

Mayes Creek Connector Routing Study

Prepared for City of Franklin
Engineering Department

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Prepared by:



I. Background

This study was authorized on December 19, 2012 by the City of Franklin as part of a multiple-basin planning update in order to evaluate routing options for conveying sanitary sewer flows from Mayes Creek Drainage Basin to the future site of the South Water Reclamation Facility. This evaluation uses flow data and projections from the 2008 update of the Goose Creek Basin Study and the Mayes Creek Basin Update, being completed this month for the City under this contract. The findings, conclusions and recommendations of this evaluation are detailed in the following report.

II. Mayes Creek Connector

i. Description

The Mayes Creek Connector is a large diameter gravity interceptor that is anticipated to convey flow from the mouth of the Mayes Creek Drainage basin then west along the Harpeth River through the Goose Creek Basin to the proposed location of the South Water Reclamation Facility. The Connector is intended to convey the total flow from the Mayes Creek Basin as well as flow from sub-basins 5 and 5-A of the Goose Creek Basin. The Connector will terminate on the northern portion of an existing 184-acre City of Franklin-owned parcel that was purchased some years ago when it became available with the thought that it might be an appropriate location for a second treatment facility in the future. The line will initially connect to the existing Goose Creek pump station via the Simmons Ridge Sewer until such time as an additional sewage treatment option exists in the southern portion of the City. As the Mayes Creek and

Goose Creek basins develop, the City should continue to evaluate the flows from this basin to confirm adequate capacity in the Goose Creek collection system to accommodate those flows.

The Mayes Creek Basin is comprised of approximately 9,850 acres located on the eastern edge of the City of Franklin Urban Growth Boundary. The reader is referred to the Mayes Creek Drainage Basin Study from June 2006, the Goose Creek Basin Study from May 2005 and subsequent updates for more detailed descriptions of those basins, the development of sanitary sewer flows and the rationale followed in providing a conceptual design of sanitary sewers for planning purposes.

ii. Projected Flows

The Mayes Creek Basin drains southwest to the lowest point of the basin, said point being near the intersection of Carothers Parkway South with Arno Road. The current study update provides an estimated total peak flow from Mayes Creek basin to be approximately 14.2 million gallons per day (mgd). Peak flows are used in studies of this type in order to properly plan for adequate capacities for sewer collection systems to handle the highest instantaneous flows that might be generated from an area.

Exhibit 1 to this report, attached, depicts the proposed route of the Mayes Creek Connector. The route begins at a point just north of the Harpeth River at Mayes Creek and continues westward along the river through the Goose Creek Basin. Along the route, an additional 1.97 mgd is added from Goose Creek Sub-basin 5A. Further to the west, near the intersection of the Harpeth River with South Carothers Road, an additional 3.9 mgd of flow is added to the pipeline from the north and south for a total flow

demand of approximately 20 mgd. The recommended route continues west to cross the Harpeth River onto the City's property, then north along the river to the location of the Simmons Ridge Sewer.

iii. Hydraulics and Routing Recommendations

The ultimate required pipe size for conveying sanitary sewer flow from the Mayes Creek basin is shown on Exhibit 1. While the ultimate flows generated in the basin are easily handled by the 48" and 54" diameter pipelines as shown, the City may wish to install a smaller pipe initially to allow for the lower flows anticipated for a number of years as the basin begins to fully develop. Gravity pipe must be installed at minimum slopes required to maintain a scouring velocity of 2ft/sec to prevent buildup of solids in the pipe inverts, and installing new lines to accommodate flows for maximum development in an undeveloped basin can mean that the pipe exhibits very low flows for years, causing blockages in the line that require regular cleaning to maintain flow.

As an alternative to the 48" diameter section of the Mayes Creek connector, the City could install a 24" gravity line at 0.037% slope to allow for a flow of approximately 4 mgd, or approximately 3,500 homes. As development in the basin continues, a second 36" diameter line would be installed parallel to the original 24" line to accommodate the remainder of the 14 mgd flow from the basin. This type of long range planning and construction of gravity lines is routine when considering a large, undeveloped area like Mayes Creek basin. The City would want to plan ahead and acquire sufficient easement for both lines initially.



Similarly, the pipeline shown on Exhibit 1 as 54” diameter could be installed as a 36” diameter line initially and followed by a parallel 36” to 42” diameter line when flows from future development require additional capacity. Installing smaller diameter pipe during the early phases of development of a basin can provide some cost savings during the initial installation and can reduce operating and maintenance costs. When further development requires additional collection system capacity, the future developments can help pay for the installation of that infrastructure.

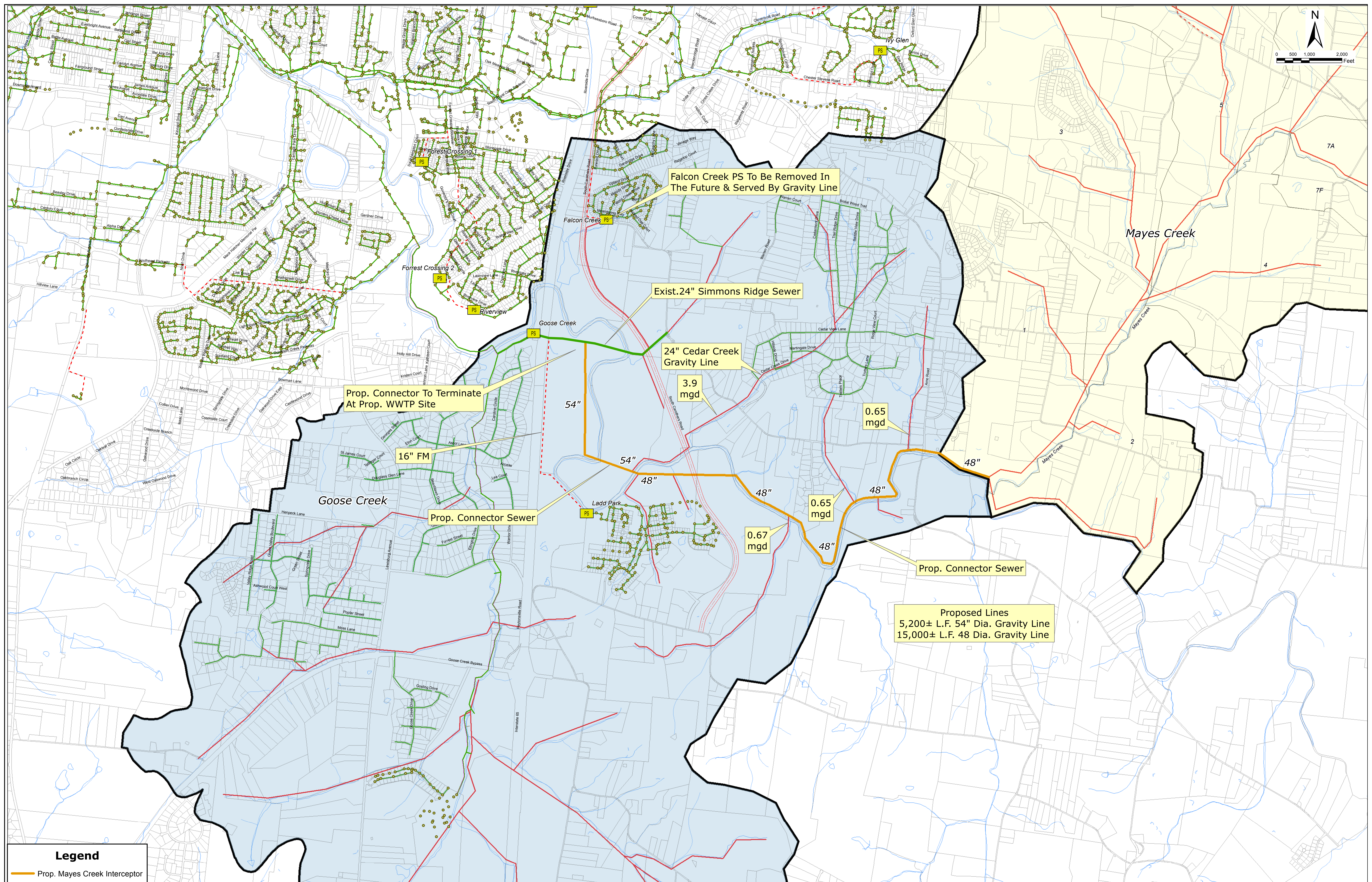
For planning purposes, the recommended route for the Mayes Creek Connector interceptor line as shown consists of approximately 5,200 linear feet (lf) of 54” diameter gravity pipeline and approximately 15,000 lf of 48” diameter line. Please refer to Exhibit 1 for depiction of the recommended routing.

ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST			
<u>Description</u>	<u>Quantity/Unit</u>	<u>Unit Cost</u>	<u>Total</u>
48-inch Gravity Sewer	15,000 LF	\$300.00	\$4,500,000.00
54-inch Gravity Sewer	5,200 LF	\$375.00	\$1,950,000.00
Manholes	70 EA	\$4,250.00	\$297,500.00
River Crossing	1 LS	\$115,000.00	\$115,000.00
Road Crossing	150 LF	\$1,350.00	\$202,500.00
15% Contingency	1 LS	\$1,059,750.00	\$1,059,750.00
TOTAL →			\$8,124,750.00

Sewer System Study
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The estimated cost to construct the Mayes Creek Connector pipeline for the recommended route is \$8.12 million. This estimate includes a 15% contingency that includes engineering and legal fees.



Legend

- Prop. Mayes Creek Interceptor
- Sewer Gravity Pipe
- Existing Force Main
- MH
- PS Existing Pump Station
- Goose Creek Drainage Basin
- Mayes Creek Drainage Basin

City Of Franklin, TN
Mayes Creek Connector - Preliminary Sizing/Routing