Preliminary Engineering Report Project Descriptions

City of Carlin

Updated April 2022

Water Projects

Phase 1 - Spring 1 Replacement, $1,143,000: This project would include replacing 3,500 of transmission main between Spring 1 and the Hamilton St. booster pump station. At the time of writing of this PER, the engineering design for these improvements has been completed, although NDEP-BSDW permitting has not. Per Table 28 (attached), the City intends on using water utility capital reserves to fund the construction of these improvements.

Phase 2 - Replace Storage Tank Transmission Mains $4,123,000: The second phase of this project alternative includes replacement of two water transmission mains which cross under I-80 and form the only two connections between the water storage tanks and the majority of the city distribution system. The existing transmission mains will be replaced or relocated with 12-inch PVC DR18 pipe. This project will also replace aging water mains near the water storage tanks. Right-of-way issues are a notable component of this project. This phase of the project will cross NDOT right-of-way in five locations. Permission to access the land will be required, in addition to directional boring at each of these locations. The existing western transmission main from the water storage tanks runs under existing residential property and structures; during the design phase a new route through City right of-way must be identified and constructed at additional cost.

Phase 3 - Replace South Distribution System $5,393,000: Phase 3 would replace the portion of the distribution system that contains the oldest pipes in the system and is also the area with the greatest water pressures. Existing mains will be replaced with 8-inch PVC DR18 pipe. Fire hydrants will also be replaced, and meter pits with meters will be installed at all services. The mains south of the railroad tracks will be extended to 10th Street and 4th Street and looped, eliminating or reducing five dead ends. The horizontal bore under the railroad track at 4th Street will be relocated to the road crossing at B Street and connect to an existing 8-inch PVC main there, eliminating a sixth dead end. Looping the water mains will reduce or eliminate dead end mains, which will increase flow to fire hydrants. Permitting with Union Pacific Railroad will be an additional cost and may take up to a year to complete. As required by the railroad, the mains will be placed inside a casing under the tracks for ease of future maintenance and to provide extra protection for tracks and water mains.

Phase 4 - Replace Northeast Distribution System $9,260,000: Phase 4 improvements include replacing existing deficient water mains north of the railroad tracks and to the east of 6th Street.

It is also proposed to include isolated segments of pipe and mains farther to the north, including some isolated segments of main near I-80. Service lines will be replaced to the edge of City right of-way and meter pits with meters will be installed. This part of the distribution system contains the second oldest pipes in the distribution system.

Phase 5 - Replace Northwest Distribution System $8,857,000: The final portion (i.e., Phase 5) of the distribution system which is being proposed for replacement are water mains north of the railroad tracks and to the west of 6th Street. Service lines will also be replaced to the edge of City right-of-way and meter pits with meters will be installed.

Phase 6 - Spring 2 Improvement $936,000: The transmission main from Spring 2 to the booster pump is also nearing the end of its useful life and is a candidate for replacement. The proposed improvements include 2,000 lf of 12-inch transmission main which would connect to the Spring 1 transmission main just to the west of Willow St. Additionally, the spring outlet and flow gauge would be replaced as well. The need for this project is significantly downgraded due to the fact that the City does not need to rely on Spring 2 water to meet average or peak demands.

Sewer Projects

Phase 1 - Sewer System Evaluation Survey + I/I Study, $280,000: This phase involves conducting a Sewer System Evaluation Survey (SSES) for the pipes constructed in the 1930s. Conducting an SSES will provide information on the existing system including areas of infiltration and inflow (I&I), pipe materials and diameters, and pipeline deficiencies such as structurally damaged pipe sections and faulty joints. The City will then determine which locations are most in need of replacement. Determining the sections of pipe to replace based on the SSES allows the City to make the most informed decisions regarding pipe replacement instead of selecting an area based solely on pipe age.

Phase 2 - Replace Priority 1 Pipes, $5,854,755: This project will replace approximately 3,000-lf of 6-inch, 17,500-lf of 8-inch, and 7,900-lf of 10-inch diameter sewer collection pipe and adjacent manholes. These pipes will be identified as being in the most critical condition in the SSES conducted in Phase 1. This project proposes to utilize CIPP construction methods to the greatest extent possible.

Phase 3 - Sludge Removal, $2,600,000: Sludge has not been removed from the wastewater treatment ponds since 1988. Significant sludge buildup in the pond cells reduces available volume and adds organic loading from anaerobic decomposition, contributing to the occasional high CBOD5 levels. This phase of the project proposes to reduce and/or remove sludge from the ponds in an effort to remedy these issues.

Phase 4 - Lift Station Improvements, $5,071,175: The rehabilitation of the Oak Street Lift Station system will consist of replacing the two pumps and motors, installing a flow meter, installation of a screen auger, and improve the wet well / dry well configuration to avoid confined space safety issues. This phase also involves replacing the existing force main that connects the pump station to the treatment ponds.

Phase 5 - WWTP Monitoring Wells, $151,050: This phase proposes to construct 2 new monitoring wells that are located closer to the wastewater treatment ponds. The addition of these wells would provide additional data sources that may impact the scope of future improvement projects at the WWTP.

Phase 6 - Phase 2 Sewer System Inspection, $300,000: This phase involves conducting a second SSES for the pipes constructed between the 1960s and the 1980s. Conducting an SSES will provide information on the existing system including areas of infiltration and inflow (I&I), pipe materials and diameters, and pipeline deficiencies such as structurally damaged pipe sections and faulty joints. During the SSES, the locations of deteriorated pipes will be identified and ranked for replacement as part of either the Phase 7 or Phase 8 projects.

Phase 7 - Replace Priority 2 Pipes, $3,152,170: This project will replace approximately 2,000-lf of 6-inch, 12,000-lf of 8-inch, and 1,000-lf of 10-inch diameter sewer collection pipe and adjacent manholes. These pipes will be identified as being in the most critical condition of the pipes studied in the Phase 2 SSES conducted in Phase 6. The inspection in Phase 6 will determine the exact size and length of pipe to be replaced in Phase 7. This project proposes to utilize CIPP construction methods to the greatest extent possible.

Phase 8 - Replace Priority 3 Pipes, $4,075,043: This phase of the improvements will replace any pipes and manholes identified as "failing" under the Phase 1 or Phase 6 SSES studies. The exact quantity and size of pipes which will ultimately be determined by the SSES projects, although a total project budget of $4-million has been identified for this project. Upon completion of all phased improvements, over 12-miles of sewer collection main (and adjacent manholes) will be replaced. This project proposes to utilize CIPP construction methods to the greatest extent possible.