

HWU



Henderson Water Utility

WATER • WASTEWATER • STORMWATER

*CAPITAL IMPROVEMENT PROGRAM
AND STRATEGIC PLAN*

WATER – WASTEWATER – STORMWATER

HENDERSON WATER UTILITY

HENDERSON, KENTUCKY

Updated 12 April 2023

HENDERSON WATER UTILITY CAPITAL IMPROVEMENT PROGRAM AND STRATEGIC PLAN WATER – WASTEWATER – STORMWATER



I. GOALS AND PURPOSE OF THIS PLAN

This represents the tenth edition of a ***Capital Improvement and Strategic Plan*** first adopted in June 2014. Our objective has been to develop a cost effective and environmentally sound Capital Improvement Program for the water, wastewater, and stormwater systems in the City of Henderson to accommodate existing needs and projected growth over a rolling 10-year time frame. We realize that planning beyond 2 to 5 years is of marginal value, as conditions change over time; the past two years have certainly proved that to be true. Nevertheless, we update this plan annually, prior to the budgeting process, to lay out a logical sequence of work that fits the resources available.

The principal short-term goal for implementation of this plan in the beginning was to finish the final Long-Term Control Plan (LTCP) project, the North WWTP Headworks. With that project completed in 2016, we negotiated termination of our Consent Judgment and moved on with our obligations for post-construction monitoring and meeting the requirements of our soon-to-be-issued discharge permit for the North wastewater system. That permit, first expected to be issued in 2017, is not yet in hand.

After completing the LTCP, our primary projects have been continued renovation of our water storage facilities, and water and wastewater treatment plants, where needed expenditures for maintenance and upgrades were delayed by work on the LTCP projects. To date, six of our nine older water storage tanks have been painted and rehabilitated, with the seventh and eighth tank maintenance projects in the planning stage.

With the new Pratt Paper industrial development, we will now be adding a tenth water storage tank, along with a ground-mounted fire suppression tank for that development, which will be transferred to Pratt upon its completion. As part of the Pratt development, we will be raising the hydraulic grade of the South/College pressure zone, so one of our tanks, College, will be taken off-line and reserved for use in emergencies or during renovation of the Pratt tank.

This strategic plan lays the groundwork for increasing our capacity to serve growth areas, together with an attempt to maintain the systems and facilities we currently have, balancing risk with the money we have available.

As we did the last two years, we've arranged the project listings under each major facet of our business as "Recent" and "Proposed" projects, to help others understand what we've accomplished, and to show the direction of the Utility's Capital Plan more clearly, near term.

Addition of the large projects to accommodate the Pratt Paper (KY) project, including two tanks, a new South Water Booster Station on Sand Lane, a sewer pump station on the Pratt site, and large water main and force main segments, has skewed the total Capital Improvement Plan numbers contained herein much higher in 2022 and 2023. We have taken steps to issue bonds in the amount of \$ 10.0 to 15.0 million to expedite this and other projects, with the remainder made up from reserves and grant funds.

The annual amount spent from our “normal” Capital Budget will remain in our planned range of \$ 3.5 to 4.5 million.

II. WATER SYSTEM PROJECTS

A. **North Water Treatment Plant -- Recent Projects**

- i. **Raw Water Intake:** A complete renovation of the Raw Water Intake was completed in 2013, including installation of pumps with a capacity of up to 20.0 million gallons per day (mgd), with the two largest pumps running, and a 30” raw water supply line running from the intake toward the plant. This project included acquisition of and provision for connection of temporary pumps, in case of a failure of the intake structure or pumps. Those pumps can also be used in the wastewater system and are stored in a purpose-built structure at the North Fork Pump Station.

This capacity for raw water is enough for present needs, and for anticipated capacity for the term to 2030. Up until the Pratt development, we have seen no significant increase in water demand since the upgrade was completed, and in fact, residential use declined for several years, although we have seen an uptick in residential billings, since we started replacing meters. Most of our residential use is concentrated in the North service area.



Vertical Turbine Pumps and Travelling Screens @ Raw Water Intake

- ii. **Critical Repairs (Phase 1 Project):** A 2013 study of needed repairs at the North Water Treatment Plant in coordination with Clark Deitz, Inc. (CDI), looked at critical and non-critical elements of the plant buildings, basins, and appurtenances, and included a complete structural evaluation of the basins due to concerns with ongoing underground leakage along the Water Street frontage of the plant. Construction of the critical elements from the study was included in a “Phase 1” project that started in November 2015 and was completed in September 2016. That work included a new flash mix basin drop box within an unused settled water aeration area at the front of the plant, near Water Street. By constructing a new



wall along the west end of the superpulvator clarifiers and a new effluent line from the clarifiers to the contact basin, a significant volume of “dead” water was eliminated, reducing chlorine use. Also, water leakage beneath the riprap slope on the west side of the plant was greatly reduced.

While constructing these improvements we replaced the influent screen, added a bypass for the contact basin, replaced deteriorated baffles and installed algae control covers. The project also increased the size of the influent piping across Water Street.

B. North Water Treatment Plant -- Future Projects

- i. Capacity of the Plant: The nominal rated capacity of the NWTP treatment system is 12.0 mgd, based on filter flow rate, with one of the six filters off-line. For the period from January 2009 to date, production at the plant has not exceeded 10.8 mgd; that occurred in 2012, and the peak has declined in most years since then. Average daily demand during the period from 2009 to 2018 was 6.22 mgd, and this number has also shown a decline, from an average of 6.5 mgd from 2009 to 2012, to an average of 6 mgd from 2013 thru 2018. Average production thus equates to about 50 % of plant capacity. The addition of 1.5 mgd in demand from the Pratt Paper facility can be handled by the NWTP without upgrades to the plant itself, and the addition of this demand still does not put the plant in a position of approaching 80% of capacity on a sustained basis.

Any large user locating in the North system would require serious consideration of a plant upgrade, most likely by adding filter capacity.

- ii. North Water Treatment Plant - Non-Critical Repairs (Phase 2 Project): Improvements scheduled in Phase 2 of the CDI study include replacing pump check valves, improvements to the clear well, roof repairs, upgraded HVAC systems and facility aesthetics. Since the area currently used to store water treatment chemicals does not have the ventilation and cooling systems required to meet recommended standards, the main plant building’s HVAC system will be upgraded. Phase 2 also includes most of the structural and architectural building repair; however, short term repair of the brick façade was included in Phase 1 to ensure a safe working environment for staff. Phase 2 projects may be accomplished in several smaller projects, spreading the expense out to the extent possible. Phase 2 will also include upgrades to the high service building, to make it fit better into the improved look of the Riverwalk and riverfront park areas.

All these NWTP improvements are shown on Sheet 2 of the Appendix, where the non-critical items are pushed out to 2026 to 2029.

- iii. High Service Pumps for North WTP: In the summer and fall of 2021, both existing high service pumps at the North WTP failed. Each was at least 25 years old, and they were at end of useful life. As an emergency measure, we issued an RFP for those two pumps, a backwash pump, variable frequency drives (VFDs) and controls. Those bids were received in March 2022, and the pumps have been ordered. While we await their construction and delivery, our consultant on this project, J.R. Wauford, has developed plans for improvements to the high-service building that will upgrade it to modern standards and incorporate a climate-controlled area to house the VFDs. This project was bid in March 2023, and construction should begin in Q2 2023. Amounts are shown in Appendix 2 to be spent on this project in the current fiscal year and next (FY 2024)
- iv. Long Range Planning: In April 2020, we issued an RFP for a preliminary engineering report (PER) related to the possible installation of granulated activated charcoal (GAC) filters at the North

WTP. This is a high-level, initial study to determine how GAC filtration would fit on the site, and to explore costs associated with such a project. It is possible that regulation of PFAS and PFOA compounds, much in the news lately, will be imposed on us at some time in the future. If this occurs, we want to be ready with at least an initial planning study and good cost estimates.

This GAC study looked at three alternatives for PFAS/PFOA removal, reverse osmosis, ion exchange, and converting some of our existing filters to granular activated carbon filter media. The costs range from \$ 10 to 15 million, and annual operational costs for the alternatives range from \$ 400,000 to 700,000. Obviously, this level of construction and operational effort will require much more study. Costs for a GAC upgrade have not been included in this edition of the plan.

A study was conducted in 2000 & 2002 to determine the feasibility of using wells as a raw water source. Results of those studies showed that in the immediate area of the City, there is little capacity for adequate wells, due to shallow bedrock. Areas further afield (Horseshoe Bend and the Geneva bottoms) showed more promise, but their relative distance from the center of town make them impractical.

C. **South Water Treatment Plant - Recent Projects**

A study of projects to mitigate risk at the South Water Treatment Plant (SWTP) was completed in 2014. Part of this effort was an attempt to schedule and plan for future needs. Designs for several projects from that study are complete, and projects are being phased in as funds become available. J.R. Wauford is the design engineer.

- i. **Short-Term Repairs:** Our “wait and see” strategy on plant replacement/upgrade has required repairs to the existing plant to keep it in service until we can afford to expand the plant, and to ensure that the existing plant life is extended until that expansion is complete. A project to expedite repairs to the settling “cones” and other deteriorated metal surfaces was completed in spring 2016, at a cost of approximately \$ 200,000.

We are also investigating the possibility of dredging or expanding the lake at the plant, to provide a larger reservoir of raw water that can be treated as a buffer, should our intake be out of service. A survey to quantify our options was completed.

A further “short term” repair project to repair and paint the deteriorated secondary clarifier was bid in March 2020 and completed in July 2020, at a cost of \$ 68,856. This project mirrored the repair strategy and paint system used on the cones in spring 2016.

- ii. **Raw Water Supply:** Our study included options related to raw water pumping (which relied on cooling water pumps at the Big Rivers power plant) and included an option of installing our own raw water pumps in the Big Rivers intake (at \$ 2.5 million), and possible improvements to the raw water feed lines, adding provision for emergency bypass connections. This was identified as Project 1 in the Wauford study. Recent developments, discussed in the next section, have led us to abandon that plan and construct our own intake at an upstream location on the Green River.
- iii. **Clearwell Improvements:** An inspection in late 2013 revealed internal corrosion of the 800,000-gallon ground-mounted steel clearwell tank that is used for storage of filtered water. There were also areas on the inlet piping that were rusted through, and we couldn’t repair those areas since the tank could not be dewatered while the plant was in operation. We bid a project to paint this

tank, but the bids came in at nearly 70% of the cost of a new tank, so a present worth analysis was performed that showed that a new prestressed concrete tank was the most economical option. A \$ 500,000 grant from the Delta Regional Authority received in October 2020 caused this project to be bid in February 2021, and work was completed in the Fall of 2021. Project total was \$ 1,587,083 as shown in the Water System Projects, Appendix 2.

D. South Water Treatment Plant - Future Projects

- i. **Dedicated Raw Water Pumps/New River Intake:** Due to the scaling-back of the Big Rivers operation at Sebree, we were being billed for power usage at the Big Rivers intake for a large pump that is being run solely for our benefit, and this cost was approximately \$ 60,000 per month. A project to construct HWU -dedicated raw water pumps in the existing Big Rivers intake was estimated to cost \$ 2.5 million and was to be constructed in Fiscal Years 2021-2022. This project was identified as Project No. 5 in the 2014 Study.

A decision by Big Rivers in March 2020 to not allow that project to proceed has caused us to change course and consider another location. Moving upstream, south of the Big Rivers complex, would put our raw water supply upstream of a large coal ash landfill at the Big Rivers complex. Wauford was tasked with a study of this option, and geotechnical investigation was performed in November 2020, which determined that the best alternative studied was a location near the KY 56 bridge over the Green River, east of Sebree. We are proceeding with development of plans for the new Intake and a raw water main from that intake to the South WTP, as well as acquisition of easements and permits for the intake and main. While estimated costs for this project are shown in the attached Water System Projects, Appendix Sheet 2, some of the \$ 10.5 million to be expended will come from a recent \$ 2.1 million Cleaner Water Program grant, with the remainder from bonding and our cash reserves.

In 2022, the Big Rivers intake pumps failed, and we quickly installed a bank of electric pumps on a rented barge, just upstream of the Big Rivers intake. This work included a new pipeline to connect these raw water pumps to our South WTP's influent pipeline. As a result of this work, we no longer rely on the large pump for the Big Rivers cooling line, and our monthly electricity costs have fallen by an order of magnitude to around \$ 6,000 per month.

- ii. **Filter Backwash System:** We have enlisted J.R. Wauford to investigate the possibility of installing a filter backwash pumping system to increase the efficiency of the plant. Currently, filter backwash is accomplished by a gravity feed from the in-service filters, resulting in long backwash cycles and inefficient use of filtered water. A backwash pumping system will reduce the length of time and the clean water used in this process, making more water available daily for sale and use. Estimated at \$ 450,000, this project has been moved to FY 2026.
- iii. **Plant Capacity:** Expansion of the SWTP to increase capacity and replace the existing plant was the main part of the 2014 study. A new plant with membrane filtration could be built in stages, spreading out the financial impact, and we authorized Wauford to take this through the design stage including permitting, so that we can be ready to build the upgrade on short notice, if prompted by plant failure or capacity needed for a new industry. Since the choice of membrane technology from any of several bidders impacts other aspects of the design, we issued an RFP for the membrane equipment, and that process included setting up a pilot plant at the SWTP to confirm that the membrane system proposed will work. That's as far as the membrane

procurement has gone, unless and until we decide to renovate/expand the plant. Membrane acquisition contract was awarded to Zenon Technologies, a division of General Electric, and expenditures for this pilot study were \$ 125,000. The costs of the membranes were locked in for 5 years, and that option expired late in 2020.

Costs for the new membrane filtration plant were estimated in late 2014 at \$ 8.1 million for a 4.0 mgd option, or \$ 10 million for an ultimate 6.0 mgd facility. No funds are included in this plan, for this expansion, which we now believe will cost \$ 12-15 million. Since technology in this field is changing rapidly, we will likely need to repeat the pilot plant process, and evaluate membranes and other, newer technologies.

E. Water Distribution Systems

- i. South Distribution – Future Projects: At the South WTP, the distribution system is relatively new, and there are no known deficiencies that require upgrades, so there are no “Recent” projects to list. Most of our South distribution lines are “transmission” mains, as our primary customers are contractual (Sebree, Beech Grove, and the Tyson facilities). Additional industrial customers in the 4-Star Industrial Park will require relatively short water line extensions, depending on usage.
- ii. North Distribution: The North distribution system serving the City is divided into three pressure zones: North/Frontier (from about 14th Street north, and east of the Cloverleaf on US 60), South/College (from Fairmont Cemetery, south and west out US 60 West, including the Riverport), and the Central/Standard zone, which includes central areas of the City and runs directly off the high service pumps and the Vine Street tank.

In order to rationally determine our needs in the North distribution system, we contracted with Strand Associates to construct and calibrate our Water Model in the Innovyze software we purchased in 2011. This effort was completed late in 2014, and with the model in our hands, we can more readily identify areas of concern and projects to address them. We also have contracted with Strand on an ongoing basis to assess discrete projects as they come up, with the following detailing some problem areas that need to be addressed.

1. South/College Pressure Zone – Recent Projects: The South/College Zone was controlled by a small, outdated pump station near Fair Street, constructed around 1968. We completed a project to move an unused temporary booster station on Barret Boulevard to a new location on 60 West, at the corner of Fairmont Cemetery. This 60 West station will now be supplanted by the Sand Lane Booster Station discussed below, and when the Sand Lane station is complete, this station can be demolished, and the building that surrounds it possibly re-used elsewhere.

Key projects in this zone have included 16” and 12” water main extensions associated with providing redundancy and better pressure and flow to the Borax Drive/Ohio Drive/Riverport area. In the Riverport off KY 136, we had several lines that ran toward the River to dead-ends. The new projects were designed to “cross the T’s” of those lines, providing a looped system, and insuring redundant service. Portions completed have included projects across the Mosaic Crop Services and Custom Resins properties. Planning has begun for the last section of this project, across property owned by Hydro Aluminum from Riverport Road to Industrial Park Drive. This was facilitated by an expansion of the Hydro plant, which required

a sewer to be relocated. At the time the sewer relocation was approved, we obtained an easement for the water line project, which will be constructed as part of a project to provide service to a new grain elevator to be constructed west of the main Riverport development.

2. South/College Pressure Zone – Future Projects: The South pressure zone suffers from having only one storage tank (College) available. This makes periodic cleaning or tank maintenance difficult. In 2002 we purchased a small parcel near the intersection of the KY 425 Bypass and US 41 A with the intention of constructing a 1.0 million gallon elevated tank, but a large increase in steel prices at that time led to a decision to shelve that project and it was never constructed. Construction of that tank would also have entailed addition of a large diameter main along KY 425 to serve it and allow it to function in combination with the College Tank. This tank project may now need to be moved up in the queue, to provide redundant service to Pratt. If any large water user locates in that pressure zone, this tank might need to be upgraded to a 2.0 MG tank.

Pratt Paper projects: With the advent of Pratt Paper locating a large paper recycling mill and a corrugated box plant in the College pressure zone, we have been faced with very large project expenditures to serve this development. In late 2021, we engaged J.R. Wauford to produce a Preliminary Engineering Report for the projects required by this new industrial client. Pratt's mill will use more than 1.5 million gallons per day of potable water, and will discharge 60 to 75 percent of that amount to the collection system. Projects required to handle this demand include (authorized expenditures shown):

- a) 2.0 million gallon Elevated Water Storage Tank - \$ 6.0 million
- b) 1.0 million gallon Ground-mounted Fire Suppression Tank - \$ 1.8 million
- c) 16" & 18" Water Mains and Force Mains to Pratt Site - \$ 2.3 million
- d) 20" South Booster Water Main along Sand Lane - \$ 4.3 million
- e) Sand Lane Water Booster Station - \$ 3.7 million
- f) Pratt Sewer Pump Station - \$ 1.4 million

All these projects are currently under construction, and must be in place and operational at startup of the Pratt Mill. They are shown with current approved appropriations in the Wastewater and Water Appendices.

3. North/Frontier Pressure Zone – Recent Projects: The only recent project in this area was the rebuilding of the North/Frontier pressure zone booster station in Atkinson Park in 2008 after the near collapse of the Atkinson Park tank. This booster station functions very well.
4. North/Frontier Pressure Zone – Future Projects: This zone is adequately served by two storage tanks (Frontier & Green River). There are areas within the North zone that have inadequate pressure due to elevation of the land, mostly in Grantwood Hills, and on Timberline Drive. A study was performed, and Strand Associates has presented a report that identified options for these areas, including provision of a booster station at a point near the Green River Road tank, to provide a small additional pressure zone in this area. This would not provide adequate flow for fire protection but would boost pressure for individual residences at higher elevations. The chosen alternative from the Strand study envisions a new Green River Road

pressure zone, controlled by a new Green River Road Booster Station, with two, 10-horsepower pumps controlled by VFDs, and approximately 850 feet of new water line. This project is shown to be constructed during 2028, at a cost of \$ 350,000.

5. Central/Standard (or Low Pressure) Zone – Recent Projects: The central pressure zone extends from the North and South zone boundaries and from Downtown to the edge of our service territory at Graham Hill. Overall, its problems of pressure or flow are the result of older lines, some of which exceed an age of 100 years. The water system plan includes an amount for line replacement each year, and will concentrate on areas adjacent to the Downtown, extending to the East End.

One area of concern was the North Main-North Elm-Craig Drive corridor, from 8th Street to 12th Street. Users in that area experienced rapid drops in pressure at times, and some homes were equipped with booster pumps on the customer side of the meter. We have completed a project to move this area to the North (Frontier) pressure zone, at a cost of approximately \$ 353,000. It led to improvements in both pressure and flow in that area.

6. Central/Standard (or Low Pressure) Zone – Future Projects: Several main extension projects that would increase capacity and reliability in the system are included in the plan, but with limited cost estimating, pending modeling within the updated Water Model, and future detailed design.

An area near the Accuride plant, and some areas on Outer Second Street suffer from lower than optimal pressure. A possible solution to this issue would construct an additional booster station east of Hwy 41 and add a “Graham Hill” pressure zone that would encompass the far eastern areas along Zion Road, Hwy 41 South, and Adams Lane south of Airline Road. Wauford conducted a scoping study of that area to identify our options. Currently, the Graham Hill tank presents difficulties in operation when it is in service, and it had been sidelined for well over 2 years; it was brought online in June 2016 in preparation for the painting of the Vine Street Tank. While shown in an out year, this project, at \$ 1.6 million, is unlikely to be funded.

An important project that had been planned in the Central zone entailed installing a 20” continuation of our “backbone” system on S. Main Street from Hancock Street to a point past the Chapelwood Place apartments. This would have tied-in to an 18” main that extends further out U.S. 60 West. With the now-planned addition of a South Booster Station on Sand Lane and the accompanying water mains, the South Main project has now been cancelled. A portion of this project on S. Main from Yeaman to the existing 18” line off South Green is being subsumed into the Sand Lane Booster Station water main project.

We have also completed plans for a 20” main from Washington Street and South Green, running down Washington and Alvasia Streets to the “back side” of the Vine Street Tank. This will allow us an alternate means of filling the Vine Street tank, and will be an important component for feeding growth in the South/College pressure zone. The design of this project was in an RFP issued in late 2018. Construction is currently planned for 2024-25.

A need we’ve identified but not addressed adequately relates to some of our oldest water mains. These cast iron lines are severely corroded and tuberculated, mostly due to past

practice of feeding lime in the treatment process. Attempts to clean lines and return them to service have had poor results, so we have programmed a yearly amount to replace a few blocks of line at a time. Planning for this type of project in the East End has begun. The funds set aside for this work should increase over time.

7. **Water Meter Replacement Project:** Limited random testing of residential water meters in Summer 2018 revealed serious shortcomings in the accuracy of small meters. We approved a project in 2020 to begin replacing these meters, authorizing 1,000 meters in the 2020-2021 fiscal year, and hoping to increase that number in subsequent years and complete a total replacement of residential meters in 4 or 5 years. The new meters are ultrasonic, with no moving parts, and carry a 20-year accuracy guarantee. They are also capable of accommodating an Advanced Meter Infrastructure system, which will be part of the build-out of the system. Meter installation began in October 2020 and is proceeding as time and funds permit. Installation of the AMI system started at the same time, and along with a customer portal that allows sharing of water use information with our customers, is being rolled out as meters are replaced. Long lead times on the meter reading (AMI) system components are causing this rollout to be stretched out. A contract to install a further 2,100 meters was let in February 2023, utilizing an outside contractor. An additional 2,000 meters are in stock, and a contract to install those meters should be let later in CY 2023.

F. WATER STORAGE TANKS

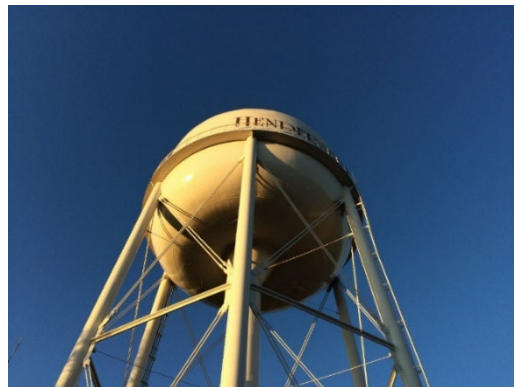
We completed an assessment of the nine storage tanks in the water distribution system in May 2014. Inspection reports summarized the work needed at each tank, and the repair and coating items have been categorized by immediate needs and those that can be put off for a few years. Sheet 1 of the Appendix shows a proposed schedule of repairs to the tanks for the Years 2019 through 2029 using costs generated by the inspection reporting.

RECENT

- i. **Frontier:** This 500,000-gallon steel elevated tank was constructed in 1967-68, and was last cleaned and top-coated in 1992. There was significant paint failure and corrosion outside, and some corrosion and metal loss on the interior. This project was bid in May 2015, and coating was completed during the spring of 2016. Recoating of a portion of the bowl was completed in 2018 as a warranty repair.



Corrosion on the Frontier Tank



Completed Project

- ii. Vine Street: This fluted pedestal steel tank has a capacity of 1,000,000 gallons. It was constructed in 1989 and was washed and top-coated in 1996. The exterior had 5 to 10% paint failure, and the wet interior surfaces showed significant corrosion. Bids were taken on this project in March 2016, and work was completed in April 2017, at a cost of \$ 846,297.



Corrosion on Vine Street Tank Exterior



Completed Project

- iii. College: This 500,000-gallon steel elevated tank was constructed in 1967-68 and was cleaned and top-coated in 1992. Bids were received in April 2017, and we finished this project in the 2017-2018 fiscal year at a cost of \$ 435,252. Our consultant on this project, Strand Associates, assessed raising the tank by 15 feet to enhance pressure around the Riverport and the US 60 West industrial areas. With the new tank at Pratt, the College Tank will be taken out of service.



Corrosion on Diagonal Bracing - College Tank



Project Now Complete

- iv. Green River Road: This tank is a steel, modified standpipe with a capacity of 330,000 gallons. It was constructed in 1991 and has had no major maintenance. The exterior is in fair condition, and the interior wet and dry surfaces show some corrosion and pitting. This project was bid in April 2019, and work was completed in October 2019. The Green River Road tank is our most problematic for disinfection by-products and we have considered adding a mixing system, and may at some future time.



Loss of Coating on the Roof of the Green River Road Tank



Completed Project

- v. 4-Star: This is an elevated steel tank with a capacity of 1,000,000 gallons. It was constructed in 2004 and has had no major maintenance. The exterior is in fair condition, with 1 to 2 % paint failure; the interior wet surfaces are in poor condition with 10 to 15% paint failure. This project was bid in June 2020, work began in September, and was completed at the end of October, at a total cost of \$ 605,040.

For all these repair and coating projects completed to date, the cost of storage renovated has averaged 83 cents per gallon.

FUTURE

- vi. Pratt – 2.0 MG Elevated Storage Tank: This project is under construction and will be completed in Q1 2024.
- vii. Pratt – 1.0 MG Ground-Mounted Fire Suppression Tank: This project was bid in April 2022, and the tank is now largely complete. This tank will be transferred to Pratt, and they will operate and maintain it. Costs will be reimbursed to HWU under a long-term fee that will be added to monthly bills.
- viii. Graham Hill: This 750,000-gallon steel ground storage tank was constructed in 1989 and has had no major maintenance. There is minor paint failure and corrosion outside, and some corrosion and metal loss on the interior. This tank is of limited usefulness in our system currently but does act as the backup for Vine Street. It is scheduled for rehab in 2025 on the current list; a decision on keeping it in service should be made prior to any work being performed, along with consideration of the Graham Hill pressure zone project previously discussed.

- ix. Tyson: This is a fluted pedestal steel tank with a capacity of 1,000,000 gallons. It was constructed in 1996 and has not had any major maintenance. The exterior is in poor condition, and the wet and dry interior surfaces are in fair condition and will likely be painted in 2026.
- x. Chamberlain: This 1,000,000-gallon steel ground storage tank was constructed in 2008 and as our newest tank has not required major maintenance. The exterior and interior surfaces are in good condition, and will likely not require painting within the next 5 years. Minor repair items are set for 2027.
- xi. Atkinson Park: This is a 4,500,000-gallon steel ground storage tank constructed in 1945 and last painted inside and out in 2008 when the booster station associated with this tank failed. Interior and exterior are in good condition, and will likely not require painting within the next 5 years. This tank had heavy interior pitting of the steel when it was painted in 2008, and the repairs have held up well. Minor repairs are shown along with recoating/touch-up painting in 2028.
- xii. Future Maintenance: Painting and repair of the Tyson and Graham Hill tanks was included in an RFP issued in April 2020 and plans for those tanks are complete. That will leave only the Chamberlain tank without recent paint/repair, or at least solid plans to implement those maintenance activities.

We've included an amount in future "out years" for further maintenance on all the tanks, starting with Frontier, so that we have a placeholder amount for future maintenance, and don't build up a deficit in the tank maintenance category. Tank maintenance must be an ongoing, planned expenditure. It is also now the responsibility of our Distribution System Operator.

III. WASTEWATER SYSTEM PROJECTS

A. North Wastewater Treatment Plant – Recent Projects:

The North Wastewater Treatment Plant Improvements (Headworks) project was substantially completed in CY 2016. This project increased the peak plant capacity to 25.5 MGD, which maximizes the through-put of the existing aeration basins.

We identified additional work in the old clarifiers that needed to be done in the short term. The clarifier work was bid in the spring of 2017 and was completed in Q3 2018. Rehabilitation of these clarifiers allows the completed plant to operate at its new design capacity.

B. North Wastewater Treatment Plant – Future Projects:

Sludge disposal issues have been at the forefront of our thinking for several years. We have belt filter presses that can achieve 14 to 16 % solids (86% water) in our processed sludge, but this is not conducive to some landfill operations. Our focus for the last several months has been to research technologies that will reduce our sludge volume and/or increase the solids content. This will be a necessity as landfill space is being used up and few new landfills are being planned. Reducing volume of the final product also saves money on hauling. We have not included a lot of detail about these potential projects in this plan, since the parameters of what we will/might do change frequently. Advances in technology also impact this area, as new systems and methods are being continually introduced. Sludge disposal will remain an expensive and evasive target.

We have bid a project in FY 2023 to upgrade NWWTP Basin # 2 in the same manner that Basin # 1 was upgraded in 2013, with fine bubble diffusers mounted to a concrete floor and a more robust liner with a gas removal system. Renovation of Basin # 2 may allow Basin # 3 to be taken offline and used as a surge basin, greatly reducing the amount of air required for aeration and mixing, with savings in electric use. This project was moved up in the queue, due to the Pratt development, and should be completed in FY 2024.

A project to add the second grit removal train to the Headworks, left out of the LTCP project but accommodated in the sizing of the Headworks structure, is scheduled for 2029. This is not a high priority but could be a plus from the standpoint of allowing a redundant grit removal train.

C. South Wastewater Treatment Plant – Recent Projects:

South WWTP projects are related to maintenance and not capacity, as the flow capacity of the SWWTP is rated at 8 mgd (except for the wastewater discharge line), and 8 mgd is twice the

current capacity of the South water plant. Until a large industrial customer locates in the area, no increase in SWWTP capacity is needed. A relocation of the wastewater discharge line had been included in the Raw Water line project for the South water plant, to remove this line from a bad location on the Big Rivers power station property, but since this project is no longer viable due to issues with Big Rivers, we will need to plan for a new location for this discharge, likely across property to the north of the Big Rivers site.



Concrete pour on floor of Basin - SWWTP

A major project of note at the SWWTP was the renovation of Basins # 4, 5 & 6, which experienced repeated liner and air diffuser problems, and were a maintenance nightmare. Rehabbing these basins has increased the redundancy of the plant. Work began in late summer of 2017, and one basin was renovated and on-line by the end of November. The remaining two basins were completed in early 2019, with a total project cost of nearly \$ 3.5 million.



New Basin Liner being Installed – SWWTP

Receipt of a grant from the Delta Regional Authority allowed us to include construction of some needed items that were left out of the initial project because of funding issues. After receipt of bids, which came in higher than expected, we scaled this project back to only include renovation of the belt presses, since they are the most critical element in that project. That press renovation project was completed in Q2 2019.

The increased automation may be installed piecemeal over the next few years.

D. South Wastewater Treatment Plant – Future Projects:

There are no new projects scheduled for the South WWTP in the near term. Planning for a new effluent pipeline, to replace the current location on the Big Rivers property, may need to be initiated at some point.

E. Wastewater Collection Systems – Recent Projects:

Our goals for the Collection System are to continue with separation projects as we are able, to upgrade systems before they fail, and to ensure compliance with EPA policy by reducing sewer overflows, either from the combined system, or from the separate system where capacity or maintenance might be an issue. Projects have been included in the plan for the following in the North Collection System:

- i. **Atkinson Park and Myrene Drive pump stations:** Study has been completed on options for these stations. The Myrene Drive pump station improvements were completed in Q1 2020, as they were a priority due to overflow and backup experience in that area. The Atkinson Park pump station is also a concern due to its age, condition, and location. Many areas that once contributed flow to this station (Balmoral, Frontier, and other areas on US 60 East) have now been redirected to the Canoe Creek Interceptor, so assessment of this station has led to a plan for replacing it with a smaller station with submersible pumps in the same vicinity. The master planning effort for this area also addressed the possible elimination of the Spruce Drive pump station, along with a new master pump station in the far north end of the service area. That master pump station project is beyond our means, at present. The resulting five Atkinson/Myrene projects are shown in the Wastewater schedule attached as being phased from 2020 to 2025. Myrene pump station was bid in February 2019 and work was completed in 2020. The Myrene Force Main from that pump station to the Atkinson Park Pump Station was completed in January 2021. The last two portions of the Atkinson-Myrene project are the rebuild of the Atkinson Park sewer pump station, and the Atkinson Park force main, which handles the discharge from that station and runs from the station to a point on 14th Street, east of Green Street. The Atkinson projects are shown on

the plan in Appendix Sheet 3 as being completed in FY 2024 and 2025, subject to available funding. Spruce Drive pump station removal has been moved to 2027.

Future Projects

- ii. **Countryview Subdivision Sewer Lining:** This project would reduce problems with inflow and infiltration (I & I) in this old system of clay pipes with offset joints and sundry leaks. This area and Highlander Acres are two prime sources of I & I, which cause us to pump and treat water that we shouldn't have to. Controlling I & I reduces costs to treat, and increases capacity in the system. This work is shown in the out years.
- iii. **Highlander/Gardenside Sewer System:** In planning for future residential growth in areas near the City, we issued an RFP for an engineering firm to investigate pump station upgrades, control of infiltration and inflow, and planning for future growth in areas along the KY 351 and Airline Road corridors. We have since authorized Wauford to begin a flow monitoring study, that will attempt to provide definition and scope for future projects.
- iv. **Audubon – Airline Sewer Project:** When the Bent Creek subdivision was constructed on Airline Road, we extended sewer to that area, but left a small pump station near Presidential Park in service. Additional flow and potential projects in that area mean that this pump station should be retired, and we had planned a project to bore a gravity sewer under the Audubon Parkway, connecting to an existing sewer on Airline Road near the School System's maintenance building. This project has a cost estimate of \$ 350,000, and has now been included in the Highlander/Gardenside project discussed above.
- v. **New Sandefur Drive Pump Station and International Paper Pump Station Upgrade:** The IP station is set for a major overhaul in 2025, which may include additional wet well volume to allow the pumps to cycle less frequently. The IP project includes a study of corrosion prevention at the NWWTP Headworks.

Building a new station near the corner of Sand Land and Sandefur Drive will allow two other pump stations (Rolling Hills and Fair Street) to be consolidated into one, and that new station would pump into the North Fork Pump Station force main, discharging directly to the North WWTP. This project would redirect an area of the separate sewer system away from the Ragan Street CSO overflow, reducing sewer discharges to the Ohio River, and will remove an area of separated flow that passes through the combined system on the way to the treatment plant. Design has begun and the new Station project is set for construction in 2026. This project requires several easements, and work on that activity has not begun.

- vi. **Separation Projects:** We have done very preliminary planning for two additional separation projects, one in the Dixon-Green-Powell-Water Street sewer-shed (Clay-Dixon project), one in the Washington-Ingram area. The Washington project would relieve stormwater flows to the North Fork pump station, reducing sewer overflows even further than our current efforts. These estimates are placeholders and are shown on the wastewater system spreadsheet appendix, subject to further study and design.

These projects could reduce combined sewer overflows, but that need will have to be weighed against other priorities; since the completion of our LTCP and the pending issuance of a new

permit for the North wastewater system that allows CSO discharges to continue, there is a reduced emphasis in our planning on reduction of the combined sewer system.

- vii. Sewer Inspection: We entered a services contract with a firm that specializes in sewer cleaning and inspection in October 2017, to provide those services for the Canoe Creek Interceptor Phase I system, which had been constructed about 20 years ago. Inspection of large diameter sewers is beyond the capabilities of the TV inspection equipment we own. This contractor performed the inspection on over 41,000 feet of sewer line in about 6 weeks. We let another contract in late 2018 to continue this work by inspecting the Ragan Street and Downtown Interceptor systems. Future work should concentrate on the brick sewer that drains from the Midtown area to the Third Street Basin.
- viii. South Collection System: The South collection system is essentially a series of transmission mains from customers in 4-Star industrial park, the Tyson facilities, and the City of Sebree. Since most of this system was newly constructed in 1995, it is not anticipated that large-scale repair or replacement will be necessary during the study period. The 4-Star park authority completed a small project in 2016 to provide service to a “build-ready” lot in the park. Small projects to serve additional areas of 4-Star will likely happen as industrial development proceeds, but it makes little sense to construct wastewater collection lines to unoccupied lots in the industrial park.

IV. STORMWATER PROJECTS

We have included an annual amount from 2020 to 2026 of \$ 100,000 for continued stormwater work in Countryview Subdivision and should be matched by the City.

We’ve also included amounts for several small stormwater projects and are advancing plans for those, which we will construct as funds become available.

The final phase of the Center & Julia project is shown being constructed in FY 2026, but that timing is subject to change. We revived that project in 2019, applied for and received a crossing permit, and have updated the plans with some changes that should reduce costs and the impact on surrounding property. Environmental permitting for this project, due to its location in the floodway, was a challenge, with Stream Construction, Water Quality Certification, Army Corps of Engineers, Kentucky Transportation Cabinet, and even the State Historic Preservation permits all involved. This project would be moved up in case of the emergency collapse of the existing stone culvert that this stormwater line is replacing. All easements required for this project have been acquired.

Small amounts we have included for “Neighborhood Stormwater” projects are placeholders, and do not represent our total efforts in this area. Most stormwater work is performed as maintenance and is not included here as capital spending. As larger stormwater projects are programmed, they will be taken from the amount allocated under the annual capital budget.

Three relatively small separation/stormwater projects have been started in FY 2018-2019, with construction spread out over the next few years. The Chestnut-Norris project dealt with an area of 9.2 acres near First Christian Church on South Green Street that was removed from the combined sewer system relatively easily. The Atkinson-Clay project will attempt to reduce persistent flooding near that intersection by providing a separate storm sewer system. The Judson Place project will remove another small area from the combined sewer system,

discharging stormwater flows directly to the river. Chestnut-Norris has been completed, and the other projects have been surveyed, design is proceeding, and they will be constructed as monies become available.

V. OTHER AREAS: VEHICLES, AUTOMATION, IT, ADMINISTRATION

We have included entries for each of these areas in the strategic plan, in an attempt to ensure that these areas are not forgotten. A new wash truck was acquired in the 2015-2016 FY. A new “Vac” truck was acquired in FY 2018-19. These two vehicles are the most expensive and used items in our fleet. We have acquired a smaller “Non-CDL” Vac truck to replace our backup unit, which was near end of useful life. The smaller unit provides options for use in tight spaces, and it’s far less expensive than a full-size unit.

We purchased a new mini-excavator, a new Track-hoe, and a new F-250 utility vehicle in 2021.

We have completed a project to install “refuge” backup generators at three plants and the Admin Building, using funds from a Homeland Security grant. The new SOC project includes a generator that continues this effort to provide emergency power for our critical facilities.

Replacement of our Systems Operation Center in a 20,000 square foot building on Commonwealth Drive is underway. This will replace the current, outmoded buildings we use on Alvasia Street with a new modern facility that will allow all our field and administrative functions to be housed in one location. Bids on this project were taken 2022, and construction of the new facilities is ongoing. The old SOC buildings and land will likely be sold to defray some of the costs of the new facility.

The Cityworks asset management software permeates our operations, and is the way we plan, schedule and track work for our field crews. It also is the method we use to allocate costs to some contractual customers. We are committing to using this system as a predictive and preventive maintenance program for the treatment plants. Cityworks supports handheld computers, so that our GIS mapping and system information are more readily accessible to everyone in the field.

Another need we hope to address is the lack of a useful model of our wastewater system. The Innovyz software we purchased for our water model has the capability of producing such a model, and we will likely pursue having a consultant develop that at some point. The water model has proved to be invaluable in planning distribution system projects.

Placeholder entries for IT, SCADA, vehicles, and small equipment are shown on the final page of the Appendix in the “Overall Summary”.

VI. CAPITAL IMPROVEMENT PLAN SUMMARY

The last sheet of the Appendices shows an overall summary of the expenditures required by this CIP. Please note that several projects listed in the plan have no dollars associated with them, as yet. Also, the summary includes an inflation adjustment, assuming construction industry inflation of 2 to 4% in the years ahead.

Our task in the years to come will be to mold this plan to fit available resources as conditions change, as they always do, and to keep in mind that clean water is our reason for being here.

VII. POLICIES AND PERFORMANCE STANDARDS RELATED TO STRATEGIC AND CAPITAL PLANNING

The **American Waterworks Association (AWWA)** publishes standards for our industry, including Standard G-410-09, *Business Practices for Operation and Management*, which describes the critical elements of effective business practices for the operation and management of water and wastewater utilities. Effective business practices establish criteria for how water utilities develop, measure the performance of, and improve the strategic planning, resource management and support functions necessary to create and sustain a high-performing organization. The following is a listing and discussion of these standards and how they are met by our staff.

- A. **Strategic Planning**: To meet this standard, we must have policies related to developing and implementing a Strategic Plan. In practice, this means that a plan is in place to: guide the delivery of our core services; maintain and invest in infrastructure; and hire and develop employees.

We update our strategic plan annually. The implementation of this plan is one factor used in performance evaluation of senior management. Additionally, the needed investment identified by the capital improvement planning process is used to formulate the Utility's financial planning and long-range forecast of expenditures and cash flow, and to inform decisions on rate adjustments. The Strategic Plan then serves as the basis for communicating the expectation for management to implement necessary programs and projects to accomplish the mission of HWU, and deliver our core service, which is clean water, from river to river.

- B. **Capital Improvement Program**: To ensure acceptable performance of our infrastructure over the long run, we must have in place policies for developing a multi-year capital improvement program that specifies in detail our plans for replacing, rehabilitating, and expanding our system infrastructure. This includes policies related to employment of consultants; project selection; and financing and facilitating system growth.

Key to this standard is accountability for program execution. In our case, the responsibility lies with the senior management team of the General Manager, the CFO, the Chief Engineer, and the Director of Operations. In general, this team oversees all aspects of the CIP, including project selection, development, financing, and scheduling. They are assisted by engineering and operations staff.

We utilize consultants on most construction projects, save for small line extensions and internal repair and overhaul projects. This allows internal staff to focus on planning and day-to-day execution. Project selection is driven by the availability of funds – at present, we have more project needs than available capital to fund them.

In terms of financing future system growth, we largely rely on outside funding. Sources of outside funds include developer-built infrastructure related to new subdivisions, commercial facilities, or new industry. HWU has policies in place that allow outside developers to recoup some costs of new facilities, in cases where other lands can be served by those facilities at some point in the future. We also have utilized grant funds for system expansion (Coal Severance for the Finley Addition Sewer Project, Delta Regional Authority for the Automation/Rehab project at the South WWTP, for the Custom Resins/Riverport Water Main, and for the South WTP Clearwell Project), and we are actively pursuing other grant opportunities. Two grants from Kentucky's Cleaner

Water Program will be used to defray portions of the cost of the Sand Lane Water Booster Station, and the South Water Intake and Raw Water Pipeline.

Within the City limits, our system is largely “built out”, and there are few areas that require costly line extensions. Growth in the Henderson area has slowed, and our CIP does not include funding to extend service to undeveloped areas not currently served. One exception to that is the recent initiative by the City in partnership with a developer of a 300+ lot subdivision on the northeast side of town. HWU has pledged \$ 100,000 for the extension of a water line to that new subdivision.

The selection of a preferred route for Interstate 69 (ORX) through Henderson has led to design and construction of some extensive water and wastewater relocations. The I-69 preferred corridor crosses U.S. 60 East at the same location as our major trunk sewer that serves that area. Moving lines and accommodating future development at that intersection will be a major undertaking, but the costs of these relocations are being funded by the ORX project.

An area that needs improvement is in community and stakeholder communication. We do not have an ongoing communications program for relaying our capital improvement program to the community, regulators, and other external stakeholders. We do a decent job of communicating to internal stakeholders (employees and Board members), and through social media, but our business is not exciting or especially fascinating to a general audience, and it’s difficult to generate much interest on Facebook or Twitter. Our MS4 permit (stormwater) requires a higher degree of community involvement, both in education about stormwater issues, and in making decisions on stormwater spending.

Technology is used to inform our CIP decision making. Extensive SCADA monitoring and associated data-mining software keep us aware of problem areas in our system. Daily reports of treatment plant performance, pump station run times, and CSO overflow volumes are disseminated to management and help to point up problems that need to be addressed in the CIP. Our Geographic Information System (GIS) is also a vital tool in analysis of our collection and distribution systems. We purchased modelling software that works inside the GIS and have used that to propagate a model for the water distribution system. A model of the wastewater collection system is needed and will be pursued in the next few years.

- C. **Continuous Improvement:** On the Water side, we participate in the Partnership for Safe Water, whose mission is to improve the quality of water delivered to customers by optimizing water system operations. The Partnership offers self-assessment and optimization programs so that operators, managers and administrators have the tools to improve performance above and beyond even proposed regulatory levels. In this program, we are teamed with six drinking water organizations and more than 200 water utilities.

So far, this program has involved the two water treatment plants, and we are working towards implementing the companion Distribution System program.

The goal of the Partnership is to provide a new measure of safety to our customers by implementing prevention programs where legislation or regulation does not exist, or that go above and beyond the basic limits of existing regulations. Preventative measures are based

around optimizing treatment plant performance and distribution system operation, and the result is the production and delivery of superior quality water to all users.

- D. **Engineering**: To meet standards in this area, we balance the use of in-house staff and consultants to implement projects. We issue requests for qualifications (RFQs) for most large capital projects.

We also have in place Technical Standards for each major area of work, Water, Wastewater and Stormwater, which guide the selection of materials, equipment, construction methods, safety, and environmentally responsible maintenance and construction practices. The Water and Wastewater Standards were revised in 2016 and 2018, respectively, and a review and revision of the Stormwater Standards is proceeding, although slowly.

Likewise, we have policies in place for ensuring the quality of work performed by contractors and private parties. We employ resident project representatives on large construction projects. We also have a policy of obtaining and retaining accurate as-built information upon project completion, as well as GPS positioning information on in-ground facilities as they are constructed. The system for electronic filing of as-built plan information is incomplete and cumbersome and is an area that needs improvement.

One area of concern in the Engineering field was our inability to hire replacement engineering talent, as our engineering staff was aging out and retiring. An attempt to hire a Director of Engineering in 2015 fizzled due to a lack of qualified outside candidates. We have had more success with hiring of a project engineer, who started with us in early 2021. In late 2022, we were able to replace our retiring Chief Engineer with a local person with 20+ years of experience, and that has greatly eased our concerns in this area.

- E. **Finance and Fiscal Management**: This area covers financial planning, budgeting, accounting, reporting, debt management, management of reserves, and rate making.

Our financial planning and reporting functions are strong and robust. The annual budget preparation process has been automated using extensive and interlinked spreadsheets. Ongoing expenses and requests for new funds are entered by line managers, and then reviewed at the Department Head level, prior to being submitted to our Board for approval and forwarding to the City Commission for their endorsement.

The budgeting process includes discussions with our Board on debt management, maintenance of sufficient cash reserves, and rates. This takes the form of a multi-year cash flow forecast that is regularly updated and presented to the Board.

Debt management is addressed in our annual audit, which provides a good summary of outstanding debt and the obligation of the Utility to reimburse the City for all required debt service payments, through the end of the current bonded indebtedness. All of our current bonds were issued as Tax-Exempt, General Obligation bonds by the City. There are provisions in the enabling ordinances for each bond issue that require HWU to commit funds to the City to retire this debt.

Monthly reports to our Board, along with an annual audit, ensure that our financial condition is transparent and above-board. The monthly financial reports compare current period results with previous period results, and to the budget. Unusual or one-time revenue and expense items are flagged and explained.

Finance includes the process of receiving, categorizing, and paying bills, and of generating invoices for receivables. This process is tightly integrated with the City's financial software, which has recently been upgraded. The upgrades have included better reporting, streamlined payment procedures and a general reduction in the manhours devoted to financial duties. Additionally, it has allowed us to reclaim some payment/billing functions, in-house, so we have more control.

In the area of rate making, we have some control, but ultimate responsibility lies with the elected City Commission. Our relationship with the City is good, but the timing of rate adjustments can be impacted by political considerations. Our most recent rate adjustment included the imposition of fixed charges for water and wastewater. This was an effort to move away from strictly volumetric rates, to provide more stability to our revenue stream. We also converted our rate structure to gallons from cubic feet in early 2020.

In addition to rate reviews, we also regularly review fees and surcharges, comparing our current charges to actual costs over 2 to 3-year periods. These fees include charges to industry related to pretreatment, and charges for taps and connections to our system by developers and homeowners.

We relaxed meter and inspection fees for developers in early 2023, as part of the City's initiative to underwrite an increase in housing development. This reduction will extend through the end of CY 2024.

- F. **Governance**: This area deals with enabling legislation, and operating policies of the Board. Our enabling legislation is contained in the City Code of Ordinances, which sets up our Board, describes the duties of our General Manager, and sets forth the basic structure of the relationship between HWU and the City of Henderson. The General Manager is appointed by and serves at the pleasure of the Water and Sewer Commission (referred to as our "Board"). Senior management and the Board are governed by the local Code of Ethics.

We regularly review and enact changes to the City Code sections that govern our day-to-day functions, and act as the legal underpinning for enforcement action. This process began in earnest in 2011 with a complete update of the relevant chapter of the Code, which included extensive changes related to the Municipal Separate Storm Sewer System (MS4) sections, which had lagged and needed to be implemented immediately. As time has passed, other sections have been updated, clarified, and added. Additionally, staff has been involved in updates to other sections of the Code, including those related to erosion and sediment control on construction sites, flood damage prevention, and trenchless construction.

We completed a review of our Local Limits, along with the addition of a surcharge based on chemical oxygen demand (COD) on the wastewater side in the fall of 2019.

In October 2013, we initiated a complete review of the organization's internal policies and procedures and began a process of codifying and disseminating those throughout the utility in the form of a Policy Manual. That process has resulted in the issuance of over 30 policy documents covering everything from water & sewer taps to information security, and boot & clothing allowances. Many of these policies were long-standing, but now have been documented in an easily reviewable format.

In December 2014, we adopted a policy that specifies procedures for obtaining Board approval of projects and expenditures through Board Action Reports and Board Resolutions, and we modified that policy in mid-2019 to adjust trigger amounts in concert with changes in state law. Action Reports are not required for budgeted capital expenditures less than \$ 30,000 but are required for all other capital projects and for budgeted capital items under \$ 30,000 when special or unusual circumstances apply (sole source, bid irregularities, etc.). Action Reports are prepared from pricing obtained under the requirements of the Purchasing Policy, contained in policy B-200.

Board Resolutions are typically required for items that will be forwarded to the City for further action, such as dispositions of real property, ordinance revisions, or budget amendments. Resolutions require a roll-call vote of the Board.

- G. **Health and Safety**: We have in place policies and performance standards for managing employee health and safety. These include policies related to management and mitigation of hazards, extensive training requirements, and metrics that enable us to measure the effectiveness of our health and safety policies. We use the City's Safety and Training Coordinator who deals directly with our workers and management.

Annual trainings are provided in confined space entry, lockout/tagout, trenching and shoring, fall protection, blood-borne pathogens, flagging and traffic control, equipment operations, hearing protection, use of personal protective equipment and chemical safety.

In addition to creating a "safety culture", our top management is responsible for developing, modifying and evaluating the effectiveness of our employee health and safety strategy. Frontline workers, however, have the primary responsibility for executing a health and safety program, and have the most valuable insights into health and safety risks they face and the opportunities for improvement.

Some safety functions (workers compensation, etc.) are handled by City personnel attached to the Human Resources department. We also participate in the City's Safety Review Board, a committee made up of management and frontline employees from the entire City workforce.

- H. **Human Resources**: We have in place policies related to classification and compensation, hiring and selection, provision of training, performance reviews, corrective action and discipline, provision of benefits (health care, vacation and sick leave), and compliance with federal and state law. Many of these areas are controlled by State statute for the Civil Service system.

We completed a compensation study in 2017 that compared our salary levels to other cities of our size in Kentucky, and this study resulted in a large number of salary adjustments in the 2018 fiscal year.

We have adopted a policy of hiring new employees as non-Civil Service employees. This mirrors City policy, and allows more leeway in hiring, compensation and severance of employment. Currently, the General Manager, Chief Financial Officer, Chief Engineer, Director of Operations and Senior Project Manager are covered by contractual arrangements.

Related to the broad area of human resources, we have policies in place that encourage our employees to seek training and certification in areas related to their work duties, and that compensate them for achieving higher levels of licensure.

Most day-to-day HR functions are handled for us by the City's HR Department.

Disciplinary actions follow the City's Employee Manual, which contains procedures as required by the Civil Service statutes. In due course, disciplinary actions are reviewed by a Civil Service Commission, a three-member City board that has ultimate authority over civil service employees. Newer employees are governed by procedures that mirror those of civil service, without the ultimate right to appeal to that Commission.

- I. **Information Management:** We employ a dedicated Information Systems Manager, who oversees our computer systems and the integration of some functions with the City's payroll, financial and billing systems. HWU also has an Automation department with two specialists who direct implementation of our Supervisory Control and Data Acquisition (SCADA) system. Finally, we employ a dedicated Geographic Information System (GIS) Manager, who oversees the extensive and ever-growing mapping and work order systems that we use to schedule work and record the location and condition of our physical assets.

We have policies in place to guard sensitive information. Since personal information may conceivably be contained in any email, those with email access on personal cell phones are required to allow us to wipe that phone if it is ever lost (we have not done this, to date). Since we do not handle most HR-related records (that is done by the City), we have access to few items of personal information. Training has been done on personal privacy compliance for those who have access to birthdate, SSN, or other sensitive personal data.

Our security management for IT infrastructure is robust. Multiple firewalls exist, and the SCADA system is explicitly designed to be non-accessible from the internet. We will be teaming with the City and County soon to have a security audit done by an outside firm. The teaming effort is driven by the fact that our IT systems are connected and integrated across City and County government.

Work order management is a very important facet of our operations; we manage this information with the Cityworks software purchased in 2014. It is an integral part of our procedures, impacting most of our operations. It also is used to allocate costs to various functions, so it is important from a financial perspective, also.

We are implementing a move to Sharepoint, to better control and access project files and other historical information.

- J. **Organizational Development:** Specific policies contain standards to ensure ethical business practices, and transparency of business transactions. Multiple levels of approval are required prior to any disbursement of funds.

Closely related to development of the organization is the need for succession planning. Our inclusion in a Civil Service system makes this nearly impossible at the street level, since promotion and filling of vacant positions are governed by arcane rules of testing and onboarding. To the maximum extent possible, we attempt to fill open positions with internal testing, which includes HWU and all other City departments. Since upper management and professional positions have been made non-Civil Service by City policy, we are now able to fill those openings without following the Civil Service rules and mandates.

In order to foster employee involvement and teamwork, management holds regular meetings with groups of employees in various workforce areas (operators, crew leaders, senior staff, etc.).

Knowledge retention and management is a key issue for us, as we have reached a period where a large number of our senior employees are eligible for retirement. The requirements of the Civil Service system for promotion and hiring made it difficult to train an existing employee to fill a soon-to-be-vacant position. Being able to hire positions outside Civil Service is a plus in this regard.

- K. **Plant and Property Management**: We do not have detailed written policies in place for management of records, deeds, drawings, and other documents. This is a critical need.

Our maintenance practices do not include regular inspections of equipment, roofs, doors, windows, gutters, and foundations. Maintenance of physical plant is performed on an as-needed basis.

Lawn, fence, and security maintenance is performed by outside contractors. We bid an extensive facility mowing contract that covers over 75 locations throughout the City and County. Compliance with contract terms is monitored by the operational personnel in charge of maintenance for each facility.

Work orders are used to track work history for assets in our systems, and from a financial perspective, they are the records we use to allocate costs between our various plants and systems, impacting billings for some of our large contractual customers (i.e., Tyson billing reflect costs for the South Plants, etc.). Work order management is thus a very important facet of our operations; this is done in the Cityworks software purchased in 2014. Implementation and fine-tuning of this system have been ongoing since that time.

Systems for tracking preventive/predictive maintenance are covered in spreadsheets and personal calendar reminders. The Cityworks system does not easily address work orders that must be generated on a daily/weekly/monthly/quarterly basis.

Vehicle maintenance is largely performed in-house by our own mechanic. He schedules regular and preventive maintenance on our fleet, with some larger projects being contracted out to various local businesses. Vehicle replacements have been scheduled from a master list in the past, but with the reduced capital funding we have available, we now replace vehicles only at the end of life, either through attrition or after a wreck.

Training of maintenance staff has been enhanced with classes offered through the Henderson Community College. These have included basic and advanced electrical knowledge, which has allowed several of our maintenance technicians to advance in grade and classification.

Easement procurement policies and procedures are well documented in policy.

Our capital improvement plan includes projects that address the redundancy and adequacy of facilities, in our plants and in the distribution and collection systems.

For services and functions not available internally (welding, electrical, etc.), we contract on an as needed basis. This reduces our staffing levels and costs associated with “beefing up” our staff to cover every contingency and situation.

- L. **Procurement**: We promulgated an HWU-specific Purchasing Policy in August 2014, updating it five times since then. This policy governs requisitions, authorizations, approvals, and purchase limits. It also reinforces the fiscal responsibility and accountability delegated to department heads, managers, and employees, and attempts to expedite purchases and payments, purchasing and payment procedures by clarifying the delegation of purchasing authority.

By Ordinance, HWU follows the Model Procurement Code established by Kentucky law (KRS 45A.345 to 45A.460), and that is codified in the City Code at Chapter 23, Section 45.2 (revised in June 2019). Our procurement policy contains specific requirements for levels of purchasing limits, ranging from sealed bids (greater than or equal to \$ 30,000), detailed quotes (\$ 5,000 to \$ 30,000), documented quotes (\$2,500 to \$ 5,000), verbal/telephone quotes (\$1,000 to \$ 2,500), or “best effort and judgment” (\$ 50 to \$ 1,000). Purchase under \$ 50 are made from vouchers or petty cash. Travel and training expenditures always require a voucher, and approval by the Department Head and GM.

Specific positions have spending limits set for their approval authority, classified by upper management, middle management, Crew Leader/Specialist/Operator, and line-level employees.

We follow the Model Code provisions for notice (public bids), criteria for evaluation and award, and guidelines for waivers and declaration of emergencies (codified in City Code Chapter 23-45.2). The policy also includes provision for quicker, streamlined approval of items that are procured under a specific contract (construction projects, chemicals, sludge disposal, etc.) or that are regular monthly bills (telephone, power, etc.).

We have not formally adopted the Model Code provision related to procurement of professional services, but we do generally follow those requirements.

Additionally, we have adopted a policy for disposal of surplus personal property (Policy B-100), which ensures that assets to be disposed of are made available to the public on an equitable basis, to realize the maximum return on investment on disposal, and to ensure that assets are removed timely and accurately from the Utility’s accounting and inventory records. The guiding principle in disposing of assets is to maximize the return on the investment, and this means that the method used is usually a public auction, or the web-based auction site [GovDeals](#).

Under the policy, surplus property will not be given to an officer or employee of HWU or the City. HWU employees involved in the decision to declare any item of property as surplus are not allowed to bid on any item for sale, directly or indirectly.

The Disposal policy also includes requirements for proper disposal of electronically stored data to ensure the privacy and security of sensitive user information, such as personnel records, financial data, and protected health information. Any equipment which has capabilities of storing such data must be sanitized via removal of the data storage mechanism (hard drive, memory cards, flash drives, tapes, cartridges, etc.). It is the responsibility of the IS Manager to properly destroy data storage mechanisms before disposal of property.

Disposal of real property is covered by specific sections of KRS.

M. **Risk Management**: Here is a brief summary of some risks faced by the Utility.

Fluctuating Demand: We face risks of not being able to meet the needs of a large new water customer in the South system but have drawn up plans for a plant replacement/expansion that will address that issue. Some additional demand could be met in the North system, but a large-use customer would stretch our water plant during the summer months. We currently have no plans to expand the North Water plant, where higher demand would require additional filter capacity.

On the downside of the demand picture, water use has fallen from both residential and industrial customers. Residential use decline is likely due to increased use of low-flow fixtures, and the elasticity of demand in response to our rates increasing by 5.85% per year from 2011 to 2018. For industrial users, lower use is directly related to attempts by large customers to contain costs. Further reductions in use may lead to a need to increase rates on all customers to maintain our current expenditures, as many of our costs are fixed. This Conservation Conundrum, as it's called, is being faced by utilities across the country, and the industry hasn't come up with a good fix to the problem.

A Few Large Customers: Two large industrial users and one governmental entity (Tyson Foods, International Paper, and the Henderson County Water District) account for a large amount of our yearly revenue. For fiscal year 2022, these three customers accounted for \$ 11,139,924 in sales and surcharges, or 44.8% of our total operating revenues. Closure of either of the large industrial customers would have an immediate, material adverse impact on our financial condition. Adding the Pratt Paper facility to our list of contract customers will mean that more of our eggs are in the industrial basket, but the risk to our financial condition of any one industry leaving will be somewhat reduced.

Environmental Regulation: We are subject to governmental regulation by federal and state authorities covering a variety of environmental, health, safety and labor laws and other matters. On the environmental side, the Kentucky Division of Water regulates us under permits for our water and wastewater plants, as well as a stormwater permit (MS4). Any failure on our part to comply with laws and regulations could have an immediate adverse impact on us, from possible fines for permit violations to imposition of consent judgements or administrative orders for more serious offenses. More seriously, government can at any time change the legislative and regulatory framework within which we operate, leaving us no recourse to address adverse impacts on our costs and expenses. On the health and safety side, we employ a Safety and Training coordinator working full time to keep us compliant with rules on training, and for job safety oversight.

Inflation and Supply Chain: The last three years have pointed up nationwide problems with the supply chain for parts and consumables that we use in abundance. We have seen delivery times lengthen for pipe, pumps, and parts. Some chemical deliveries have been delayed. And pricing for many items has risen drastically. We have little control over these issues, which seem to be abating.

Technology: We rely on information technology in all aspects of our business. As SCADA and IT systems have grown more complex, we are able to remotely monitor plants, tanks and pump stations, and this ability has greatly increased the reliability of our systems. Office IT

improvements have made us more productive, too. The Cityworks asset management system is central to much of our workflow. The threat of a cyberattack or other significant disruption or failure of IT systems, software, or communications could mean a significant service disruption or security breach, which could have a material impact on operations. We have installed robust firewalls and anti-virus software, but the level, scale and sophistication of attacks grows every day.

Hazardous Materials: We store, manage, and use a large volume of chemicals, some of which present a hazard if released into the atmosphere or combusted. Release or human contact with some of these chemicals could involve significant costs, claims for personal injury, property damage and environmental penalties and remediation in excess of our insurance coverage. Switching to ultraviolet disinfection at the North WWTP has greatly reduced one risk exposure.

Personnel Retention/Replacement and Personnel Costs: We have many experienced employees who have passed or are approaching retirement age, with 33 retiring in the last 8 years, and approximately 8 more who may be eligible to retire in the next five years. This loss of some of our most knowledgeable employees has and will have an impact on our ability to perform work in a timely and efficient manner.

Costs for insurance, pensions, and other benefits are directly related to the number of employees, and only partially controllable. A strategy to deal with increased costs associated with salaries and benefits, especially pension costs, may lead us to hiring fewer employees, and contracting out more services. As openings occur, we study those and other positions, and attempt to combine job duties and reduce headcount, when possible.

Sewer Backups: Over the course of a year, we encounter 3 to 5 sewer backups into basements, on average. Damage is covered by insurance with no deductible. In most cases, we do not have prior knowledge of the causes of these backups, and insurance rejects the claims. We have a policy in place to defray costs for the homeowner up to a limit of \$ 2,500.

Climate Change: There is mixed scientific and anecdotal evidence that algae blooms on our source rivers are increasing due to global warming. Treatment of algae in our raw water increases our costs for carbon. Significant blooms containing hazardous substances could overwhelm our treatment facilities, leading to substantial problems with delivery of water, including disease outbreaks.

PFAS: Much has been made of the presence of this class of chemicals in our raw water feed to the North system. Currently unregulated, these chemicals will likely be regulated in the near future, and we have performed studies and tests on methods required to treat them to assumed levels. In late 2022, we increased powdered activated carbon (PAC) treatment rates to higher levels to insure that PFAS testing in our potable water was below the level of detection.

Claims and Lawsuits: We currently do not face any lawsuits or claims of a significant nature, but we do have exposure to the potential for claims related to labor and employment, personal injury, catastrophic accident, and environmental liability.

The Unknown Unknowns: Most of our water distribution and wastewater collection systems are underground and not normally visible. While we use cameras to inspect our collection system pipes and manholes, water pipes are inaccessible. We can't know the true condition of most of these assets and hence we rely on informed assumptions to make decisions.

We also don't know what new regulation, requirement, or new industry may be just around the corner. Our staff works to stay ahead of new regulations, and we've shown our ability to react quickly to new infrastructure needs.

Tank Coating and Repair Summary

Water Storage Tank - Repair, Coating and Construction Project Summary																					
Tank Project Summary					Estimated Repair Costs by Tank/FY																NOTES
<i>Tank</i>	<i>Volume (Gallons)</i>	<i>Year Constructed</i>	<i>Type</i>	<i>Prior Major Maintenance (YR)</i>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>	
Atkinson Park	4,500,000	1946	Ground	2008													\$130,000	\$1,125,000			
Chamberlain	1,000,000	2008	Ground														\$750,000				
College	500,000	1967	Elevated	1992 (See Note 1)				\$392,287													Completed Repair/Coating in February 2018
Four Star	1,000,000	2004	Elevated							\$19,500	\$585,540									\$50,000	Completed Repair/Coating in October 2020
Frontier	500,000	1967	Elevated	1992 (See Note 1)	\$14,000	\$491,667													\$50,000		Completed Primary Coating in January 2016
Graham Hill	750,000	1989	Ground	Interior 1991											\$600,000					\$50,000	
Green River Road	330,000	1991	Wet-Riser Hydropillar	Exterior 1992						\$398,774									\$50,000		Completed Repair/Coating in October 2019
Pratt Fire Suppression	1,000,000	2022	Ground	New Construction									\$1,795,826								
Pratt Elevated	2,000,000	2022	Concrete Hydropillar	New Construction									\$4,507,275	\$1,502,425							
Tyson	1,000,000	1996	Fluted Column Hydropillar													\$900,000					
Vine Street	1,000,000	1989	Fluted Column Hydropillar	1996			\$846,297												\$50,000		Completed Repair/Coating in November 2016
Total Spending Per FY					\$ 14,000	\$ 491,667	\$ 846,297	\$ 392,287	\$ -	\$ 418,274	\$ 585,540	\$ -	\$ 6,303,101	\$ 1,502,425	\$ 600,000	\$ 900,000	\$ 880,000	\$ 1,125,000	\$ 150,000	\$ 100,000	
					- Primary Coating/Repair Needs																
					- Secondary Coating/Repair Needs - (Deferred)																
<i>Note 1: Interior 1991 / Exterior 1992</i>																					
					- Actual Expenditures																
					- Future Minor Maintenance																
											Repair & Coating cost to date \$ 0.83 per gallon										

Wastewater System Projects

Wastewater System																		
Wastewater Plant/Collection System Project Summary			Estimated Costs per FY															
Project	Location	Total Estimated Cost	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Countryview Sewer Lining	Collection System	1,500,000													500,000	500,000		500,000
East End Separation Projects	Collection System	600,000												300,000	150,000		150,000	
Comanche Drive Sewer Replacement	Collection System	54,000					54,000											
Ragan Street Separation Project	Collection System	1,500,000																1,500,000
Highlander Sewer Lining	Collection System	350,000														350,000		
Dixon/Clay Separation Project	Collection System	850,000						125,000					725,000					
Washington/Ingram Sewer Separation	Collection System	550,000													550,000			
Riverdale Court Storm/Separation	Collection System	125,000						112,000										
Pratt Paper Sewers & Force Main	Collection System	2,310,000								2,310,000								
Pratt Paper Pump Station	Pump Stations	1,420,000								1,420,000			-					
Atkinson Park Sewershed - Project 1A - Myrene Dr PS Renovation - New Station	Pump Stations	702,121					702,121											
Atkinson Park Sewershed - Project 1B - Myrene Dr PS - New Force Main	Pump Stations	1,459,408						1,459,408										
Atkinson Park Sewershed - Project 2 - Atkinson Park PS Replacement	Pump Stations	850,000										850,000						
Atkinson Park Sewershed - Project 3- Atkinson Park PS - New Force Main	Pump Stations	1,612,000											1,612,000					
Atkinson Park Sewershed - Project 4 - Eliminate Spruce Dr PS	Pump Stations	380,000													380,000			
Audubon - Airline Sewer Project	Pump Stations	350,000														350,000		
International Paper Pump Station Upgrade	Pump Stations	210,000						14,250					195,750					
Crestline Pump Station Upgrade	Pump Stations	50,000												50,000				
Highlander Acres Pump Station Upgrade	Pump Stations	150,000													150,000			
Bentley Hughes Pump Station Elmination	Pump Stations	200,000																200,000
New Sandefur Drive Pump Station - Rolling Hills/Fair Street Replacement	Pump Stations	1,450,000						90,000	114,780					1,245,220				
NWWTP - Clarifier 1 & 2 Upgrades	North WWTP	781,472		781,472														
Add Second Grit Removal Train - NWWTP Headworks	North WWTP	1,100,000															1,100,000	
Replace/Renovate Belt Presses (Sludge Disposal)	North WWTP	1,600,000											1,600,000					
Sludge Disposal Upgrades (ATAD System/Class A Sludge)	North WWTP	9,700,000	Not Funded															
Upgrade Sludge Disgester Building (Piping, Pumps and Controls)	North WWTP	435,000																435,000
Upgrade EAB # 2	North WWTP	3,697,000									1,478,800	2,218,200						
Renovate Belt Presses (Sludge Disposal) - net of DRA Grant	South WWTP	180,000					180,000											
Fine Bubble Aeration Renovation - Basins 4, 5 & 6 (10 MG Volume)	South WWTP	3,460,351			116,000	2,200,000	1,144,351											
Sludge Storage Building	South WWTP	150,000	166,625															
		Total Spending Per FY	\$ 166,625	\$ 781,472	\$ 116,000	\$ 2,200,000	\$ 2,080,472	\$ 1,800,658	\$ 114,780	\$ 3,730,000	\$ 1,478,800	\$ 3,068,200	\$ 4,132,750	\$ 1,595,220	\$ 1,730,000	\$ 1,200,000	\$ 1,250,000	\$ 2,635,000
			- Actual Expenditures															

