ 100,000	$ -	**$ 500,000**
Wastewater Treatment Facility	Operations Building	Exhaust fan #1	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Exhaust fan #2	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Exhaust fan #3	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Exhaust fan #4	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Exhaust fan #5	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Exhaust fan #6	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	$ 7,500	$ -	**$ 37,500**
Wastewater Treatment Facility	Operations Building	Water heater boiler	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	$ -	$ 50,000	**$ 250,000**
Wastewater Treatment Facility	Operations Building	500 gal oil fuel storage tank	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	**$ 60,000**
Wastewater Treatment Facility	Operations Building	Operations building electrical	$ 300,000	$ -	$ -	$ -	$ 300,000	$ -	$ -	$ -	$ 300,000	$ -	**$ 900,000**
Wastewater Treatment Facility	Operations Building	Operations building process piping	$ 100,000	$ -	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	**$ 200,000**
Wastewater Treatment Facility	Operations Building	Operations building piping/plumbing	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Plant Wide	Graphics panel/PLC/alarms/controls	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	**$ 350,000**
Wastewater Treatment Facility	Plant Wide	Yard piping	$ -	$ -	$ -	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	**$ 200,000**
Wastewater Treatment Facility	Plant Wide	Yard piping - valves	$ 50,000	$ -	$ 50,000	$ -	$ -	$ 50,000	$ -	$ 50,000	$ -	$ -	**$ 200,000**
Wastewater Treatment Facility	Site Electrical	Site lighting	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	**$ 225,000**
Wastewater Treatment Facility	Septage Receiving	Septage acceptance plant	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -	**$ 750,000**
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #1	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Septage Receiving	Septage receiving mixer #2	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Septage Receiving	Septage receiving plunger pump	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	$ 20,000	$ -	**$ 100,000**
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #1 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Septage Receiving	7500 gal Septage receiving tank #2 concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 50,000**
Wastewater Treatment Facility	Site Electrical	Pad mounted transformer	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	**$ 150,000**
Wastewater Treatment Facility	Standby Power	Standby generator & ATS	$ -	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ 200,000	$ -	$ -	**$ 400,000**

Year 1 =

2019

Cells outlined in red are spreadsheet formulas =

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HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Estimated Year Installed	Replacement Cost	Useful Life	End Useful Life	Remaining Useful Life	Replacement Year
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Pump station building -concrete	1975	$ 500,000	75	2050	31	2050
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Concrete plank roof structure	1975	$ 75,000	75	2050	31	2050
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Membrane roof	1995	$ 25,000	40	2035	16	2035
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Metals - railings/grating	1999	$ 50,000	40	2039	20	2039
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Alarm system	2017	$ 10,000	15	2032	13	2032
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - wetwell	2013	$ 25,000	20	2033	14	2033
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Make-up air unit - wetwell	1994	$ 25,000	20	2014	-5	2019
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - pump room/control room	2019	$ 25,000	20	2039	20	2039
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Electrical	2017	$ 100,000	40	2057	38	2057
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Comminutor (Muffin Monster)	2016	$ 7,500	5	2021	2	2021
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	2017	$ 75,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	2017	$ 75,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	2017	$ 75,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #1	2017	$ 30,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #2	2017	$ 30,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #3	2017	$ 30,000	20	2037	18	2037
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process piping	1975	$ 25,000	50	2025	6	2025
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process valves	1975	$ 25,000	15	1990	-29	2019
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Yard piping	1975	$ 50,000	100	2075	56	2075
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Probes/sensors/controls	2017	$ 50,000	15	2032	13	2032
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood frame walls	1994	$ 50,000	50	2044	25	2044
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood truss, asphalt shingles	1994	$ 25,000	30	2024	5	2024
West Henniker Pump Station	West Henniker Pump Station	Wetwell	1975	$ 100,000	75	2050	31	2050
West Henniker Pump Station	West Henniker Pump Station	Drywell	1975	$ 100,000	75	2050	31	2050
West Henniker Pump Station	West Henniker Pump Station	Electrical	1994	$ 75,000	40	2034	15	2034
West Henniker Pump Station	West Henniker Pump Station	Heater & Vents	1994	$ 30,000	20	2014	-5	2019
West Henniker Pump Station	West Henniker Pump Station	Generator unit & ATS	2012	$ 75,000	40	2052	33	2052
West Henniker Pump Station	West Henniker Pump Station	275 gal diesel tank	2012	$ 10,000	40	2052	33	2052
West Henniker Pump Station	West Henniker Pump Station	Pump #1	1975	$ 30,000	20	1995	-24	2019
West Henniker Pump Station	West Henniker Pump Station	Pump #2	1975	$ 30,000	20	1995	-24	2019
Ramsdell Road Pump Station	West Henniker Pump Station	Comminutor (Muffin Monster)	2018	$ 7,500	5	2023	4	2023
West Henniker Pump Station	West Henniker Pump Station	Alarm system	2018	$ 15,000	15	2033	14	2033
West Henniker Pump Station	West Henniker Pump Station	Process piping	1975	$ 50,000	50	2025	6	2025
West Henniker Pump Station	West Henniker Pump Station	Yard piping	1975	$ 50,000	100	2075	56	2075

Year 1 =

2019

Cells outlined in red are spreadsheet formulas =

Cells outlined in blue are imported from ArcMap =

HENNIKER WASTEWATER DATA TABLE

Asset Description	Basin/Category	Subcomponent/Asset ID	Impact of Malfunction	Overall Performance Score	Condition Score	Risk Score = Impact x Performance	Criticality	Quantity	Diameter	Material
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Pump station building -concrete	4	2		8	Frequent Monitoring			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Concrete plank roof structure	4	2		8	Frequent Monitoring			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Membrane roof	2	3		6	Priority Renewal			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Metals - railings/grating	3	2	2	6	Frequent Monitoring			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Alarm system	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - wetwell	4	3		12	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Make-up air unit - wetwell	4	5		20	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - pump room/control room	2	3		6	Priority Renewal			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Electrical	5	2		10	Frequent Monitoring			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Comminutor (Muffin Monster)	2	4		8	Priority Renewal			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #1	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #2	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #3	3	3		9	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process piping	4	4		16	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process valves	4	5		20	Highest Risk			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Yard piping	3	1		3	Frequent Monitoring			
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Probes/sensors/controls	3	3		9	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood frame walls	3	2		6	Frequent Monitoring			
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood truss, asphalt shingles	3	4		12	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Wetwell	5	2		10	Frequent Monitoring			
West Henniker Pump Station	West Henniker Pump Station	Drywell	5	2		10	Frequent Monitoring			
West Henniker Pump Station	West Henniker Pump Station	Electrical	5	3	3	15	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Heater & Vents	3	5		15	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Generator unit & ATS	5	2		10	Frequent Monitoring			
West Henniker Pump Station	West Henniker Pump Station	275 gal diesel tank	4	2		8	Frequent Monitoring			
West Henniker Pump Station	West Henniker Pump Station	Pump #1	4	4	4	16	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Pump #2	4	4	4	16	Highest Risk			
Ramsdell Road Pump Station	West Henniker Pump Station	Comminutor (Muffin Monster)	3	4		12	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Alarm system	4	3		12	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Process piping	3	4		12	Highest Risk			
West Henniker Pump Station	West Henniker Pump Station	Yard piping	3	1		3	Frequent Monitoring			

Year 1 =

2019

Cells outlined in red are spreadsheet formulas =

Cells outlined in blue are imported from ArcMap =

HENNIKER WASTEWATER DATA TABLE			COST OF CRITICAL ASSET REPLACEMENTS - FIRST TEN YEARS									
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Asset Description	Basin/Category	Subcomponent/Asset ID	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Pump station building -concrete	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Concrete plank roof structure	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Membrane roof	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Metals - railings/grating	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Alarm system	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - wetwell	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Make-up air unit - wetwell	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - pump room/control room	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Electrical	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Comminutor (Muffin Monster)	$ -	$ -	$ 7,500	$ -	$ -	$ -	$ -	$ 7,500	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #1	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #3	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process piping	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process valves	$ 25,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Yard piping	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Probes/sensors/controls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood frame walls	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood truss, asphalt shingles	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Wetwell	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Drywell	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Electrical	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Heater & Vents	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Generator unit & ATS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	275 gal diesel tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Pump #1	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Pump #2	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Ramsdell Road Pump Station	West Henniker Pump Station	Comminutor (Muffin Monster)	$ -	$ -	$ -	$ -	$ 7,500	$ -	$ -	$ -	$ -	$ 7,500
West Henniker Pump Station	West Henniker Pump Station	Alarm system	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Process piping	$ -	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -
West Henniker Pump Station	West Henniker Pump Station	Yard piping	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Year 1 =	Cells outlined in red are spreadsheet formulas =	2019	2029	2039	2049	2059	2069	2079	2089	2099	2109
2019	Cells outlined in blue are imported from ArcMap =	2028	2038	2048	2058	2068	2078	2088	2098	2108	2118

COST OF ASSET REPLACEMENTS - NEXT 100 YEARS

HENNIKER WASTEWATER DATA TABLE			**0 to 10**	**10 to 20**	**20 to 30**	**30 to 40**	**40 to 50**	**50 to 60**	**60 to 70**	**70 to 80**	**80 to 90**	**90 to 100**	**0 to 100**
Asset Description	**Basin/Category**	**Subcomponent/Asset ID**	**2019-2028**	**2029-2038**	**2039-2048**	**2049-2058**	**2059-2068**	**2069-2078**	**2079-2088**	**2089-2098**	**2099-2108**	**2109-2118**	**2019-2118**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Pump station building -concrete	$ -	$ -	$ -	$ 500,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 500,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Concrete plank roof structure	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 75,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Membrane roof	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	**$ 75,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Metals - railings/grating	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	**$ 100,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Alarm system	$ -	$ 10,000	$ 10,000	$ -	$ 10,000	$ 10,000	$ -	$ 10,000	$ 10,000	$ -	**$ 60,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - wetwell	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	**$ 125,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Make-up air unit - wetwell	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	**$ 125,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Rooftop exhaust fan - pump room/control room	$ -	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	$ 25,000	$ -	**$ 100,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Electrical	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ 100,000	$ -	$ -	**$ 200,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Comminutor (Muffin Monster)	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	**$ 150,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	**$ 375,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	**$ 375,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	700 GPM influent pump #1	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	$ -	$ 75,000	**$ 375,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #1	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	**$ 150,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #2	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	**$ 150,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	VFD #3	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	**$ 150,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process piping	$ 25,000	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ -	$ -	$ -	**$ 50,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Process valves	$ 25,000	$ 25,000	$ -	$ 25,000	$ 25,000	$ -	$ 25,000	$ 25,000	$ -	$ 25,000	**$ 175,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Yard piping	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	**$ 50,000**
Ramsdell Road Pump Station	Ramsdell Road Pump Station	Probes/sensors/controls	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	$ 50,000	$ 50,000	$ -	**$ 300,000**
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood frame walls	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	**$ 100,000**
West Henniker Pump Station	West Henniker Pump Station	Pump station - wood truss, asphalt shingles	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -	$ 25,000	$ -	$ -	$ 25,000	**$ 100,000**
West Henniker Pump Station	West Henniker Pump Station	Wetwell	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 100,000**
West Henniker Pump Station	West Henniker Pump Station	Drywell	$ -	$ -	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -	$ -	**$ 100,000**
West Henniker Pump Station	West Henniker Pump Station	Electrical	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	**$ 225,000**
West Henniker Pump Station	West Henniker Pump Station	Heater & Vents	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
West Henniker Pump Station	West Henniker Pump Station	Generator unit & ATS	$ -	$ -	$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ -	$ -	**$ 150,000**
West Henniker Pump Station	West Henniker Pump Station	275 gal diesel tank	$ -	$ -	$ -	$ 10,000	$ -	$ -	$ -	$ 10,000	$ -	$ -	**$ 20,000**
West Henniker Pump Station	West Henniker Pump Station	Pump #1	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
West Henniker Pump Station	West Henniker Pump Station	Pump #2	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	$ 30,000	$ -	**$ 150,000**
Ramsdell Road Pump Station	West Henniker Pump Station	Comminutor (Muffin Monster)	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	**$ 150,000**
West Henniker Pump Station	West Henniker Pump Station	Alarm system	$ -	$ 15,000	$ 15,000	$ -	$ 15,000	$ 15,000	$ -	$ 15,000	$ 15,000	$ -	**$ 90,000**
West Henniker Pump Station	West Henniker Pump Station	Process piping	$ 50,000	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	**$ 100,000**
West Henniker Pump Station	West Henniker Pump Station	Yard piping	$ -	$ -	$ -	$ -	$ -	$ 50,000	$ -	$ -	$ -	$ -	**$ 50,000**

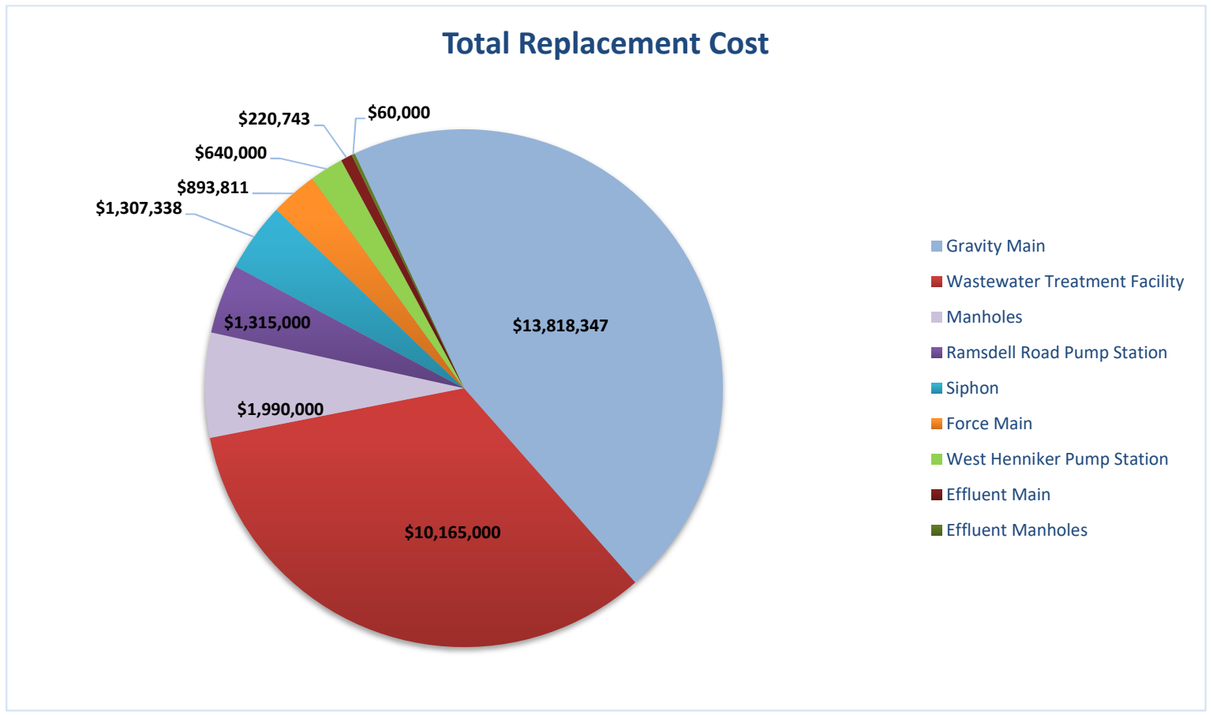
HORIZONTAL ASSETS - QUANTITIES	
Row Labels	**Sum of Quantity**
Manhole	199
Siphon	872
Force Main	2,750
Gravity Main	39,481
Effluent Main	631
Effluent Manhole	6

HORIZONTAL ASSETS - ESTIMATED YEAR OF INSTALLATION						
Sum of Quantity	**Column Labels**					
Row Labels	**Manhole**	**Siphon**	**Force Main**	**Gravity Main**	**Effluent Main**	**Effluent Manhole**
1975	175	872	2,750	34,009	631	6
1978	12			3,447		
1980	4			665		
1985	6			899		
1986	2			461		

PIPE QUANTITIES - BY DIAMETER	
Row Labels	**Sum of Quantity**
Force Main	**2,750**
6	2,500
10	250
Gravity Main	**39,481**
	393
Unknown	825
8	34,206
10	1,759
12	2,298
Siphon	**872**
6	432
8	439
Grand Total	**43,103**

PIPE QUANTITIES - BY TYPE AND MATERIAL				
Sum of Quantity	**Column Labels**			
Row Labels	**Gravity Main**	**Force M**	**Siphon**	**Grand Total**
AC	36,497			36,497
CI	10	2,750	872	3,632
DI	407			407
PVC	1,618			1,618
VC	310			310
Unknown	638			638
Grand Total	**39,481**	**2,750**	**872**	**43,103**

ESTIMATED REPLACEMENT VALUE OF ASSETS - 2019 DOLLARS	
Row Labels	**Sum of Replacement Cost**
Gravity Main	$13,818,347
Wastewater Treatment Facility	$10,165,000
Manholes	$1,990,000
Ramsdell Road Pump Station	$1,315,000
Siphon	$1,307,338
Force Main	$893,811
West Henniker Pump Station	$640,000
Effluent Main	$220,743
Effluent Manholes	$60,000
Grand Total	**$30,410,239**



ESTIMATED CAPITAL NEEDS OVER THE NEXT TEN YEARS

Values	Wastewater Treatment Facility	Ramsdell Road Pump Station	West Henniker Pump Station	Grand Total
Sum of 2019	$ 1,975,000	$ 50,000	$ 90,000	$2,115,000
Sum of 2020	$ -	$ -	$ -	$ -
Sum of 2021	$ 270,000	$ 7,500	$ -	$ 277,500
Sum of 2022	$ 200,000	$ -	$ -	$ 200,000
Sum of 2023	$ -	$ 7,500	$ -	$ 7,500
Sum of 2024	$ 195,000	$ -	$ 25,000	$ 220,000
Sum of 2025	$ 125,000	$ 25,000	$ 50,000	$ 200,000
Sum of 2026	$ 445,000	$ 7,500	$ -	$ 452,500
Sum of 2027	$ -	$ -	$ -	$ -
Sum of 2028	$ 145,000	$ 7,500	$ -	$ 152,500
Sum of 2019-2028	$ 3,355,000	$ 105,000	$ 165,000	$3,625,000
				$ 362,500

Values	Highest Risk	Priority Renewa	Frequent Monit	Limited Mon	Grand Total
Sum of 2019	$ 1,575,000	$ 540,000	$ -	$ -	$2,115,000
Sum of 2020	$ -	$ -	$ -	$ -	$ -
Sum of 2021	$ 270,000	$ 7,500	$ -	$ -	$ 277,500
Sum of 2022	$ 200,000	$ -	$ -	$ -	$ 200,000
Sum of 2023	$ 7,500	$ -	$ -	$ -	$ 7,500
Sum of 2024	$ 30,000	$ 190,000	$ -	$ -	$ 220,000
Sum of 2025	$ 100,000	$ 100,000	$ -	$ -	$ 200,000
Sum of 2026	$ 265,000	$ 187,500	$ -	$ -	$ 452,500
Sum of 2027	$ -	$ -	$ -	$ -	$ -
Sum of 2028	$ 27,500	$ 125,000	$ -	$ -	$ 152,500
Sum of 2019-2028	$ 2,475,000	$ 1,150,000	$ -	$ -	$3,625,000

Criticality	(All)
2019-2028	(Multiple Items)

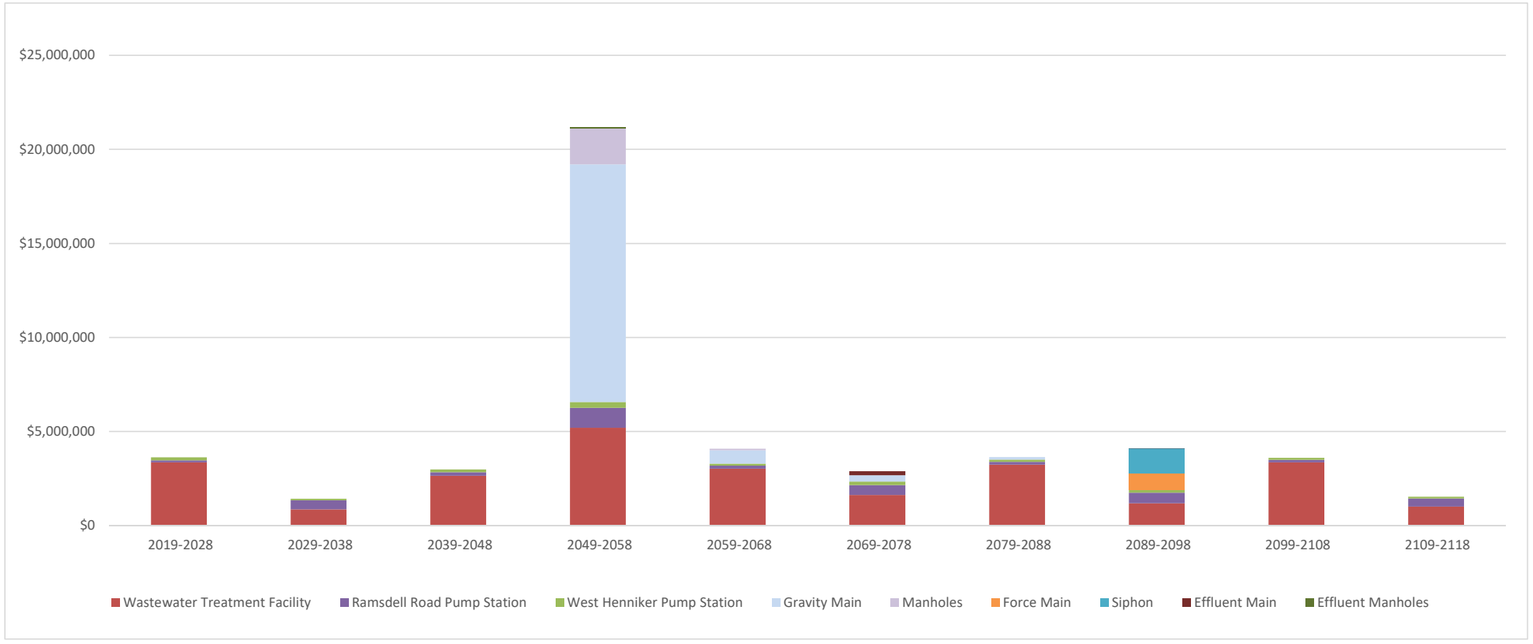
Row Labels	Sum of 2019-2028
25	
Wastewater Treatment Facility	
Belt Filter Press	$ 1,000,000
20	
Wastewater Treatment Facility	
Degritting classifier	$ 75,000
Ramsdell Road Pump Station	
Process valves	$ 25,000
Make-up air unit - wetwell	$ 25,000
16	
Wastewater Treatment Facility	
Aeration tank submersible mixer #2	$ 15,000
Aeration tank submersible mixer #1	$ 15,000
Ramsdell Road Pump Station	
Process piping	$ 25,000
West Henniker Pump Station	
Pump #2	$ 30,000
Pump #1	$ 30,000
15	
Wastewater Treatment Facility	
HVAC unit and ducts	$ 100,000
Pad mounted transformer	$ 50,000
Corrugated Metal Building - HVAC	$ 50,000
Yard piping - valves	$ 50,000
Corrugated Metal Building - Controls	$ 25,000
Return activated sludge pump #2	$ 20,000
Belt Filter Press feed pump	$ 20,000
Grit pump #1	$ 20,000
Grit pump #2	$ 20,000
NaOH feed pump #1	$ 5,000
West Henniker Pump Station	
Heater & Vents	$ 30,000
12	
Wastewater Treatment Facility	

Secondary settling tanks - metal troughs and weirs	$	200,000
Secondary settling tank fiberglass cover #1	$	100,000
Secondary settling tank fiberglass cover #2	$	100,000
Probes/sensors/controls	$	50,000
Sludge blower unit #1	$	40,000
Sludge blower unit #2	$	40,000
Blower VFD #3	$	30,000
Blower VFD #2	$	30,000
Blower VFD #1	$	30,000
Blower Building - HVAC	$	25,000
Operations building piping/plumbing	$	25,000
Frac tank	$	20,000
Effluent flow metering system	$	20,000
Return activated sludge VFD #2	$	20,000
Return activated sludge VFD #1	$	20,000
NaOH feed pump #2	$	5,000
Ramsdell Road Pump Station		
Comminutor (Muffin Monster)	$	15,000
West Henniker Pump Station		
Process piping	$	50,000
Pump station - wood truss, asphalt shingles	$	25,000
10		
Wastewater Treatment Facility		
Operations building electrical	$	300,000
Site lighting	$	75,000
Graphics panel/PLC/alarms/controls	$	50,000
Secondary setting tanks - scum drives	$	50,000
Exhaust fan #4	$	7,500
Exhaust fan #3	$	7,500
Exhaust fan #5	$	7,500
Exhaust fan #2	$	7,500
Exhaust fan #6	$	7,500
Exhaust fan #1	$	7,500
8		
Wastewater Treatment Facility		
Septage acceptance plant	$	150,000
Operations building process piping	$	100,000
Sludge conveyor to roll-off	$	75,000
Aeration blower #2	$	60,000
Aeration blower #3	$	60,000
Aeration blower #1	$	60,000
Corrugated Metal Building - Electrical	$	50,000
Septage receiving mixer #2	$	20,000
Septage receiving mixer #1	$	20,000
Ramsdell Road Pump Station		
Comminutor (Muffin Monster)	$	15,000
5		
Wastewater Treatment Facility		
Septage receiving plunger pump	$	20,000
Grand Total	**$**	**3,625,000**

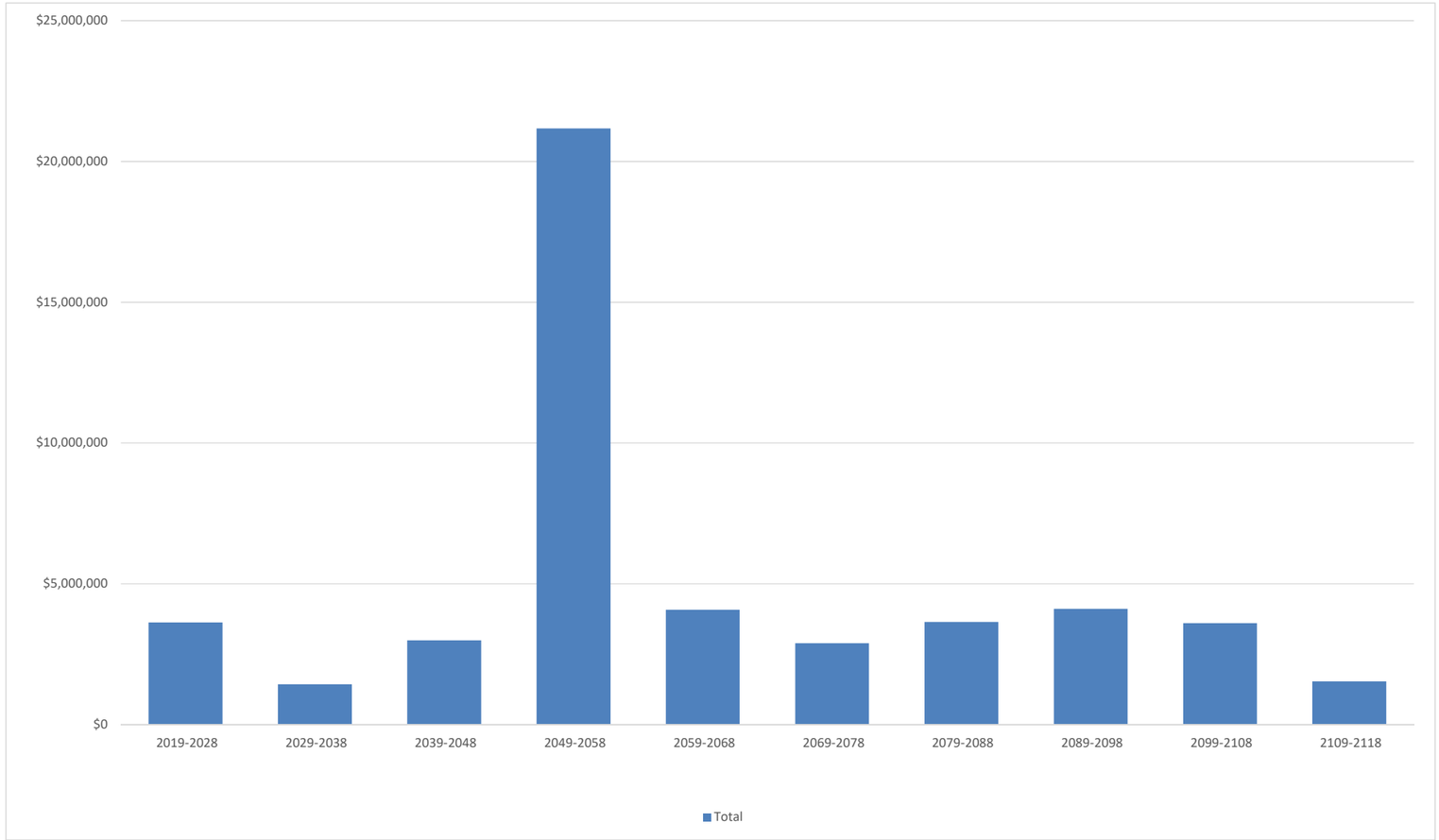
Values		
Sum of 2019	$	2,115,000
Sum of 2020	$	-
Sum of 2021	$	277,500
Sum of 2022	$	200,000
Sum of 2023	$	7,500
Sum of 2024	$	220,000
Sum of 2025	$	200,000
Sum of 2026	$	452,500
Sum of 2027	$	-
Sum of 2028	$	152,500

Values	Column Labels Wastewater Treatment Facility	Ramsdell Road Pump Station	West Henniker Pump Station	Gravity Main	Manholes	Force Main	Siphon	Effluent Main	Effluent Manholes	Grand Total
2019-2028	$3,355,000	$105,000	$165,000	$0	$0	$0	$0	$0	$0	$3,625,000
2029-2038	$855,000	$480,000	$90,000	$0	$0	$0	$0	$0	$0	$1,425,000
2039-2048	$2,640,000	$190,000	$155,000	$0	$0	$0	$0	$0	$0	$2,985,000
2049-2058	$5,190,000	$1,070,000	$310,000	$12,631,742	$1,910,000	$0	$0	$0	$60,000	$21,171,742
2059-2068	$3,015,000	$165,000	$105,000	$708,647	$80,000	$0	$0	$0	$0	$4,073,647
2069-2078	$1,620,000	$530,000	$190,000	$331,731	$0	$0	$0	$211,993	$0	$2,883,724
2079-2088	$3,230,000	$155,000	$115,000	$142,579	$0	$0	$0	$0	$0	$3,642,579
2089-2098	$1,185,000	$555,000	$150,000	$3,649	$0	$893,811	$1,307,338	$8,750	$0	$4,103,547
2099-2108	$3,355,000	$140,000	$105,000	$0	$0	$0	$0	$0	$0	$3,600,000
2109-2118	$1,010,000	$420,000	$100,000	$0	$0	$0	$0	$0	$0	$1,530,000
	$25,455,000	**$3,810,000**	**$1,485,000**	**$13,818,347**	**$1,990,000**	**$893,811**	**$1,307,338**	**$220,743**	**$60,000**	**$49,040,239**

$490,402.39

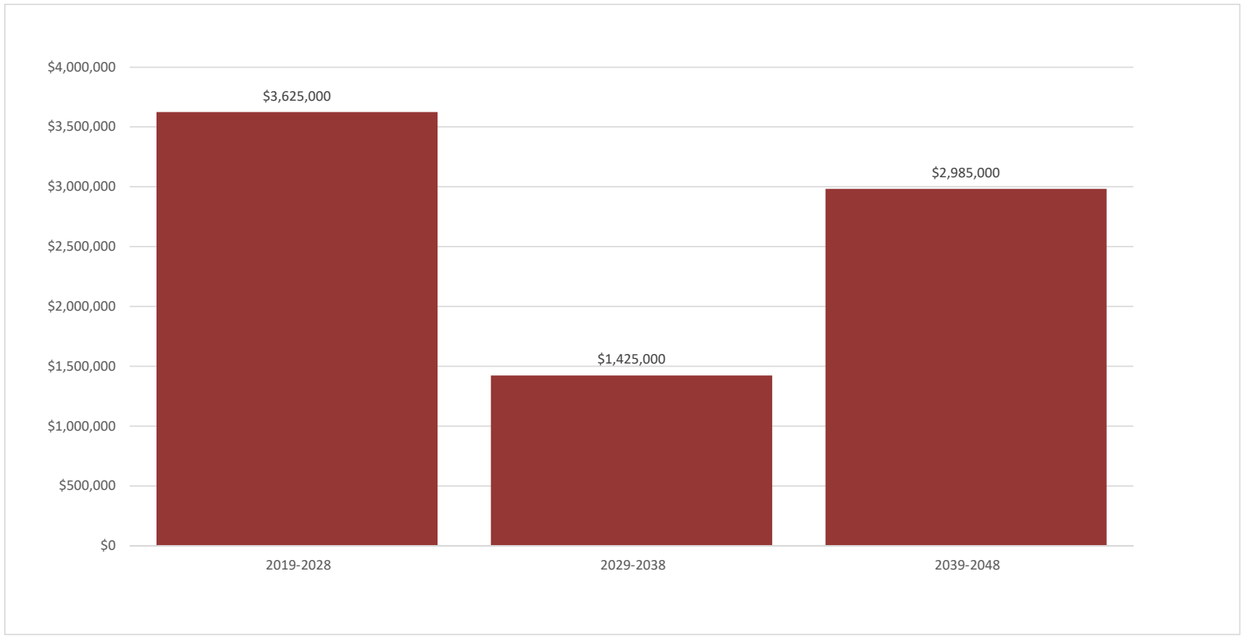


Values	
2019-2028	$3,625,000
2029-2038	$1,425,000
2039-2048	$2,985,000
2049-2058	$21,171,742
2059-2068	$4,073,647
2069-2078	$2,883,724
2079-2088	$3,642,579
2089-2098	$4,103,547
2099-2108	$3,600,000
2109-2118	$1,530,000


$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
2019-2028
2029-2038
2039-2048
2049-2058
2059-2068
2069-2078
2079-2088
2089-2098
2099-2108
2109-2118
Total

	Column Labels				
Values	Highest Risk	Priority Renewal	Frequent Monitoring	Limited Monitoring	Grand Total
2019-2028	$2,475,000	$1,150,000	$0	$0	$3,625,000
2029-2038	$1,302,500	$115,000	$7,500	$0	$1,425,000
2039-2048	$1,830,000	$525,000	$625,000	$5,000	$2,985,000
2049-2058	$1,493,755	$567,025	$9,150,587	$9,960,375	$21,171,742
2059-2068	$2,202,500	$1,075,000	$7,500	$788,647	$4,073,647
2069-2078	$1,275,000	$165,000	$911,993	$531,731	$2,883,724
2079-2088	$2,087,500	$575,000	$732,500	$247,579	$3,642,579
2089-2098	$1,232,500	$65,000	$2,756,047	$50,000	$4,103,547
2099-2108	$2,050,000	$1,025,000	$500,000	$25,000	$3,600,000
2109-2118	$1,407,500	$115,000	$7,500	$0	$1,530,000
2019-2118	$17,356,255	$5,377,025	$14,698,628	$11,608,331	$49,040,239

Values	
2019-2028	$3,625,000
2029-2038	$1,425,000
2039-2048	$2,985,000
	$8,035,000
	$267,833



Row Labels	Sum of 2049-2058
Wastewater T	$5,190,000
Ramsdell Roac	$1,070,000
West Hennike	$310,000
Gravity Main	$12,631,742
Manholes	$1,910,000
Effluent Manh	$60,000
Grand Total	**$21,171,742**

Appendix D

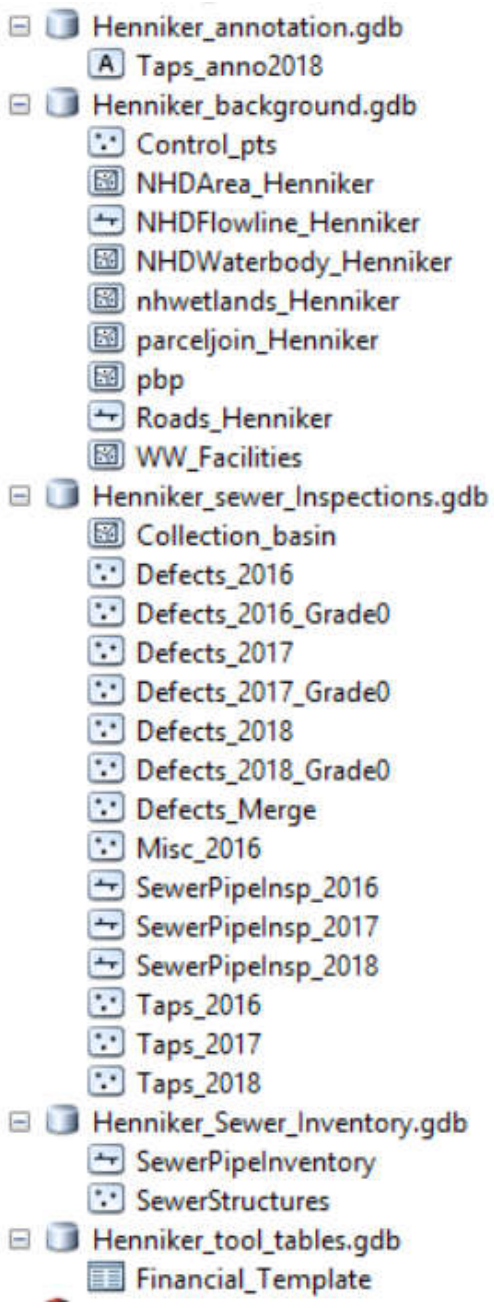
Asset Management Program Instruction Sheets

ArcMAP FILES

File Geodatabases:

The following "Henniker_Wastewater_System" File Geodatabase containing the Town's Wastewater System inventory information has been provided as listed in Figure D-1 below.

Figure D- 1. List of Feature Classes stored in Henniker_Wastewater_System File Geodatabases



The main file is the "Henniker_Sewer_Inventory" geodatabase. This file contains the bulk of the information on the Town's Wastewater system pipes and structures, such as estimated age, material, remaining useful life, etc.

The "Henniker_Sewer_Inspections" geodatabase includes data from the CCTV inspections performed over the past three years. The defect spreadsheet in Appendix C was exported into Excel from the "Defects_Merge" file, which contains all the defects found in the three years of inspections.

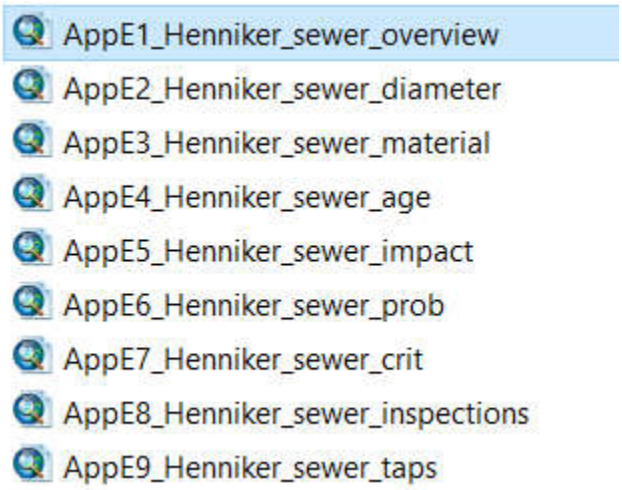
Several "background" files have been provided as well, including such items as town boundaries, water bodies, roads and parcels. These are stored in the "Henniker_Background" file geodatabase.

The "Henniker_annotation" geodatabase includes labels for each of the taps mapped in Appendix E9.

***Map (mxd) files and Layer files**:*

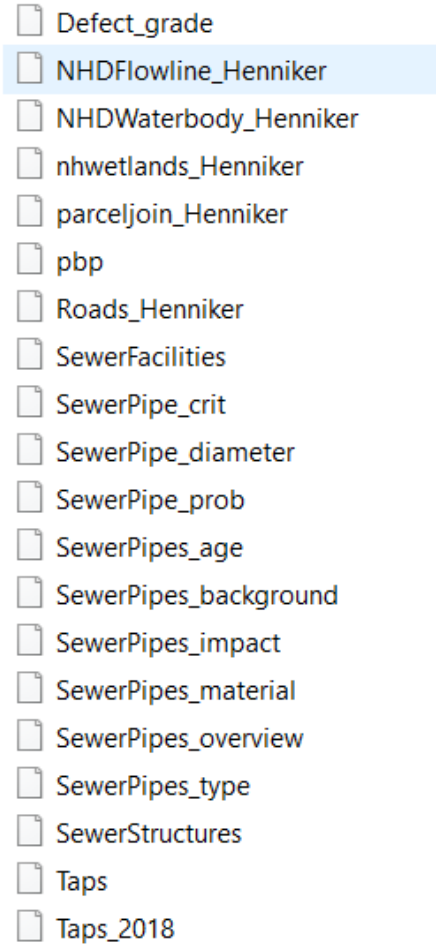
The data is displayed in .mxd files, several of which have been prepared for the Town. The various maps (or .mxd files) display the data in various ways. Paper versions have been provided in Appendix E, and are listed below.

Figure D- 2. List of Map Files



Each of the maps has different symbology. For instance, Map E2 displays the Wastewater system by pipe diameter and Map E4 displays the Wastewater system by the year installed. Layer files enable the user to quickly change the parameters shown on the map. The layer files provided are listed in Figure D-4 below.

Figure D- 3. List of Layer Files



Tools:

Various tools have been provided to allow the Town to easily update and export data from the "Henniker_Sewer_Inventory" geodatabase. Field names, descriptions and types for each of the two feature classes are provided in Tables D-1and D-2 below. Tools and their input screens are included in the pages that follow.

Table D- 1. Wastewater Pipe Feature Class Fields

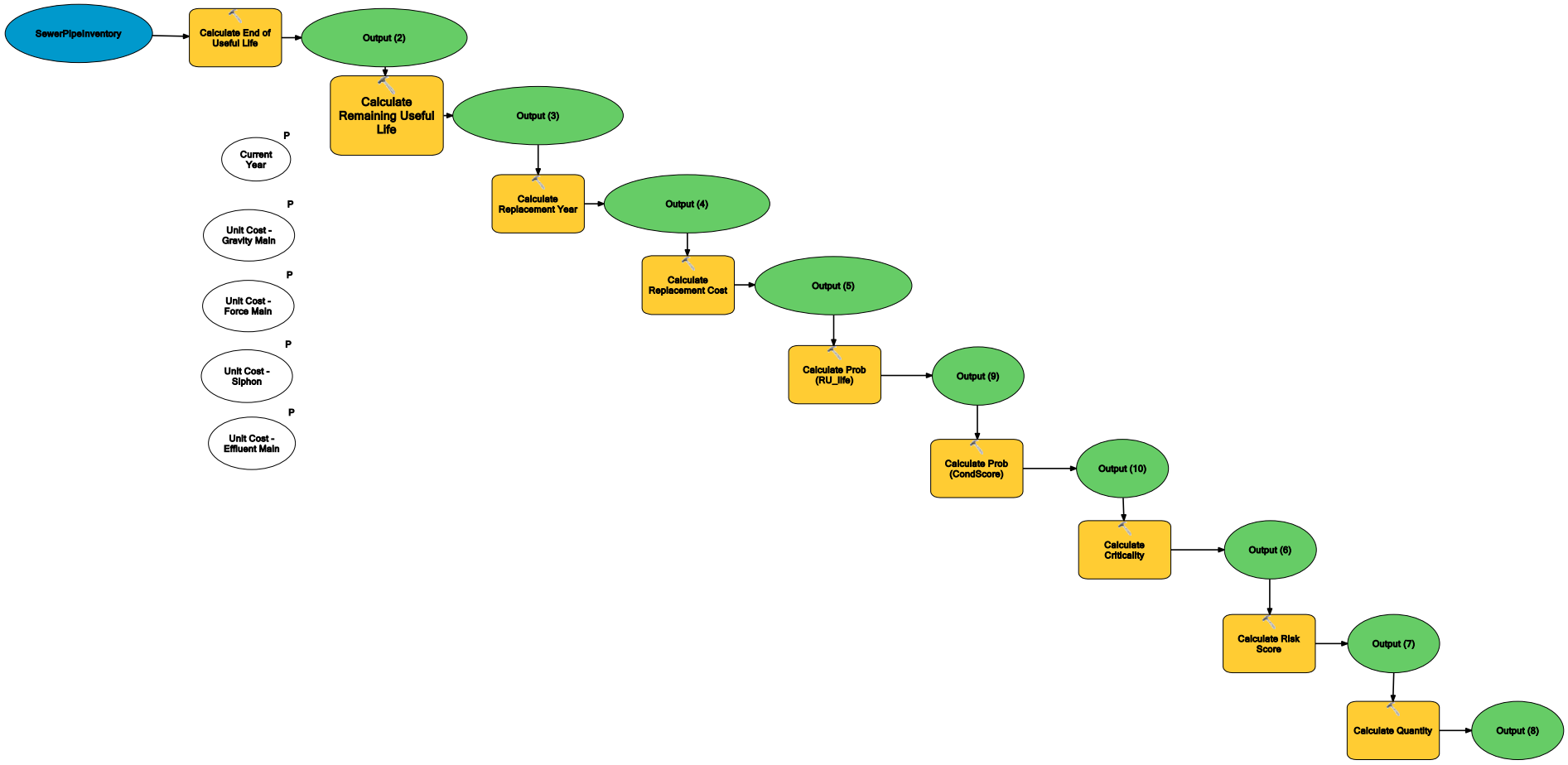
Name	Alias	Type	Length	Description	Formula
OBJECTID	OBJECTID	OID	4	assigned by ArcMap	
SHAPE	SHAPE	Geometry	0	assigned by ArcMap	
Type	Type	String	50	Asset type (ie. gravity main, force main, etc.)	
Year_in	Year_In	Integer	4	Estimated based on record drawings	
US_MH	US_MH	String	50	Upstream manhole	
DS_MH	DS_MH	String	50	Downstream manhole	
AssetID	AssetID	String	50	USMH-DSMH	
Year_txt	Year_txt	String	20	Year installed if known, otherwise "Unknown"	
Material	Material	String	50	From record drawings, inspections, or "Unknown"	
Rec_Dwg	Rec_Dwg	String	50	Information source if available	
U_life	U_life	SmallInteger	2	Estimated based on material according to industry sources (ie. "Buried No Longer")	
EU_life	EU_life	SmallInteger	2	computed using 00_Calculate_Pipe_Fields tool	Year_In + U_life
RU_life	RU_life	SmallInteger	2	computed using 00_Calculate_Pipe_Fields tool	Current Year - EU_life
Prob	Overal Performance Score	Double	8	computed using 00_Calculate_Pipe_Fields tool	If "Cond_score" is available then, "Cond_score", otherwise based on remaining useful life
Impact	Impact of Malfunction	Double	8	assigned by user	
Risk_Score	Risk Score	Double	8	computed using 00_Calculate_Pipe_Fields tool	Impact*Prob
Crit	Criticality	String	50	computed using 00_Calculate_Pipe_Fields tool	If-Then statement based on Impact and Prob fields
Basin	Basin	String	50	sewer basin (Ramsdell Road or West Henniker)	

Name	Alias	Type	Length	Description	Formula
Repl_year	Repl_year	Integer	4	computed using 00_Calculate_Pipe_Fields tool	If EU_life > Current Year Then EU_life; otherwise Current Year
Repl_Cost	Repl_Cost	Double	8	computed using 00_Calculate_Pipe_Fields tool	SHAPE_Length x Unit Cost (Unit Cost input by user based on type of pipe)
Dia	Dia	String	50	From record drawings, inspections, or "Unknown"	
Road	Road	String	50	Based on location of pipe	
Quantity	Quantity	Double	8	computed using 00_Calculate_Pipe_Fields tool (used in export to Financial Planning Spreadsheet)	Equals SHAPE_Length
CondScore	Condition Score	Double	8	assigned by user; over-rides Overall Performance Score, which is computed based on Remaining Useful Life	
SHAPE_Length	SHAPE_Length	Double	8	automatically computed by ArcMap	

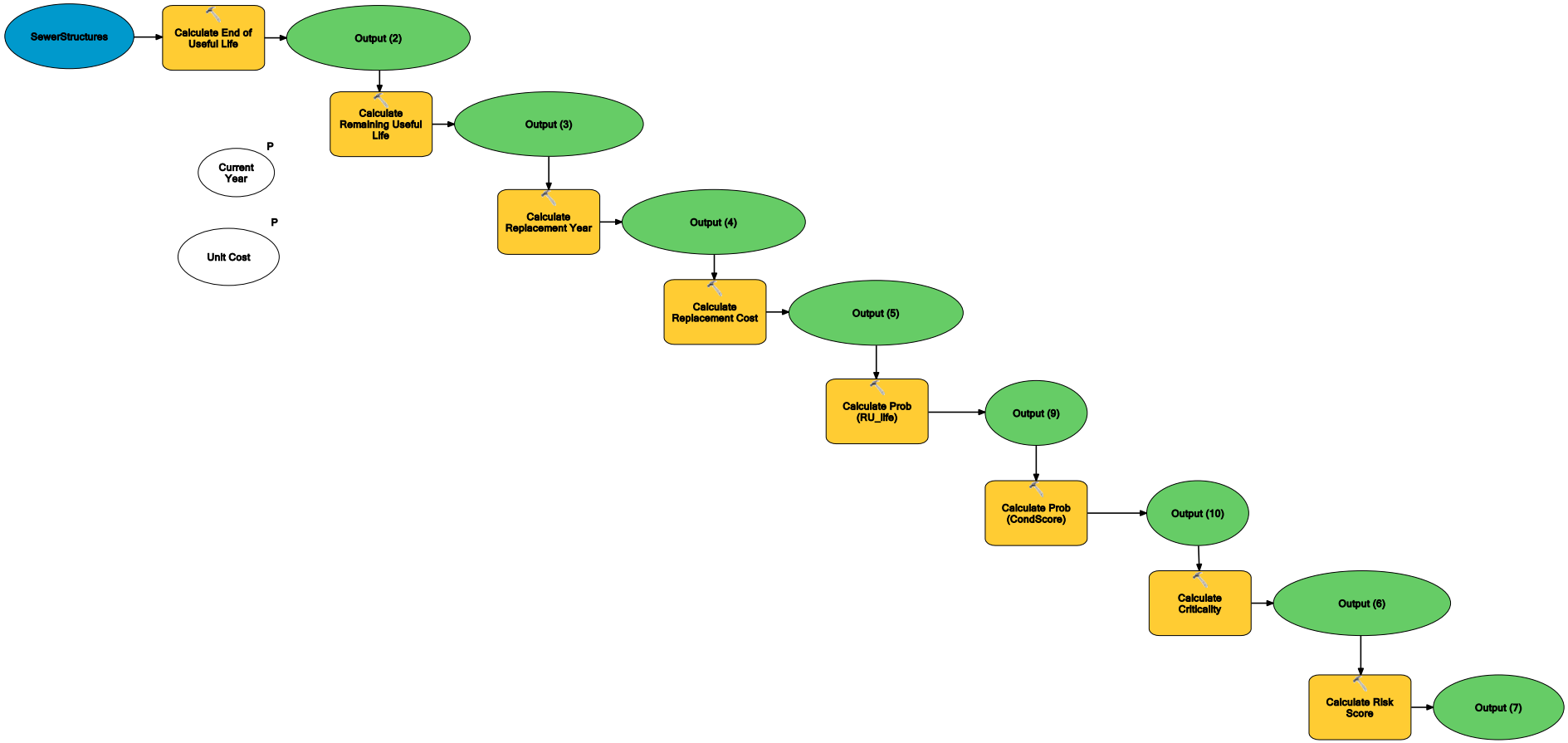
Table D- 2. Wastewater Structure Feature Class Fields

Name	Alias	Type	Length	Description	Formula
OBJECTID	OBJECTID	OID	4	assigned by ArcMap	
SHAPE	SHAPE	Geometry	0	assigned by ArcMap	
AssetID	AssetID	String	50	manhole number per paper map used by Town	
Year_in	Year_In	Integer	4	Estimated based on record drawings	
Type	Asset_Type	String	50	Asset type (ie. manhole)	
Basin	Basin	String	50	sewer basin (Ramsdell Road or West Henniker)	
Year_txt	Year_txt	String	50	Year installed if known, otherwise "Unknown"	
Quantity	Quantity	Double	8	Defaults to 1, used in export to Financial Planning Spreadsheet	
Material	Material	String	50	from record drawings if available, typically "precast"	

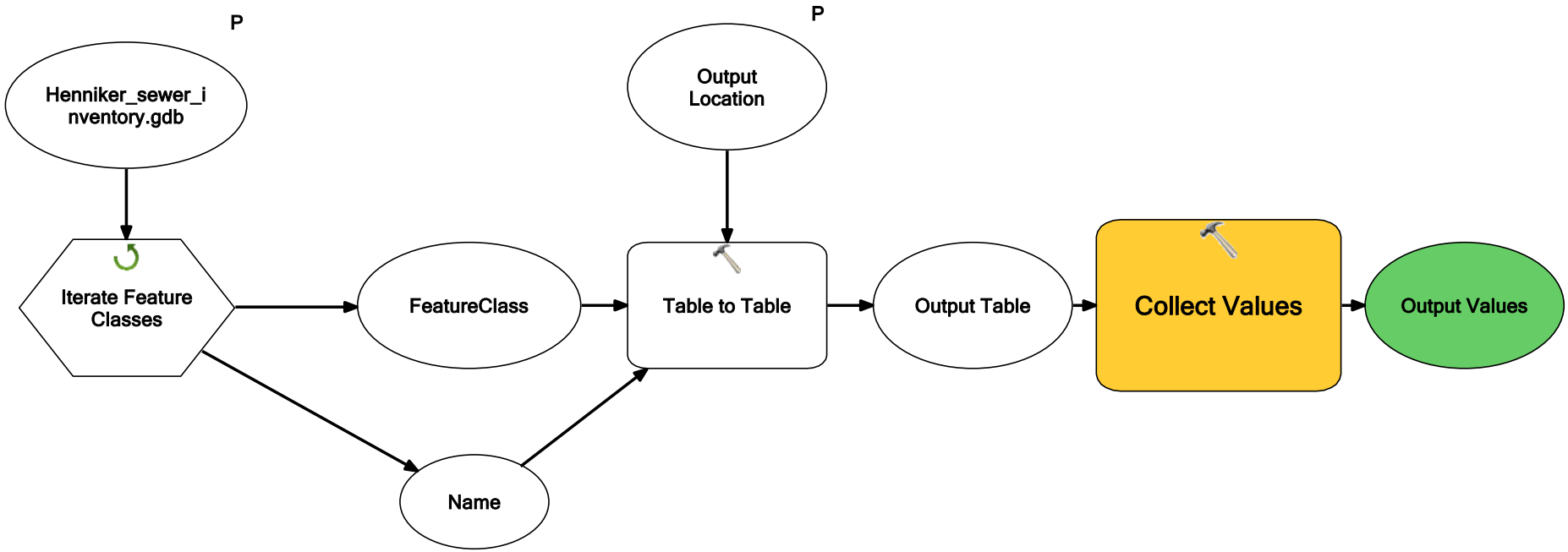
Name	Alias	Type	Length	Description	Formula
U_life	U_life	Integer	4	estimated to be 75 years	
EU_life	EU_life	Integer	4	computed using 00_Calculate_Pipe_Fields tool	Year_In + U_life
RU_life	RU_life	Integer	4	computed using 00_Calculate_Pipe_Fields tool	Current Year - EU_life
Repl_year	Repl_year	Integer	4	computed using 00_Calculate_Pipe_Fields tool	If EU_life > Current Year Then EU_life; otherwise Current Year
Repl_Cost	Repl_Cost	Integer	4	computed using 00_Calculate_Pipe_Fields tool	SHAPE_Length x Unit Cost (Unit Cost input by user based on type of pipe)
Risk_Score	Risk_Score	Double	8	computed using 00_Calculate_Pipe_Fields tool	Impact*Prob
Crit	Crit	String	50	computed using 00_Calculate_Pipe_Fields tool	If-Then statement based on Impact and Prob fields
Prob	Overall Performance Score	Double	8	computed using 00_Calculate_Pipe_Fields tool	If "Cond_score" is available then, "Cond_score", otherwise based on remaining useful life
Impact	Impact of Malfunction	Double	8	assigned by user	
Dia	Dia	String	50	input if available	
Road	Road	String	50	Based on location of structure	
CondScore	Condition Score	Double	8	assigned by user; over-rides Overall Performance Score, which is computed based on Remaining Useful Life	



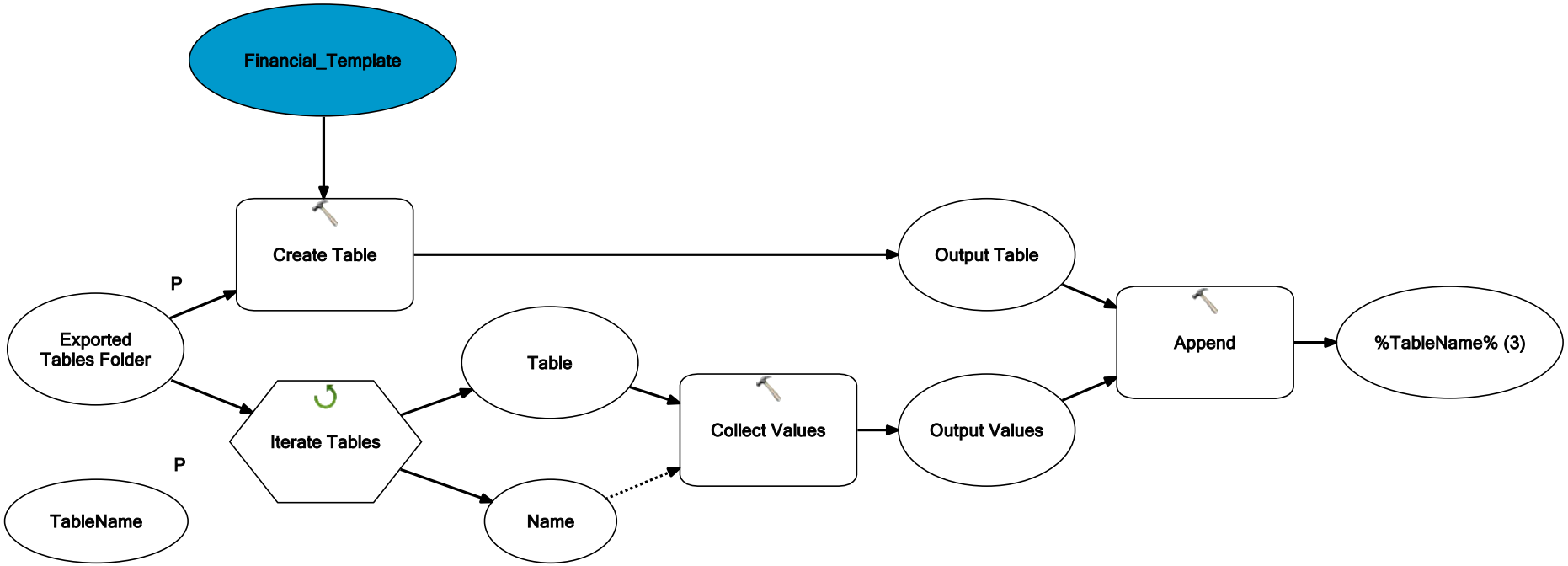
00_Calculate_Pipe_Fields



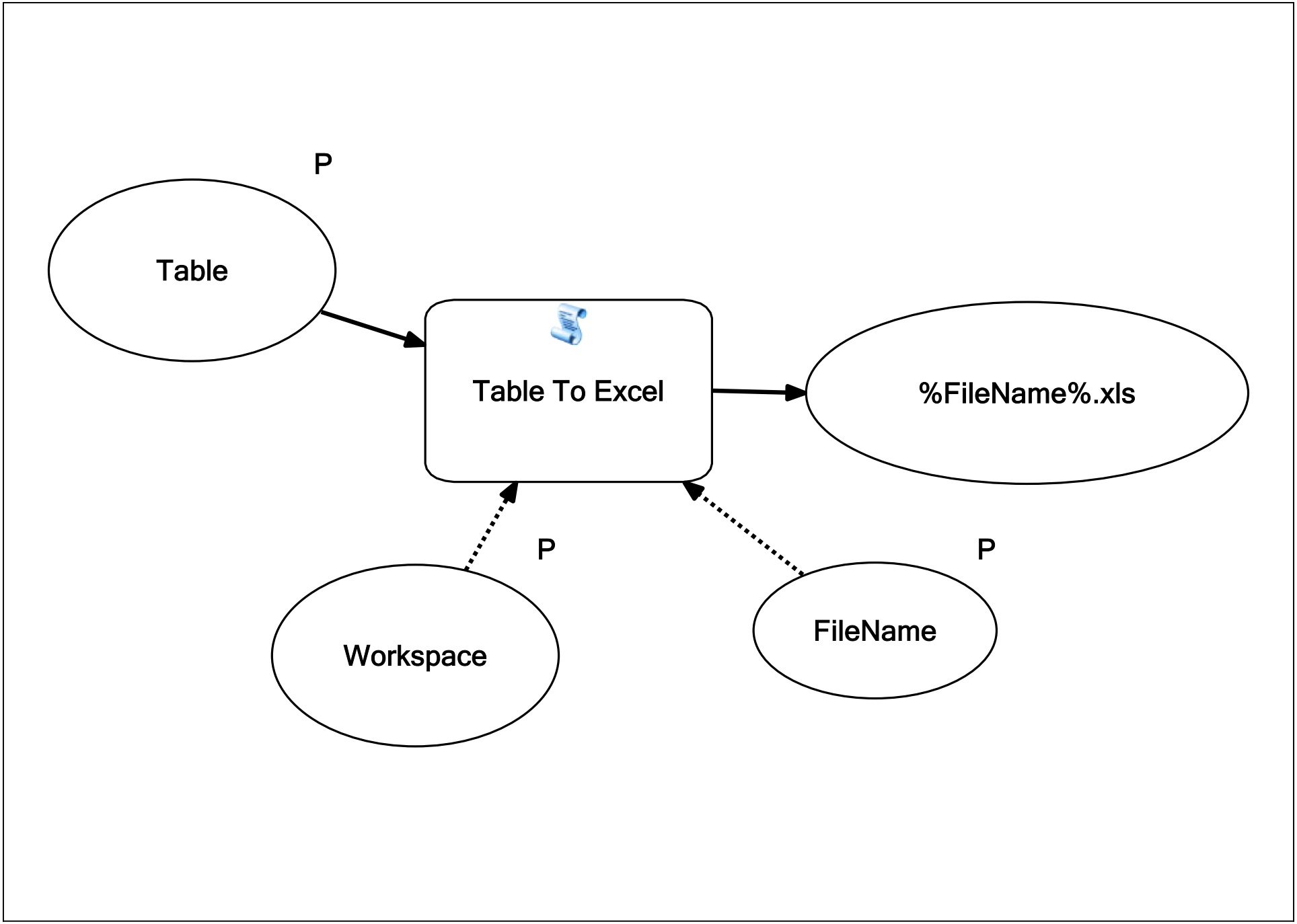
01_Calculate_Structure_Fields



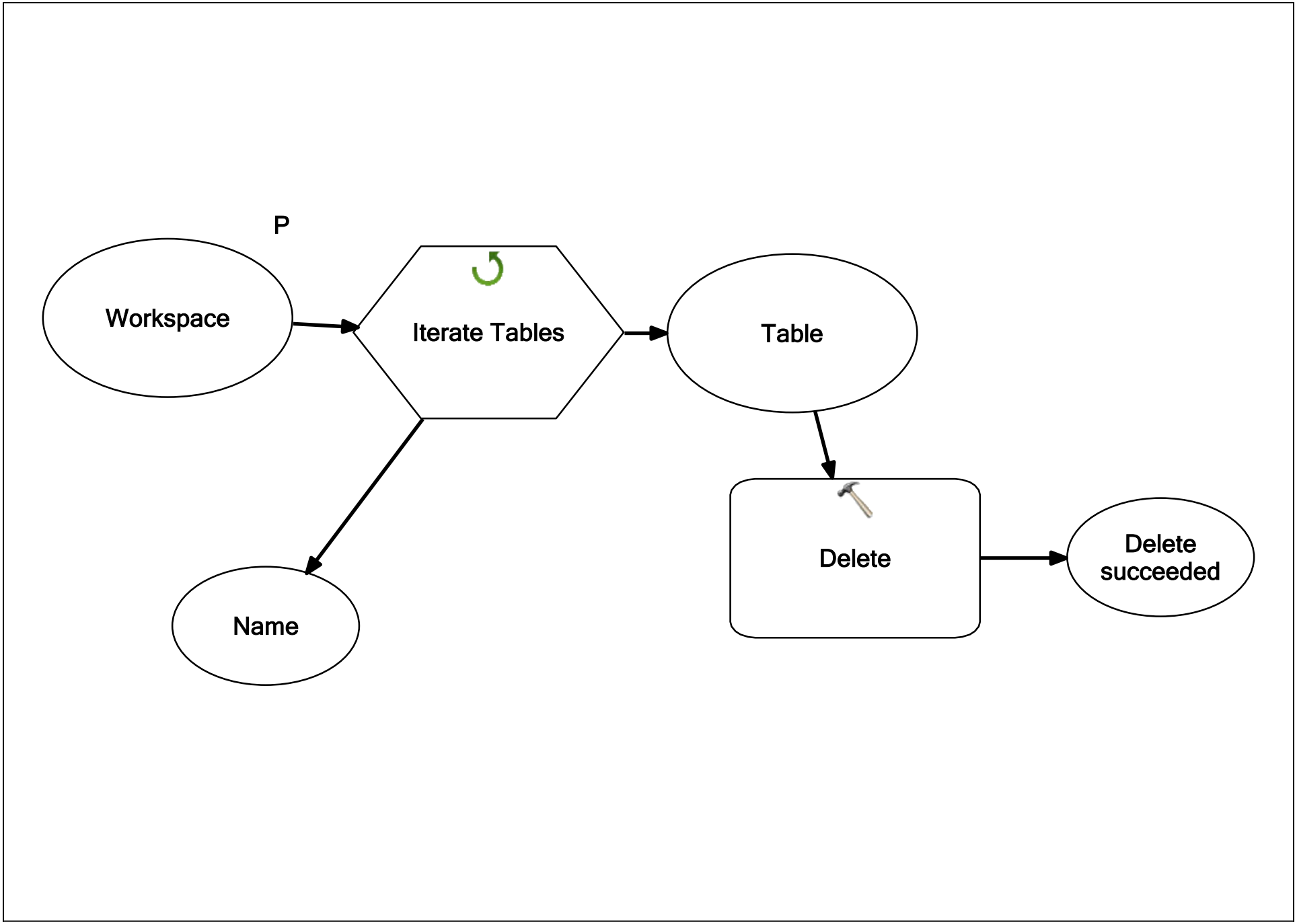
02_Export_Tables



03_Merge_Tables



04_Merge_to_Excel


P
Workspace
Iterate Tables
Table
Name
Delete
Delete succeeded

FINANCIAL PLANNING AND INVENTORY SPREADSHEET

The Financial Planning and Inventory Spreadsheet has been provided to assist the Town with long-term planning. An explanation of the spreadsheet and how it works has been provided below.

Asset Data Table: This tab contains information on the vertical asset subcomponents (ie. pumps, treatment facilities, building components, etc.) and each horizontal asset component (ie. Wastewater mains, hydrants, and valves).

The first 16 columns are the same as the feature class fields listed in Tables D-1 and D-2 above.

Replacement Schedule: These 20 columns are normally hidden. Formulas in these cells schedule out the year replacements are due, up to 20 replacements. This assumes that no assets with a useful life of less than 5 years will be included. If the Town wants to schedule out assets with useful lives less than five years, the spreadsheet can be modified to accommodate that.

Estimated Cost of Replacements Over Ten Years - formula computes the estimated cost of replacements each year for the next ten years. Note that the years in the headings are automatically recalculated when cell "A2" (Year 1) is revised.

Estimated Cost of Replacements Over One-hundred Years - formula computes the estimated cost of replacements each year for the one hundred years. Note that the ten-year time frames in the headings are automatically recalculated when cell "A2" (Year 1) is revised.

Inventory Summaries: This tab includes Pivot Tables which summarize various aspects of the wastewater collection system. For instance, pipe length by material and age.

Replacement Value: This tab totals up the estimated replacement cost for the entire system using a pivot table and chart.

Ten-Year Look Ahead: This tab contains the following pivot tables, which detail replacement costs for the next ten years.

- A summary of estimated replacement costs over the next ten years by year.
- A summary of estimated replacement costs over the next ten years by criticality.
- A list of all assets described due for replacement in the next ten years by Risk Score in descending order.

If the "Data Table" is modified, then this summary table can be updated simply by clicking the "Analyze" tab at the top of the spreadsheet and then clicking "Refresh". If records are added to the "Data Table", then choose "Change Data Source" to make sure all records are included.

One Hundred-Year Look Ahead: This tab includes a table and a bar chart which summarize replacement costs for the next hundred years by decade.

ASSET DATA TABLE FORMULA SUMMARY

Columns G through I, K, M and N contain formulas to compute such parameters as "Remaining Useful Life" for vertical assets. These same parameters are computed for horizontal assets using Tools in ArcGIS.

Column G: End of Useful Life

Equal to Year Installed + Useful Life

Column H: Remaining Useful Life

Equal to End of Useful Life – Current Year (Cell A2)

Column I: Replacement Year

Equal to End of Useful Life unless End of Useful Life is less than the Current Year in Cell A2. If that is the case, then Replacement Year is equal to Current Year.

Column K: Overall Performance Score

If there is no Condition Score (Column J) then Overall Performance Score is computed based on Remaining Useful Life as shown in Table D-3.

If there is a Condition Score, then Probability of Failure equals the Condition Score.

Table D- 3. Probability of Failure (Condition) Score Based on Remaining Useful Life

Condition Score	General Description
5.0	Remaining Useful Life <= 0
4.0	Remaining Useful Life > 0 and <= 10
3.0	Remaining Useful Life > 10 and <= 20
2.0	Remaining Useful Life > 20 and <= 50
1.0	Remaining Useful Life > 50

Column L: Condition Score

The Condition Score of an asset is assigned by Town staff and overrides its Remaining Useful Life in determining its Probability of Failure. For instance, if an asset has ten years of remaining useful life, but is in poor condition and is non-functional, it's Overall Performance Score will be 5, not 3.

Column M: Risk Score

Probability of Failure x Impact of Failure

Column N: Criticality

If Probability of Failure and Impact of Failure are both >= 2.5, then “Highest Risk”.

If Probability of Failure >= 2.5 and Impact of Failure < 2.5, then “Priority Renewal”

If Probability of Failure < 2.5 and Impact of Failure >= 2.5, then “Frequent Monitoring”

If Probability of Failure and Impact of Failure < 2.5, then “Limited Monitoring”

Column R: First replacement

If End of Useful Life is less than the Current Year, then first replacement is scheduled to occur in the current year. Otherwise, First Replacement = End of Useful Life.

Column S-AK: Subsequent replacements

If the prior replacement is "0", then "0". If the prior replacement + Current Useful Life falls outside the 100-year time frame, then "0".

If neither of these is true (ie. the next replacement falls between Year 1 and Year 100), then the replacement is scheduled for the prior replacement + Current Useful Life.

Column AL - AU: Schedule out replacement cost for the next ten years -

Compare the year in the header row to the scheduled replacements for a given asset. If there's a match then multiply by the replacement cost.

Column AV - BE: Schedule out replacement cost for the next hundred years -

Compare the year in the upper header row (ie. beginning of ten-year period) and the lower header row (ie. the end of the ten-year period) to the scheduled replacements for a given asset. If there's a match then multiply by the replacement cost.

Column BF: Sum Columns AR through BA to determine replacement costs for the next 100 years.

Appendix E

Wastewater System Maps

APPENDIX E1

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Ramsdell Road Pumping Station

WWTF

Siphon Inlet Chamber

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

SewerStructures

Type

- Gravity Main
- Siphon
- Effluent Main
- Force Main
- WW_Facilities
- Collection_basin

APPENDIX E2

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Diameter

- 6-inch Force Main
- 10-inch Force Main
- Unknown diameter, Gravity Main
- 8-inch Gravity Main
- 10-inch Gravity Main
- 12-inch Gravity Main
- 18-inch Gravity Main
- 6-inch Siphon
- Siphon, 8
- Effluent Main, 12
- Effluent Main, 18
- WW_Facilities
- Collection_basin

APPENDIX E3

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Material

- Force Main, CI
- Siphon, CI
- Gravity Main, AC
- Gravity Main, CI
- Gravity Main, DI
- Gravity Main, PVC
- Gravity Main, RC
- Gravity Main, VC
- Gravity Main, Unknown
- Effluent Main, CI
- Effluent Main, RC
- WW_Facilities
- Collection_basin

APPENDIX E4

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Year Installed

- Force Main, 1975
- Siphon, 1975
- Gravity Main, 1975
- Gravity Main, 1978
- Gravity Main, 1980
- Gravity Main, 1985
- Gravity Main, 1986
- Gravity Main, Unknown
- Effluent Main, 1975
- WW_Facilities
- Collection_basin

APPENDIX E5

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Impact of Malfunction

- Force Main - Very High
- Force Main - High
- Siphon - Very High
- Gravity Main - Very Low
- Gravity Main - Low
- Gravity Main - Moderate
- Gravity Main - High
- Gravity Main - Very High
- Effluent Main - Moderate
- WW_Facilities
- Collection_basin

APPENDIX E6

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Overall Performance Score

- Force Main, 1
- Gravity Main, 1
- Gravity Main, 2
- Gravity Main, 3
- Gravity Main, 4
- Gravity Main, 5
- Siphon, 1
- Effluent Main, 1
- WW_Facilities
- Collection_basin

APPENDIX E7

WASTEWATER COLLECTION SYSTEM
PROJECT OVERVIEW
HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

West Henniker Pumping Station

Siphon Inlet Chamber

Ramsdell Road Pumping Station

WWTF

One 6-inch siphon
One 8-inch siphon

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures

Criticality

- Force Main, Frequent Monitoring
- Siphon, Frequent Monitoring
- Gravity Main, Highest Risk
- Gravity Main, Priority Renewal
- Gravity Main, Frequent Monitoring
- Gravity Main, Limited Monitoring
- Effluent Main, Frequent Monitoring
- WW_Facilities
- Collection_basin

APPENDIX E8

WASTEWATER COLLECTION SYSTEM
GRAVITY MAIN INSPECTIONS AND DEFECTS

UNDERWOOD engineers

APRIL 5, 2019

N

1 inch = 400 feet

400 0 400 800 Feet

Legend

- SewerStructures
- 5 - Very severe defect
- 4 - Severe defect
- 3 - Moderate defect
- 2 - Minor defect
- 1 - Very minor defect
- Collection_basin
- SewerPipeInsp_2016
- SewerPipeInsp_2017
- SewerPipeInsp_2018

APPENDIX E9

WASTEWATER COLLECTION SYSTEM TAPS HENNIKER, NH

UNDERWOOD engineers

APRIL 5, 2019

N

1 inch = 400 feet

400 0 400 800 Feet

Tap Locations by Clock Position

(Distance of tap from starting manhole)

- Sewer Structure
- 2 o'clock
- 3 o'clock
- 9 o'clock
- 10 o'clock
- 11 o'clock
- 12 o'clock
- Clock position not specified
- Direction of 2016 sewer inspection
- Direction of 2017 sewer inspection
- Direction of 2018 sewer inspection
- Gravity Main
- Siphon
- Force Main
- Collection_basin

Note:
1. The clock position depends on the direction of the CCTV inspection and is in accordance with the diagram below.