

Beal Slough Relief Trunk Sewer Alignment Study Report

Replacement Sewer

6.0 Replacement Sewer

6.1 Options for Replacement of Existing Sewer

Alignment No. 2 (Red Alignment) is located adjacent to the existing Beal Slough Sewer from 17th Street and Pioneers Blvd to 56th Street and Highway 2. Therefore, this reach of sewer provides an opportunity to evaluate the cost of replacing the existing sewer with a larger pipeline versus providing a parallel relief sewer and Insituform lining the existing Beal Slough sewer. The existing sewer is made of vitrified clay pipe (VCP) and was installed in the late 1960's. Although currently in good condition, it is anticipated the sewer will require rehabilitation in the future due to problems associated with the brittle nature of VCP and higher leakage rates with the larger number of VCP joints. It is anticipated the sewer will require rehabilitation and lining with Insituform within 10 years. This chapter provides a comparison between Insituform lining of the existing sewer versus replacing the sewer by increasing the pipe size of Alignment No. 2 from 17th Street and Pioneers Blvd to 56th Street and Highway 2.

6.1.1 Insituform

Insituform lining of the existing sewer would minimize infiltration through the joints and provide additional structural reinforcement for damaged areas of the sewer. The lining is applied in the pipeline between manholes with by-pass pumps diverting the flow around the section where the installation is occurring. The area representative for Insituform was contacted to determine the cost for Insituform lining of the existing Beal Slough sewer. Based on the bury depth of the existing sewer, manhole spacing, and overall condition of the sewer, Insituform indicated a cost of \$6 per diameter-inch which is typical for most sewer projects of this type and size. This unit cost is representative of other Black & Veatch projects in the Midwest.

The opinion of probable project cost for Insituform lining the existing sewer from 17th Street and Pioneers Blvd to 56th Street and Highway 2 is \$2,290,000 in 2003 dollars. A detailed breakdown of this alternative is included in Appendix C. It is assumed that

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the Insituform lining will be installed 10 years in the future, the present worth cost of this work is \$1,547,000. This cost is in addition to the \$10,005,000 project cost for the relief sewer with Alignment No. 2. Therefore, the total present worth cost for the relief sewer and the Insituform lining of the existing sewer is \$11,552,000.

6.1.2 Replacement Sewer

Two options are available for replacement of the existing sewer. The first involves paralleling the existing sewer from 17th Street to 56th Street with 48 inch, 42 inch, and 36 inch sewer as indicated in the Red Alignment. After the parallel sewer is installed, the existing sewer would be abandoned in place. The second option would involve removing and replacing the sewer in the existing right-of-way utilizing by-pass pumping. Either option would require 3,471 linear feet of 48 inch sewer from 17th Street to approximately 28th Street; 5,712 linear feet of 42 inch sewer from 28th Street to approximately 33rd Street; and 10,982 linear feet of 36 inch sewer from 33rd Street to 56th Street. At 17th Street the flow would be split between the existing sewer to the northwest and the new sewer extending to the south.

The opinion of probable project cost for replacement and abandoning the existing sewer in-place is \$11,293,000. The opinion of probable project cost for removal and replacement of the existing sewer with a larger pipeline is \$11,036,000. A detailed breakdown of these alternatives is included in Appendix C. These costs include the 36 inch sewer from 17th Street and Pioneers Blvd west to the connection to the Salt Valley - Phase IV sewer.

6.2 Conclusion

The option to remove and replace the existing sewer with a new sewer is has the lowest project cost, but the project cost for the three options are within 4%. During a study, if the cost options are within 10% of each other, they are considered equivalent. Replacement of the existing sewer would eliminate any potential concerns pertaining to damage occurring to the existing pipeline during installation of the relief sewer. Based

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on this evaluation, it is recommended that a parallel replacement sewer be constructed along the proposed Alignment No. 2 (Red Alignment) and then abandon the existing sewer in-place by demolishing to top eight feet of the manholes and backfill the manholes and sewer with flowable fill. This option will eliminate potential difficulties associated with by-pass pumping systems. From 27th Street to 33rd Street, portions of the existing sewer may be replaced because of limited room for installation of the relief sewer.