City of Lawrence
UTILITIES

2014 Utilities Capital Improvement Projects Summary Report

In March of 2013, the City Commission adopted the Water and Wastewater 2013-2017 Capital Improvement Program (CIP) for Scenario 5 – Taste, Odor, & Microtoxins. In the nearly two years since this plan was approved by the City Commission, Utilities staff has made significant progress on these projects. This report outlines 35 projects, ranging in size and duration. Currently the department has $46.9 million in contracts for these projects. The projects outlined in this report fall into the following categories: Capacity and Large Capital Projects (8 projects), Reliability Projects (29 projects), and Other Utilities Projects (4 projects). The following summary report describes the many Capital Improvement Projects completed, under construction, or under design during 2014.

Capacity and Large Capital Projects

Wakarusa Wastewater Treatment Plant Facility/Influent Pump Station/Site Fill/Force Main

After 10 years in the works, design and construction of a new wastewater treatment plant, Pump Station No. 10, Kaw River Wastewater Treatment Plant lab improvements, and force main to the new plant are currently in the final design phase. When completed, this project will provide a second wastewater treatment plant, as well as, great flexibility. Pump Station 10 will allow for diversion of flows to either plant during wet and dry weather. The overall project provides for future community growth in varying types and locations, meets the regulatory requirements for wet weather treatment, and increases the system's reliability and resiliency to transport and treat wastewater without impact to the community or the environment. Construction on the site fill for the plant began in July and the force mains began in September of 2014. Staff will request to advertise for construction bid on the plant and pump station in January of 2015. Overall expected completion is Fall 2017.

Above: 25 acre Wakarusa WWTP fill under construction (aerial)

Kaw Water Treatment Plant Raw Water Intake

This project included the construction of a new raw water intake structure and piping, as well as demolition of two abandoned intake structures, located in the Kansas River. It also included dredging and modification to the existing intake to lessen sediment intrusion on the current intake and raise it above the new millpond level. This is the first time that the City has had a redundant intake to the Kaw Water Treatment Plant, providing for greater water supply reliability, as well as expanded overall raw water intake capacity and decreased sand and sediment deposits. The intake is complete and in operation. Wolf Construction, the contractor, will rehabilitate Burcham Park this spring as weather conditions allow. The overall cost of the project is $4,543,633.

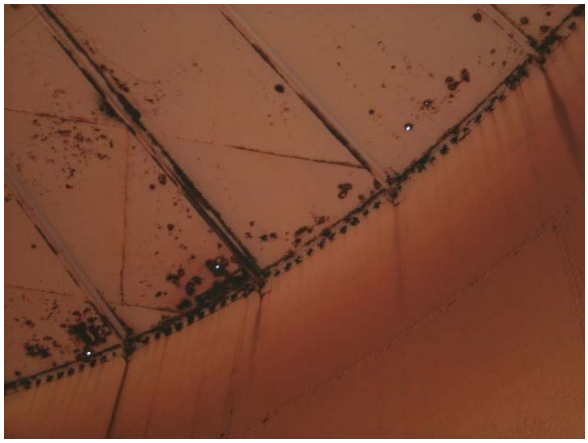
Kaw Water Treatment Plant Water Transmission Main

Prior to this project, North Lawrence received treated water via a single watermain, located along the Vermont Street bridges. This transmission main adds a redundant water line to North Lawrence, which allows staff to evaluate the current water main for rehabilitation and remove it from service for repairs with no impact to North Lawrence customers. It is also the first phase of a larger project that will eventually provide additional treated water transmission capacity to Southeast Lawrence. Garney Construction, the contractor for the project, installed the 7,000

linear feet of 36" diameter main from the Kaw Water Treatment Plant to North Lawrence, via a boring approximately 65 feet under the Kansas River. At the time of construction, the 2,400 linear foot crossing under the river was the longest in the world for fusible PVC pipe that size and using horizontal directional drilling. The cost of the project was $6,964,712 and is expected to be complete by the end of the year.

Oread Water Storage Tank and Booster Pump Station Replacement

This project addresses the replacement of both Oread water storage tanks, located in the 1200 block of Oread Avenue. The south tank, built in 1931 and nicknamed Hoover, stores 1 million gallons. The north tank, built in 1954 and nicknamed Ike, stores 1.3 million gallons as well as a 1.8 million gallon per day (mgd) booster pump station that pumps treated water from these tanks to the West Hills Service area. Both Ike and Hoover are exhibiting severe corrosion, loss of structural members, holes in the exteriors, deteriorated foundations and failing interior and exterior coatings. The tanks do not meet several current safety and American Water Works Association standards. The booster pump station needs replacement due to electrical equipment, valving, maintenance and operational issues. Preliminary design work is complete and looked at alternate sites and storage strategies. The City is currently working with the University of Kansas on the potential to relocate the facilities. Estimated project cost is $3,952,600.



Ecoflow: Rapid Rain Water Reduction Program

The Utilities Department has started phase 2 of the comprehensive "find and fix" program to reduce the rain water entering the sanitary sewer system through the public and private sewer system. Phase 1 nears completion and included areas east of Haskell Avenue and north of 23rd Steet and a small neighborhood west of the KU Campus. The Phase 1 public sewer investigation included inspection on 378 manholes, smoke testing approximately 90,000 linear feet of sanitary sewer, and CCTV inspections on approximately 30,000 linear feet of sewer line. Trekk Design Group and Utilities staff have identified 13 sanitary point repairs and approximately 18,000 linear feet of sanitary sewer identified for rehabilitation. Over 1,400 private property evaluations have been completed under this program during 2014, which identified over 300 defects that qualify for repair. To date, Utilities staff has repaired approximately 50 minor defects and program plumbing contractors have repaired 150 defects. Feedback from program participants has been overwhelmingly positive. Many of the comment sheets received praise the convenience to the homeowner or resident, time taken to explain the program and proposed corrections, courtesy of the plumbing contractors, and great results of the project. The Phase 2 focus area boundary is Barker Avenue/Connecticut Street on the west, Haskell Avenue on the east, and 23rd Street on the south. Manhole inspections and smoke testing started in late 2014 in this area. CCTV sewer inspections and private property plumbing evaluations will begin in early 2015. Public and private sector repair work will continue throughout 2015 in the phase 2 area. The overall project is anticipated to cost $19,400,000.

Sump Pump Connected to Sanitary Sewer

New Sump Pump Discharging Outside

Taste & Odor Improvements – Phase I

Taste & Odor improvements are based on recommendations in the 2013 Taste & Odor Study and other improvements requested by the City. The improvements for the Clinton Water Treatment Plant include the addition of a rapid mix system, carbon dioxide system, ferric system, and liquid lime system, tube settlers in the primary basins, and painting of the South Train basins and equipment. The improvements for the Kaw Water Treatment Plant include a new lime system, shakers and dust systems, and painting of chemical silos and lime room. Completion of these improvements is expected in the Summer 2016 at an estimated cost of $8,100,000.

South Lawrence Trafficway Sanitary Sewer Relocations and Watermain Construction

Completion of the final phase of the South Lawrence Trafficway provided the opportunity for the Utilities Department to complete several loops in the water distribution system that were previously dead end mains. Watermains connected with this project include Broken Arrow Park to 31st and Ousdahl and 31st and Haskell to 31st and O'Connell or a total of over 3,600 feet of new watermain installed. In conjunction with the watermain additions, over 4,000 feet of 24" sanitary sewer in the area were also relocated. The watermain and sanitary sewer relocation project was completed by Emery Sapp and Sons, Inc., KDOT's construction contractors. Current overall cost for sewer relocations and water main installation is $3,326,730.

Bob Billings Parkway Utility Relocations

In conjunction with the new interchange at Bob Billings Parkway, the Utilities Department relocated 3,300 feet of sanitary sewer and installed 425 feet of new waterline to serve the Langston Heights Development. The sanitary sewer was relocated crossing Bob Billings Parkway, underneath the KDOT Bob Billings Parkway Interchange, and crossing N 1500 Road. KDOT has agreed to pay for $430,959 of the cost for the relocated sewer that was within City-owned easement. The completion time is based on the KDOT timeline for the interchange, but should be complete in 2016 at the cost of $562,229.

Reliability Projects

Water Main Replacement and Relocations

This program's funding for water main replacement is 3 times more than in previous years. The increased funding for these projects is allowing the department to respond to a backlog of deferred watermain maintenance from previous years. Department of Utilities staff continuously evaluates the condition of the water distribution system based on main breaks, pipe material and age, capacity and fire protection needs. Based on these criteria, along with the criticality of the watermain within the system and the number of services affected, watermains are targeted for replacement. Continued progress in water main replacement further increases the reliability of the City's water transmission system. The outlined water main replacement projects will result in approximately 34,000 feet (or 6.4 miles) of water main replaced. The following watermain rehabilitation projects were completed, under construction, or under design during 2014:

- North Iowa Street(Lakeview to Riverridge)
- 23rd Street (Alabama to Louisiana)
- 23rd Street (Iowa to Ousdahl)
- Bob Billings Parkway (George Williams Way to Bobwhite Drive)
- Mississippi Street (3rd Street to 9th Street)
- Lawrence Ave. (27th Street to 31st Steet)
- Arkansas Street (2nd Street to 4th Street)
- Avalon Road (2nd Street to 4th Street)
- Homestead Avenue(Lawrence Avenue to Lawrence Avenue)
- 8th Street (Indiana Street to Kentucky Street)
- Cedarwood Drive(25th Street to 26th Street)

- Michigan Street (2nd Street to 7th Street)
- Arkansas Street (7th Street to 9th Street)
- Florida Street (3rd Street to 4th Street)
- 10th & New York Water Main Relocation



In-House Water Main Replacement

In conjunction with the water main replacement program, Utilities Department Field Operations staff typically replaces water main on the replacement list that are 8 inches and smaller and located in low traffic areas in neighborhoods. The ability of in-house crews to replace water main provides flexibility of the program to move quickly to address changing conditions. For example, the in-house crews were able to replace a 1922 water main at the 9th and New Jersey location in response to a school parking lot renovation. In house crews have replaced approximately 6,400 feet of water main this year. The following projects are in-house water main projects:

- Maple Lane (E. 19th to E. 21st Terrace)
- Haskell Street (E. 19th to E. 21st Terrace)
- New Jersey Street (E. 9th to E. 10th)
- Delaware and Forrest Avenue north and south
- E. 15th – Learnard/Forrest-Maryland
- Pennsylvania Street (Forrest Avenue south)


Maple Lane Water Main Replacement


Haskell Avenue Water Main Replacement

New Jersey Street Water Main Replacement

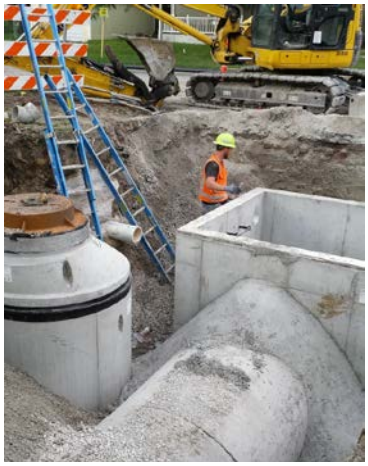
Forrest Avenue Water Main Replacement

Concrete Transmission Main Inspection

Pre-stressed concrete pipe are used in several locations of the water distribution system. This project was a proactive measure to determine the condition of concrete main in locations based on the high potential of material and manufacturing issues from a specific era of manufacture and on critical locations in the system, such as raw water transmission main and Central Service transmission main. The project consisted of using CCTV and electromagnetic inspection to identify areas needing repair. The results of the inspection showed the pipe interior, joint and pre-stressing wires in good condition with no locations identified for immediate attention. The project cost was $304,288.

Emergency Sanitary Sewer Repair (1000 Block of Connecticut Street)

Staff discovered sanitary sewer service connections passing through the storm sewer to connect to the sanitary sewer in the alley between the 1000 block of New York and Connecticut Street. The 48" brick storm sewer was constructed parallel and less than 3 feet from the 8" sanitary sewer in approximately 1932. The service connections were broken in the storm sewer causing sanitary flow to discharge into the storm sewer, causing a cross connection between the two sewers. Both old sanitary sewer and storm sewer were replaced and the sanitary sewer line was installed at a lower elevation to allow the service connections to safely pass under the new storm sewer. The project was completed in September 2014 at a cost of $591,181.



Pump Station No.4 Redundant Force Main

Staff discovered that the 8" force main that conveys wastewater from PS#4 in North Lawrence to the WWTP was exposed on the river side of the Kansas River Levee. Due to the age and capacity of the existing 18" force main that also runs from PS#4 to the WWTP, staff determined that a new and redundant force main should be installed in order to adequately carry all flow from PS#4 to the WWTP. The project was completed in September of 2014 at a cost of $1,644,900.

Kaw and Clinton Water Treatment Plants Electrical and Mechanical Improvements

This project consisted of multiple electrical and mechanical improvements at both the Kaw and Clinton Water Treatment Plants. The improvements were based on needed repairs and replacement due to age and wear, consolidation of systems, needed upgrades and relocations, and addition of generator connections for improved reliability of the systems. The Kaw Water Treatment Plant now has the ability to run 1 train on a generator. The Clinton Water Treatment Plant is now set up to easily connect to back-up generator power when needed. Combined cost was $1,505,502.

Clinton Water Treatment Plant Raw Water Intake Pump No. 4 VFD Replacement

Installation and startup of a new 350 hp motor and variable frequency drive (vfd) on the Pump No. 4 at the Clinton Water Treatment Plant Raw Water Pump Station, which addresses ongoing reliability issues with the existing equipment. The project is completed at a cost of $139,637.

Large Valve Replacement

The large valve replacement project includes the installation of a 20" butterfly valve on the existing 1954 20" concrete transmission main, located at 10th Street and Kentucky Street.

Replacement of this valve provides the ability to isolate the system at this point during a water main break. Completion is anticipated for late 2014 at a cost of $177,910.

Booster Pump Station Improvements

This project includes replacement of the booster pumping facility at the Kasold water tower, located at 1800 Kasold Drive, and the design and construction of a new booster pumping station at the Harper water tower, located at 2100 Harper Street. Completion of this project will provide better delivery of treated water to these areas. It also evaluated the potential addition of a booster pumping station at the 6th & Kasold elevated water tower. The evaluation recommends proceeding with the replacement of the existing Kasold tank booster pump station at this time. Future demand and operational conditions may warrant the addition of booster pump stations at the Harper and 6th and Kasold tanks. The estimated cost of this project is $624,000.

Kaw Water Treatment Plant Motor Control Center Replacement

The electrical motor control equipment (MCC) are essential, as they receive the incoming electrical feed and distribute 480 Volt AC power to the major equipment in the plant including pumping, control valves, treatment basin equipment, chemical feeds, and plant control systems. This MCC is approaching thirty years old and replacement parts are no longer readily available. Staff anticipates an approximate bid date in spring 2015 and an estimated cost of $650,000.

Stratford Elevated Tank Rehabilitation/Replacement Analysis

In addition to rehabilitation/restoration of coatings at the Stratford, 6th Street, and Harper Elevated Storage Facilities, staff identified the Stratford elevated storage facility, located at 1225 Sunset Drive, as the first priority for evaluation of rehabilitation and replacement options. The study will include an updated inspection of the tank; feasibility and life cycle costing of various options; and rehabilitation vs. replacement comparison. Future projects will be determined, based on the report recommendations.

Clinton Water Treatment Plant Raw Water Pump Station Electrical Improvements

The original construction of the Clinton Raw Pump Station by the US Corps of Engineers and in conjunction with Clinton Dam did not provide adequate protection of the electrical and control equipment from heat, dirt, insects, etc. This has led to ongoing operational and maintenance issues due to the heat and the dirty environment. This study will evaluate the options and costs to provide a climate controlled environment for the electrical and control equipment located in the pump station. Staff anticipates completing the review of options by the end of 2014.

Kaw & Clinton Roof Replacements

The Kaw & Clinton roof replacement project includes the replacement of the existing roof over the office and filter area at the Kaw Water Treatment Plant and the replacement of the roofing system at the Clinton Water Treatment Plant. Both roofs are failing and require replacement to stop leaking.

Wakarusa Drive Improvements – Waterline Relocations

Improvements to Wakarusa Drive at Legends Drive required relocation of several waterlines due to insufficient waterline depth, conflicts with improvements to the street, sidewalks and storm sewers, and poor waterline condition.