

TECHNICAL MEMORANDUM

DATE: September 10, 2013

PROJECT: Franklin/McVay Trunk Sewer Extension, Project No. P21080
City of Springfield, Oregon

TO: Mark Van Eeckhout, P.E. Civil Engineer
City of Springfield

FROM: William S. Evonuk, P.E.
Murray, Smith & Associates, Inc.

RE: Franklin/McVay Trunk Sewer Route Selection Report



Purpose and Scope

The purpose of this Technical Memorandum is to provide the City of Springfield (City) guidance on selecting a route for the proposed Franklin/McVay trunk sewer extension. This memorandum documents the evaluation of several viable routing alternatives. The alternative routes were evaluated with respect to a variety of evaluation parameters, including: geotechnical conditions; pipe slope/sewer depths; permitting interests; easement/right-of-way acquisition interests; traffic control requirements and traffic impacts; construction considerations; local community impacts; existing utility interests; ability to decommission the existing Nugget Way pump station; and cost. This memorandum then recommends the preferred route for the proposed trunk sewer extension.

For the purpose of this report, the highway running north/south through the Glenwood area from Franklin Boulevard through the southern limits of the urban growth boundary (UGB) will be referred to as McVay Highway (see Figure 2). Prior reports and maps also refer to this highway as Franklin Boulevard, Franklin/McVay Highway and Highway 225.

Project Overview

The Franklin/McVay Trunk Sewer Extension project is identified in the City of Springfield's Capital Improvement Program, 2013-2017, as the Franklin Boulevard System Expansion project. The key goal of the project is to extend the Glenwood wastewater system from the existing 30-inch diameter trunk line in Franklin Boulevard south in order to provide service to areas within the UGB not currently served, to promote future development in this portion

of the Glenwood area. This project will extend the trunk sewer to the Central Oregon & Pacific Railroad (CORP) located approximately 5,000 feet south of the intersection of Franklin Boulevard and McVay Highway. Based on preliminary flow analyses performed as part of this reporting, pipe sizes for the trunk sewer extension are expected to range in size from 10 to 15 inches in diameter. Extension of the trunk sewer beyond the CORP to the southerly limits of the UGB is not included in this project, but may be considered and completed at a later date to support future development needs. The subject project will be designed to accommodate such a potential future extension.

The proposed service area of the Franklin/McVay trunk sewer extension consists of a combination of existing residential, industrial, commercial and undeveloped land. Recently adopted zoning changes for the Glenwood area result in the trunk sewer extension service area consisting primarily of mixed use employment and light-medium industrial. The intended service area is roughly bounded on the north by Franklin Boulevard, on the east by the Willamette River, on the south and west by the UGB, as well as areas currently served by the City's existing sanitary sewer system (see Figure 1). The proposed service area contains approximately 250 acres.

Preliminary General Corridor Review

The proposed Franklin/McVay trunk sewer extension will connect to the existing 30-inch diameter trunk sewer located in Franklin Boulevard. The new trunk sewer will extend approximately 4,700 to 6,900 feet, depending on the alignment, to the CORP located approximately 5,000 feet south of the intersection of McVay Highway and Franklin Boulevard. The topography for the majority of the service area is flat from the Willamette River west to the CORP, then rises from the CORP west and south to the UGB.

An existing 8-inch to 10-inch diameter sanitary sewer main located in Nugget Way currently provides sewer service to the industrial areas adjacent to Nugget Way. Flow from the Nugget Way main is routed to the existing Nugget Way pump station located at the intersection of Nugget Way and 19th Avenue (see Figure 1). Flow is then routed by pressurized force main to the City's existing gravity sewer system at the intersection of 17th Avenue and Glenwood Road.

The general project area appears to be relatively favorable for routing a trunk sewer; however, various existing features along the corridor present certain challenges that warrant detailed study. This report focuses on four (4) primary routing alternatives, identified as Alternatives A, B, C, and D (see Figure 2). The various alternatives were selected for evaluation based primarily on the ability to provide gravity sewer service to the proposed service area. Additional consideration was given to alternatives that could provide gravity sewer service at the existing Nugget Way Pump Station, thereby allowing for decommissioning of the pump station. This report includes a general discussion of routing considerations and challenges followed by a detailed review of the four (4) primary routing alternatives as they relate to the routing considerations.

General Routing Considerations

Geotechnical Conditions

A preliminary geotechnical reconnaissance was performed in August 2013 by Foundation Engineering, Inc (FEI) (Franklin/McVay Sanitary Sewer Extension – Preliminary Phase I Geotechnical Reconnaissance, August 2013, FEI). Additional detailed geotechnical explorations will be conducted following route selection.

The geotechnical conditions along the routing corridor appear to be fairly consistent for all of the alignment alternatives. Potentially challenging geotechnical conditions include high water tables, seepage, unstable soils (Willamette River alluvium) and the possibility of shallow solid rock. While preliminary geotechnical reconnaissance was completed as part of the routing evaluations, detailed investigations will need to be conducted for the selected route to confirm conditions, identify special sheeting, shoring and trenching requirements, and to establish the potential for soil liquefaction and rock excavation.

Pipe Slope/Sewer Depths

It is important to consider the pipeline slope and sewer depth including the profile of the existing topography as part of the trunk sewer routing analysis. The analysis conducted as part of this report carefully considered the criteria for the depths required to provide adequate gravity service and to provide for adequate cover over the pipe. Existing subsurface utilities were also considered with respect to impacts to the sewer profile and depth of bury (see Figures 3 through 6). Field topographic surveys performed by OBEC Consulting Engineers (OBEC) of the various alignment alternatives as well as Light Detection and Ranging (LIDAR) contour mapping provided by the City was used to develop the preliminary profiles for this report.

The majority of the service area to be served by the trunk sewer extension between the Willamette River and the CORP is predominantly flat. Due to the flat topography of the service area, in order to provide maximum flexibility to serve current and future development, the trunk sewer should be installed at the minimum standard pipe slope from the connection to the existing trunk sewer in Franklin Boulevard to the upstream terminus near the CORP. Shorter overall alignments will result in a deeper pipe at the upstream terminus, which is more favorable for providing service to potential developments located farther away from the trunk sewer extension.

Modeling/Design Flow Calculations

As part of this analysis, design flows were reviewed and revised to establish needed pipe capacities, sizing and slopes. The City's Wastewater Master Plan (June, 2008) did not include flow being diverted from Nugget Way Pump Station into the trunk sewer extension. The master plan suggests that modeling conducted as part of this project should include a total of 1,194 Equivalent Dwelling Units (EDUs) for the trunk sewer extension loading

analysis. This report includes updated analysis reflecting current UGB mapping and zoning for the proposed service area. In addition, it is assumed that the current flows from the Nugget Way pump station might be diverted to the trunk sewer extension as part of this project or at a later date. Based on the documents provided by the City and additional detailed study, a revised service area boundary has been established for the trunk sewer extension that results in a total of approximately 1,700 EDUs for the sewer loading (see Figure 1). Flows from outside the current UGB are not included in this analysis.

The methodology used in this report for determining peak flows follows the methodology used in the City’s Wastewater Master Plan and Engineering Design Standards and Procedures, Revised April 2006. The capacity analysis criteria used in this report and the source of that criteria is presented in Table 1.

**Table 1
Trunk Sewer Capacity Analysis Criteria**

Criteria	Standard Value	Source
EDUs for Service Area	Dependant on zoning classification and area	- City Provided UGB Mapping - City of Springfield Development Code - Wastewater Master Plan (2008) - City of Springfield Engineering Design Standards and Procedures
Flow/EDU (gal/day)	290	City of Springfield Engineering Design Standards and Procedures
Peaking factor	Varies depending on flow - 1.5 to 3.5	City of Springfield Engineering Design Standards and Procedures
Inflow and Infiltration (I&I)	Included in Flow/EDU and Peaking Factor	City of Springfield Engineering Design Standards and Procedures
Minimum Velocity at Full Pipe (ft/sec)	2.0	DEQ/City of Springfield Engineering Design Standards and Procedures
Maximum Manhole Spacing (ft)	400	City of Springfield Engineering Design Standards and Procedures
Drop Across Manhole Structure	0.10 ft. for Pipe Deflection < 60° 0.20 ft. for Pipe Deflection > 60°	City of Springfield Engineering Design Standards and Procedures
Minimum Pipe Slope	8 in. – 0.40% 10 in. – 0.30% 12 in. – 0.22% 15 in. – 0.15% 18 in. – 0.12% 21 in. – 0.10% 24 in. – 0.09% ≥ 27 in. – 0.08%	City of Springfield Engineering Design Standards and Procedures

The peak flow for the entire service area identified on Figure 1 was determined to be approximately 1.37 million gallons per day (mgd), or 2.12 cubic feet per second (cfs). This flow was used for analyzing the alternative alignments, identifying preliminary pipe sizes and preparing comparative cost estimates. Flow rates are based on an assumed sewer loading of 1,800 gallons per day per acre for industrial and mixed use employment zoning and 15 EDU per acre for existing residential trailer parks. A more detailed analysis will be completed during the design phase to confirm the final pipe sizes and pipe size transition locations.

The preliminary pipe sizes established for the various alternatives are shown on Figures 3 through 6. It should be noted that Alternatives C and D profiles (Figures 5 and 6) show an 18-inch diameter pipe from the downstream connection at the existing Franklin trunk sewer to the Nugget Way pump station. The 18-inch diameter pipe at that location is oversized in order to meet minimum pipe slope requirements and divert flow from the pump station into the trunk sewer. According to the City's Engineering Design Standards and Procedures, paragraph 2.02.11, "*Engineers shall not use sizes of sewer pipe which are larger than necessary for carrying satisfactory capacities in order to meet grade requirements, e.g., a ten-inch pipe instead of an eight-inch pipe to allow a decrease in slope.*" Based on the preliminary flow analysis for the service area, a 15-inch diameter pipe provides adequate flow capacity for that location; however, flow from the pump station could not be diverted to the 15-inch diameter pipe due to minimum slope requirements and grade limitations between the pump station and the existing Franklin trunk sewer.

Permitting

There are several permits that are anticipated to be required for this project. As part of the alternatives analysis, OBEC conducted a review of the various alignments and prepared a summary of the required permits. Permitting will be required for work within ODOT right-of-way, work within Lane County right-of-way, work impacting existing wetlands, work disturbing ground on private property, and work within the UPRR right-of-way. Table 2 lists the regulatory agencies, required permits from each agency and the alignment alternatives that each permit will be required for. Based on preliminary field investigations, a Joint "Section 404" Removal/Fill permit is not expected to be required for this project. Following selection of a final route, a more detailed investigation will be conducted to determine the presence of existing wetlands and potential impacts.

**Table 2
Regulatory Agencies and Required Permits**

Agencies	Permits	Applicable Alignments
Lane County Department of Public Works	Facility Permit	C, D
Oregon Department of Transportation	Permit to Occupy or Perform Operations Upon a State Highway	A, B, C, D
Union Pacific Railroad	Railroad Crossing Permits	A, B, C, D
City of Springfield	Land and Drainage Alteration Permit	B, C, D
U.S. Army Corps of Engineers	Joint "Section 404" Removal/Fill Permit	(B,C,D) ¹
Oregon Department of State Lands	Joint "Section 404" Removal/Fill Permit	(B,C,D) ¹
Oregon Department of Environmental Quality (DEQ)	Section 401 Certification	(B,C,D) ¹

¹ These permits are required if the alignment impacts jurisdictional wetlands or waters. Based on preliminary reconnaissance and map reviews, it is possible that Alternatives B, C and D could impact wetlands or waters. Field verification by a Professional Wetland Scientist is recommended if one of these alignment alternatives is selected.

Easements

Routing of the trunk sewer through private property areas will require easements. It is recommended that permanent easements, 30 feet wide, centered on the pipeline, and temporary easements an additional 20 feet wide, for a total construction corridor width of 50 feet, be established. Both the costs and challenges in obtaining easements have been considered in the routing alternatives evaluations. To allow sufficient time for easement acquisitions, the easement process should commence during the early phases of the final design process. Table 3 shows the estimated easement requirements.

**Table 3
Franklin/McVay Trunk Sewer Extension - Estimated Easement Requirements**

Township/Range T18S R3W W.M.			Estimated Area of Required Easements (Square Feet) (Permanent/Temporary) ¹			
Parcel	Map No.	Tax Lot	Alt. A	Alt. B	Alt. C	Alt. D
A	18030300	1800	0/0	3,000/2,000	0/0	0/0
B	18030300	1700	0/0	2,100/1,400	0/0	0/0
C	18030300	1600	0/0	4,800/3,200	0/0	0/0
D	18030300	1500	0/0	3,000/2,000	0/0	0/0
E	18030300	3200	0/0	7,500/5,000	0/0	0/0
F	18030300	3100	0/0	8,100/5,400	0/0	0/0
G	18030300	200	0/0	6,000/4,000	0/0	0/0
H	18030300	2800	0/0	6,000/4,000	0/0	0/0
I	18030300	800	0/0	0/0	6,000/4,000	6,000/4,000
Total Estimated Area			0/0	40,500/27,000	6,000/4,000	6,000/4,000

¹ Estimated easement areas are based on 30-foot wide permanent easement and 20-foot wide temporary construction easement.

Traffic Control/Roadway Impacts

Traffic impacts will vary significantly with the various trunk sewer routing alternatives. Where the trunk sewer is routed in or near roadways, traffic flow disruptions are anticipated during construction activities and full road closures will likely be required. Detours will be required to route traffic around the work zone, while maintaining local access to businesses within the closed portion of the roadway. Where the sewer is routed outside of roadways in undeveloped lands, traffic disruptions are expected to be minimal. While disruptions to traffic may be well-managed through incorporation of appropriate construction contract provisions, the costs and impacts of such disruptions should be carefully considered as part of the route selection process.

Where the trunk sewer is routed within the roadway, reconstruction of the road surface will be required. As discussed above, the depth of the trunk sewer will vary along the route and will be approximately 15 to 17 feet deep at the downstream connection to the existing Franklin Trunk Sewer. It is expected that trench sidewall instability may be an issue for deep pipe installation and that trench excavations may impact the entire roadway in certain areas.

Construction Considerations

Each of the identified route alternatives were evaluated with respect to a number of construction related items including depth of construction, the number of bored and jacked crossings required, surface restoration, and equipment access and staging.

Local Community Impacts

As with any public works project it is important to consider the impacts and implications to the public. Each of the alternatives poses different challenges to the businesses and residents

within the project area. Careful consideration must be given to traffic movement, traffic congestion, impacts to mass transit and school bus stops and routes, access for emergency vehicles, noise, dust and other disturbances. The goal is to minimize these disturbances during the construction period as much as possible.

Utility Impacts

The Franklin/McVay trunk sewer extension will impact a number of utilities. Existing utilities along the trunk corridor may include:

- Sanitary Sewer -- City of Springfield
- Storm Drainage -- City of Springfield/ODOT
- Power -- Springfield Utility Board (SUB)
- Water -- Springfield Utility Board (SUB)
- Gas -- Northwest Natural Gas
- Fiber Optic -- Level Three Communications
- Fiber Optic -- Sprint
- Cable TV -- Comcast
- Telephone – Century Link

Each routing alternative has been evaluated with respect to utility impacts. Final designs will be adjusted with the intent of avoiding or minimizing impacts to other utilities.

Nugget Way Pump Station

As part of the alternatives evaluation, each alternative was analyzed to determine the feasibility of redirecting flow from the existing Nugget Way pump station by gravity into the new trunk sewer, thereby allowing for decommissioning of the pump station. In 2004 and 2005 the 30-inch diameter Franklin trunk sewer that this project will connect to was designed and constructed. Two (2) options were designed for the trunk sewer, a deep option and a shallower option. The shallower option was constructed.

The Franklin/McVay trunk sewer extension will connect to the existing 30-inch diameter Franklin trunk sewer, either at the existing stub located approximately 200 feet south of Franklin Boulevard on McVay Highway (Alternatives A and B), or at the intersection of Franklin Boulevard and Concord Avenue (Alternatives C and D) (See Figure 2). As a result of the shallower Franklin trunk sewer option being constructed in 2005, it has been determined that it is not feasible to divert flow by gravity from the Nugget Way pump station to Alternatives A and B. Based on field survey data collected as part of this analysis, it appears that it is possible to divert flow by gravity from the pump station to Alternatives C and D; however, in order to achieve this, the portion of the trunk sewer extension from the connection to the existing 30-inch diameter Franklin trunk sewer to the Nugget Way pump station could not be designed to meet all of the City's engineering design standards. This portion of the trunk sewer extension would need to be oversized and would require little to no drop through manholes in order to meet minimum pipe slope requirements. Oversized

pipes and pipes without drops through manholes typically will require more maintenance and cleaning than appropriately sized pipes with standard drops through manholes.

It may be possible to divert flow by gravity from the customers that are currently served by the existing Nugget Way sewer main to the new trunk sewer extension by installing a new sewer main in the Nugget Way right-of-way that flows in the opposite direction of the existing main to the intersection of McVay Highway and Nugget Way. This could allow for future decommissioning of the Nugget Way pump station. A detailed feasibility analysis of this option was not conducted as part of this reporting.

Costs

A preliminary project cost estimate was developed for each of the alignment alternatives based on a design-bid-build project delivery method. Final costs will depend on actual field conditions, actual material and labor costs, market conditions for construction, regulatory factors, final project scope, method of implementation, schedule and other variables. The Engineering News Record (ENR) Construction Cost Index (CCI) for Seattle, Washington at the time of this estimate is 10,146 (July 2013). Project costs include estimated construction cost plus a 30 percent allowance for construction contingencies and estimated easement acquisition costs. Design engineering and construction engineering and inspection costs are not included in the project costs presented in this report.

Routing Alternatives Discussion

General

Routing alternatives have been reviewed with respect to a variety of evaluation parameters, including: geotechnical conditions; pipe slope/sewer depths; permitting interests; easement/right-of-way acquisition interests; traffic control requirements and traffic impacts; construction considerations; local community impacts; existing utility interests; ability to decommission the existing Nugget Way pump station; and cost. See Figures 2 through 6 for plan view and profiles of Alternatives A, B, C and D.

As part of this alignment alternatives analysis, Brooklyn Street was initially considered as a possible alignment alternative. Currently the only access to Brooklyn Street is from Franklin Boulevard. Without available detour routes, construction activities would prevent access to or from Brooklyn Street. As a result, Brooklyn Street was eliminated from further consideration as a potential alignment alternative.

A discussion of alignment Alternatives A, B, C and D with respect to the various evaluation parameters follows:

Alternative A

Route Description

Alternative A generally follows McVay Highway, with the pipeline located within the ODOT right-of-way for its entire length. Beginning at the downstream end of the project, approximately 200 feet south of the intersection of Franklin Boulevard and McVay Highway, Alternative A extends southerly along the McVay Highway right-of-way with the pipeline located within the paved portion of the roadway. This alternative crosses under the existing UPRR trestle located just north of the intersection of 19th Avenue and McVay Highway. Alternative A continues along the McVay Highway right-of-way, within the paved portion of the roadway, to the intersection of McVay Highway and Nugget Way. At this location, the Alternative A transitions to the outside of the paved portion of the roadway to the west side of the road and continues to the south within the McVay Highway right-of-way to the upstream terminus near the CORP, approximately 5,000 feet south of Franklin Boulevard. The total length of Alternative A is approximately 4,670 feet (see Figure 2).

Geotechnical Conditions

As described previously in this report, the geotechnical conditions appear to be fairly consistent along the routing corridor. Potentially challenging geotechnical conditions include high water tables, seepage, unstable soils and the possibility of shallow solid rock. Based on the City's previous Franklin trunk sewer project and the anticipated soil conditions, it is expected that trench sidewall instability may be an issue for deep cuts along the alignment and that trench sidewall sloughing may impact the entire roadway in certain areas. Trench dewatering is expected to be required during installation of the pipeline. These conditions are expected to be similar for all of the alignment alternatives.

Pipe Slope/Sewer Depths

Alternative A will connect to the existing 30-inch diameter Franklin trunk sewer at the existing stub located approximately 200 feet south of Franklin Boulevard on McVay Highway. The invert elevation of the existing trunk sewer stub is approximately 429.18 feet and the resulting depth of the pipe at this location is approximately 17 to 18 feet deep. In order to provide maximum flexibility to serve current and future development in the service area, the trunk sewer should be installed at the minimum standard pipe slope from the downstream connection to the upstream terminus near the CORP. At the upstream terminus of the trunk sewer extension, Alternative A is approximately 12 feet deep.

The existing road grade of McVay Highway dips by approximately six feet at the UPRR undercrossing. By extending a 15-inch diameter pipe at minimum slope (0.15%) from the downstream connection under the UPRR trestle, the trunk sewer extension will be at a depth of approximately 10 feet below the roadway surface at the undercrossing. This will provide more than the minimum five feet of cover required over sanitary sewers, per the City's Engineering and Design Standards and Procedures.

Permitting

Alternative A will require permits from UPRR and ODOT, as identified previously in this report. In 2004 the City obtained a Railroad Crossing Permit from UPRR to construct a sewer line under the existing trestle along the same alignment as Alternative A. The prior permit included provisions requiring a shoring system to be designed by a Professional Engineer for construction within the UPRR right-of-way. The permit also required monitoring of the bridge structure during construction. It is assumed that a new permit for construction of the trunk sewer extension under the existing trestle will include these same requirements.

An ODOT Permit to Occupy or Perform Operations upon a State Highway will be required for work within the ODOT right-of-way along McVay Highway. Submission and acceptance of a traffic control plan will be required prior to issuance of the permit. Preliminary discussions with ODOT Region 2 permitting staff have confirmed that 24-hour closure of McVay Highway with detours during construction may be allowed. Given the constrained nature of the highway corridor and the trenching conditions likely to be encountered, such road closure is likely to be required to facilitate construction. If a road closure is allowed during construction, local access to businesses and residents will be maintained during the closures.

Easements

Alternative A is located entirely within the McVay Highway right-of-way. No easements are required for this alternative.

Traffic Control

Alternative A is located within the paved portion of McVay Highway from its downstream connection to the existing 30-inch diameter Franklin trunk sewer to the intersection of McVay Highway and Nugget Way. McVay Highway carries relatively heavy traffic with numerous commercial enterprises and residential trailer parks located on both sides of the highway.

Traffic control for Alternative A will be required for certain portions of the route. The portion of the route between Franklin Boulevard and 19th Street will require the most complex and extensive traffic control measures. This is due to the limited number and length of possible detour routes around this portion of the alignment. The best approach from a construction standpoint would be to allow 24-hour closure of both lanes during the construction period while maintaining local access to businesses and residents. If only one lane is closed, then traffic control and coordination becomes more complex and the construction contractor's work area is reduced, impacting overall construction costs and schedule. Between 19th Avenue and Nugget Way, the same considerations for traffic impacts and road closure exist; however, Nugget Way and 19th Avenue could provide for a shorter detour route around the work zone while work is occurring in this segment.

Construction Considerations

The depth of the trunk sewer will vary along Alternative A and will be approximately 17 feet to 18 feet deep at the downstream connection to the existing Franklin trunk sewer. It is expected that trench sidewall instability may be an issue for deep pipe installation and that trench excavations and construction traffic may impact the entire roadway in certain areas. Where the trunk sewer is routed within the roadway, reconstruction of the roadway will likely be required. Approximately 3,000 feet of Alternative A will be located within the roadway. Due to the possibility of high groundwater in the area, trench dewatering is expected to be required throughout construction.

Alternative A will cross under the existing UPRR trestle. It is anticipated that this crossing will be constructed by open trench methods. Additional trench excavation shoring may be required by UPRR for work under the existing trestle, as part of the permit conditions. No bored and jacked pipe installations are expected for Alternative A.

Local Community Impacts

Construction of Alternative A will require closure of McVay Highway in the immediate vicinity of the work zone. McVay Highway passes through a mix of commercial and residential uses. The commercial sites require customer access and deliveries by truck throughout the day. The residential areas are densely populated with numerous private vehicles requiring access both day and night. Detours will be established to route through traffic around the construction activities. Traffic for local access within the closed portion of the highway will be maintained during construction.

Existing Lane Transit District (LTD) facilities are located along McVay Highway. Temporary bus stops will be established and busses will be required to follow detours during construction. Road closures along the Franklin/McVay Highway will cause disruption to the local residents and businesses and should be kept to the minimum duration possible.

Utility Impacts

Based on review of the information obtained from the various utility providers, the proposed trunk sewer elevations were reviewed for potential conflicts with existing utilities that are estimated to be at or near the same elevation as the trunk sewer. Utilities that are crossed by the trunk sewer at different elevations (typically above the trunk sewer) are not considered to be conflicts and will be supported and protected during construction. Conflicting utilities may require relocation prior to construction of the trunk sewer. Potential utility conflicts for Alternative A are shown on Figure 3 and further described below:

- Between Station 6+00 and Station 7+00, Level 3 Communications has two (2) fiber optic duct banks crossing McVay Highway parallel to the UPRR. The duct banks consist of one 2-foot by 2-foot conduit bundle on the north side of tracks and one 1-

foot by 1-foot conduit bundle on the south side of tracks at unknown depths, estimated to be 5 feet to 12 feet deep.

- At Station 30+00 there is an existing City of Springfield 8-inch diameter sewer main that crosses McVay Highway. This portion of the sewer main is not currently being used and could potentially be replaced by the new trunk sewer.

The potential conflicts identified above are based on the available information at the time of this reporting. Additional conflicts may exist that are not identified herein. Additional potential utility conflicts will be addressed during final design as new information becomes available.

Nugget Way Pump Station

Diverting flow from the Nugget Way pump station, along 19th Avenue, to the Alternative A trunk sewer extension by gravity does not appear to be feasible. A field survey of the existing pipe elevations was conducted by OBEC in August 2013. The existing pipe invert elevations (IE) at the manholes located at the Nugget Way pump station and at the upstream end of the existing 30-inch diameter Franklin trunk sewer are presented below:

- IE at Nugget Way pump station manhole = 430.32 ft
- IE at end of Franklin trunk sewer manhole = 429.11 ft

Based on the preliminary flow analysis presented earlier in this report, a 15-inch diameter pipe is adequate to accommodate the anticipated peak flows for the service area. For the purpose of analyzing the feasibility of decommissioning the Nugget Way pump station, extending the existing 30-inch diameter trunk sewer to 19th Avenue was reviewed as the most conservative approach based on minimum pipe slopes. A summary of this analysis is presented below:

If the existing 30-inch diameter Franklin trunk sewer was extended southerly 845 feet to the intersection of McVay Highway and 19th Avenue at the minimum slope for a 30-inch diameter pipe (0.08%), the invert elevation of the pipe at that location would be 429.79 feet (not accounting for drops through manholes). If the 10-inch diameter Nugget Way sewer main was extended easterly 895 feet from the existing manhole located at the pump station to the intersection of 19th Avenue and McVay Highway at the minimum slope for a 10-inch pipe (0.30%), the invert elevation of the pipe at that location would be 427.64 feet (not accounting for drops through manholes). The trunk sewer would be approximately 2.36 feet higher than the sewer main from the Nugget Way pump station at the intersection of 19th Avenue and McVay Highway. Based on this analysis, it does not appear to be feasible to divert flow from the Nugget Way pump station to the Alternative A trunk sewer extension.

Costs

A brief summary of cost considerations for Alternative A is presented below:

- Relatively deep excavation in unstable soils.
- High groundwater and dewatering.
- Potential full width roadway reconstruction/resurfacing.
- Open trench construction under the UPRR trestle.
- Traffic control, road closures and detours.

Alternative B

Route Description

Alternative B follows the same alignment as Alternative A from the downstream connection near Franklin Boulevard to approximately 470 feet south of 19th Avenue. Between this location and Nugget Way the alignment leaves the right-of-way and routes through undeveloped private property along the east side of McVay Highway for a total length of approximately 1,400 feet. From Nugget Way Alignment B then routes southerly along the same alignment as Alternative A to the upstream terminus near the CORP. The total length of Alternative B is approximately 5,050 feet (see Figure 2).

Geotechnical Conditions

Geotechnical conditions for Alternative B are expected to be relatively consistent with the other alternatives. Refer to the geotechnical conditions described in Alternative A.

Pipe Slope/Sewer Depths

Pipe slope and sewer depths along Alignment B will be similar to pipe slope and sewer depths along Alignment A. The elevation of the pipe at the upstream terminus will be approximately one-half foot higher than Alternative A due to the increased length of the alignment.

The existing road grade of McVay Highway dips by approximately six feet at the UPRR undercrossing. By extending a 15-inch diameter pipe at minimum slope (0.15%) from the downstream connection under the UPRR trestle, the trunk sewer extension will be at a depth of approximately 10 feet below the roadway surface at the undercrossing. This will provide more than the minimum five feet of cover required over sanitary sewers, per the City's Engineering and Design Standards and Procedures.

Permitting

The ODOT and UPRR permitting requirements for Alternative B will be the same as for Alternative A. In addition to the ODOT and UPRR permits, a City of Springfield Land and Drainage Alteration Permit will be required for ground disturbing activities on the portion of the alignment that routes through private property. The construction contractor would obtain this permit prior to construction.

Easements

Alternative B requires eight (8) easements, as identified previously in this report (see Table 3). Approximately 1,350 feet of the alignment is routed through private lands, parallel to McVay Highway. The cost of easement acquisition has been included in the estimated project costs for this alternative.

Traffic Control

Traffic Control requirements along Alignment B are similar to Alignment A; however, alternative B will have less overall impact to traffic as a result of the portion of the alignment that is outside the McVay Highway right-of-way. For work in the roadway, 24-hour closure of both lanes during the construction period is expected while maintaining local access to businesses and residents and providing detours around the work zone for through traffic. Traffic control could be reduced or removed during construction of the approximately 1,400 feet of the alignment that is on private property. This would reduce, but not eliminate, the impacts to the travelling public and local businesses during construction, as compared to Alternative A.

Construction Considerations

Construction considerations along Alternative B will be similar to construction considerations along Alternative A; however, there will be less impact to the existing roadway as a result of approximately 1,400 feet of the alignment being routed outside the McVay Highway right-of-way, reducing the amount of roadway surface restoration required.

Local Community Impacts

Local community impacts for Alternative B are similar to those for Alternative A; however, this route avoids approximately 1,400 feet of the McVay Highway right-of-way between 19th Avenue and Nugget Way, thereby reducing the overall traffic impacts for this alternative.

Utility Impacts

Utility impacts for Alternative B are expected to be similar to Alternative A.

Nugget Way Pump Station

Similar to Alternative A, diverting flow from the Nugget Way pump station to the Alternative B trunk sewer extension by gravity does not appear to be feasible.

Costs

A brief summary of cost considerations for Alternative B is presented below:

- Relatively deep excavation in unstable soils.
- High groundwater and dewatering.
- Potential full width roadway reconstruction/resurfacing.
- Open trench construction under the UPRR trestle.
- Traffic control, road closures and detours.
- Approximately 60% of the alignment is outside the roadway (reduced roadway resurfacing).
- Easement acquisition.

Alternative C

Route Description

Alternative C connects to the existing 30-inch diameter Franklin trunk sewer at the intersection of Franklin Boulevard and Concord Street. This alternative extends southerly along the center of Concord Street to the UPRR. Alternative C crosses the UPRR by bore and jack methods to a parcel of private land located just north of the intersection of 19th Avenue and Nugget Way. At this location, Alternative C crosses 19th Avenue and routes southerly along the center of Nugget Way to the intersection of Nugget Way and McVay Highway. This alternative then continues southerly along the same alignment as Alternatives A and B to the upstream terminus located near the CORP. The total length of Alternative C is approximately 6,270 feet (see Figure 2).

Geotechnical Conditions

Geotechnical conditions for Alternative C are expected to be relatively consistent with the other alternatives. Refer to the geotechnical conditions described in Alternative A.

Pipe Slope/Sewer Depth

Alternative C will connect to the existing 30-inch diameter Franklin trunk sewer at the intersection of Franklin Boulevard and Concord Street. The invert elevation of the existing trunk sewer at this location is 427.76 feet and the resulting depth of the pipe is approximately 15 feet deep. In order to provide maximum flexibility to serve current and future development in the service area, the trunk sewer should be installed at the minimum standard pipe slope from the downstream connection to the upstream terminus near the CORP. Between Franklin Boulevard and Nugget Way the depth of Alternative C ranges from approximately 12 to 15 feet deep. Along Nugget Way the pipe depth varies from 10 to 13 feet deep. At the upstream terminus of the trunk sewer extension, Alternative C is approximately 12 feet deep.

Alternative C routes along Nugget Way which is located approximately 800 to 1,200 feet west of McVay Highway. Due to its location, Alternative C may not be able to provide gravity sewer service to certain portions of the intended service area that are located adjacent to the Willamette River. In addition, a separate sewer extension constructed southerly from

the existing upstream end of the Franklin trunk sewer in McVay Highway may be necessary to serve the area north of the UPRR along McVay Highway between 19th Avenue and Franklin Boulevard. For these reasons, Alternative C appears to be the least favorable alternative for providing gravity sewer service to the entire intended service area.

Permitting

Alternative C will require permits from UPRR, ODOT, Lane County and the City of Springfield.

A UPRR Railroad Crossing Permit will be required for the bored and jacked crossing of the railroad. Per UPRR specifications, casings must extend at least 30 feet or twice the depth of the bottom of the casing below railroad subgrade plus 20 feet, whichever is greater, each side from (measured at right angles to) centerline of the outside track. The casing is to extend beyond the limit of the railroad right-of-way as required to obtain the specified length.

An ODOT Permit to Occupy or Perform Operations upon a State Highway will be required for work within the ODOT right-of-way at the downstream connection in Franklin Boulevard and in the McVay Highway right-of-way south of Nugget Way. Submission and acceptance of a traffic control plan will be required prior to issuance of these permits.

A Lane County Facility Permit will be required for installation of the trunk sewer extension along Concord Street, 19th Avenue and Nugget Way. Submission of this permit is required at least four (4) weeks prior to the onset of construction. A condition of the permit is that a traffic control plan be submitted for approval by both the City of Springfield and Lane County two (2) weeks prior to the start of any construction that will affect traffic.

A City of Springfield Land and Drainage Alteration Permit will be required for ground disturbing activities on the portion of the alignment that routes through private property. The construction contractor would obtain this permit prior to construction.

Easements

Alternative C requires one easement, as identified previously in this report (see Table 3). Approximately 200 feet of the alignment is routed through private lands located on the south side of the UPRR crossing adjacent to 19th Avenue. The cost of easement acquisition has been included in the estimated project costs for this alternative.

It is expected that construction of the trunk sewer extension along Concord Street at depths of 12 to 15 feet could be completed within the existing 32.6-foot wide right-of-way without acquiring temporary construction easements.

Traffic Control

Alternative C will require several different phases of traffic control to be set up during construction. This alternative will impact traffic on Franklin Boulevard, Concord Street, 19th Avenue and Nugget Way.

Traffic control will be required on Franklin Boulevard during the connection of the trunk sewer extension to the existing 30-inch diameter Franklin trunk sewer. This work will likely impact all but one lane of traffic on Franklin Boulevard and require the work to be completed at night with lane closures and flagging. It is expected that the impact to Franklin Boulevard will be limited to one (1) or two (2) nights.

The portions of Alternative C located along Concord Street, 19th Avenue and Nugget Way will require road closures with detours to be established around the work zone. The traffic on these roads is relatively light, compared to McVay Highway, and primarily for local residential, business and industrial access. Detours for these roads will remain in the local vicinity and will be relatively short.

Because Alternative C does not heavily impact traffic on McVay Highway, the volume of traffic impacted by construction of this alternative is expected to be lower than the other alternatives.

Construction Considerations

The depth of the trunk sewer will vary along Alternative C and will be approximately 15 feet deep at the downstream connection to the existing Franklin trunk sewer. Similar to the other alternatives, it is expected that trench sidewall instability may be an issue for deep pipe installation and that trench excavations and construction traffic may impact the entire roadway in certain areas. Where the trunk sewer is routed within the roadway, reconstruction of the road surface will likely be required. Approximately 3,950 feet of Alternative C will be located within the roadway. Due to the possibility of high groundwater in the area, trench dewatering is expected throughout construction.

Alternative C routes through a narrow residential corridor along Concord Street with an existing 32.6-foot wide right-of-way. The construction contractor will be required to coordinate construction activities with local residents. Construction through this tight corridor may require additional time for staging materials, maneuvering equipment and installation of the pipe. Additionally, due to the anticipated existing soil conditions and the potential for sloughing of the trench sidewalls, construction through this tight corridor could impact large trees and structures located close to the edge of the existing roadway.

This alternative will parallel the existing 10-inch diameter sewer main along the entire length of Nugget Way. Additional care will be needed while working in close proximity to existing utilities, thereby increasing the amount of time required for pipeline installation.

Alternative C will cross under the existing UPRR tracks at the south end of Concord Street. It is anticipated that this crossing will be constructed by bored and jacked methods. Typically bored and jacked pipeline installations require more time than traditional open trench methods.

Local Community Impacts

Construction of Alternative C will require closure of Concord Street, 19th Avenue and Nugget Way in the immediate vicinity of the work zone during construction. The traffic on these roads is relatively light and primarily for local residential, business and industrial access. Detours for these roads will be relatively short. The overall traffic impact from Alternative C is expected to be less than the other alternatives that affect traffic on McVay Highway.

The impact to residential areas from construction of Alternative C will be limited to Concord Street. While there would be fewer overall residences impacted by this alternative than Alternatives A and B, the impact to the local community along Concord Street will be greater due to the tight corridor and the proximity of construction activities to existing homes.

Utility Impacts

Based on review of the information obtained from the various utility providers, the proposed trunk sewer elevations were reviewed for potential conflicts with existing utilities that are estimated to be at or near the same elevation as the trunk sewer. Utilities that are crossed by the trunk sewer at different elevations (typically above the trunk sewer) are not considered to be conflicts and will be supported and protected during construction. Conflicting utilities may require relocation prior to construction of the trunk sewer. Potential utility conflicts for Alternative C are shown on Figure 5 and further described below:

- At Station 14+00, Level 3 Communications has two (2) fiber optic duct banks crossing the alignment parallel to the UPRR. These are extensions of the duct banks described in Alternative A. The duct banks are at unknown depths, estimated to be 5 feet to 12 feet deep.
- At Station 40+00 and Station 42+70 Alternative C crosses a City of Springfield 8-inch diameter sewer main. It appears that flow from this main could be redirected to the proposed trunk sewer at these locations.

The potential conflicts identified above are based on the available information at the time of this reporting. Additional conflicts may exist that are not identified herein. Additional potential utility conflicts will be addressed during final design as new information becomes available.

Nugget Way Pump Station

Diverting flow from the Nugget Way pump station to the Alternative C trunk sewer extension by gravity is possible; however, in order to achieve this, the portion of the trunk sewer extension from the connection to the existing 30-inch diameter Franklin trunk sewer to the Nugget Way pump station would not meet the City's engineering design standards. A field survey of the existing pipe elevations was conducted by OBEC in August 2013. The existing pipe invert elevations (IE) at the manholes located at the Nugget Way pump station and at the existing 30-inch diameter Franklin trunk sewer manhole located at the intersection of Franklin Boulevard and Concord Street are presented below:

- IE at Nugget Way pump station manhole = 430.32 ft
- IE at Franklin Boulevard and Concord Street manhole = 427.76 ft

Based on the preliminary flow analysis presented earlier in this report, a 15-inch diameter pipe is adequate to accommodate the anticipated peak flows for the service area. Installing a 15-inch diameter pipe 1,940 feet from Franklin Boulevard to the Nugget Way pump station at the minimum slope (0.15%), the invert elevation of the pipe at the pump station would be 430.67 feet (not accounting for drops through manholes). This elevation is 0.35 feet higher than the invert elevation of the existing pipe at the pump station. Using a 15-inch diameter pipe does not appear to be feasible to divert flow from the Nugget Way pump station to the Alternative C trunk sewer extension.

Installing an 18-inch diameter pipe 1,940 feet from Franklin Boulevard to the Nugget Way pump station at the minimum slope (0.12%), the invert elevation of the pipe at the pump station would be 430.09 feet (not accounting for drops through manholes). This elevation is 0.23 feet lower than the invert elevation of the existing pipe at the pump station. By installing an 18-inch diameter pipe with little to no drop through manholes, it is possible to divert flow from the pump station into the Alternative C trunk sewer extension.

While it is possible to decommission the Nugget Way pump station by diverting flow into the Alternative C trunk sewer extension, the portion of the trunk sewer extension from the pump station to Franklin Boulevard would need to be oversized and would require little to no drop through manholes in order to meet minimum pipe slope requirements. Oversized pipes and pipes without drops through manholes typically require additional maintenance and cleaning than appropriately sized pipes and standard drops through manholes.

Costs

A brief summary of cost considerations for Alternative C is presented below:

- Relatively deep excavation in unstable soils.
- High groundwater and dewatering.
- Potential full width roadway reconstruction/resurfacing.
- Bored and jacked cased crossing under the UPRR.
- Traffic control, road closures and detours.

- Narrow construction corridor along Concord Street.
- Alignment adjacent to an existing sewer along Nugget Way.
- Easement acquisition.

Alternative D

Route Description

Alternative D connects to the existing 30-inch diameter Franklin trunk sewer at the same location as Alternative C. This alternative follows the same alignment as Alternative C from Franklin Boulevard to the Nugget Way pump station at the intersection of 19th Avenue and Nugget Way. Alternative D then routes easterly along 19th Avenue to the intersection of 19th Avenue and McVay Highway. From this location Alternative D follows the same alignment as Alternative A southerly along the McVay Highway right-of-way to the upstream terminus located near the CORP. The total length of Alternative D is approximately 6,670 feet (see Figure 2).

Geotechnical Conditions

Geotechnical conditions for Alternative C are expected to be relatively consistent with the other alternatives. Refer to the geotechnical conditions described in Alternative A.

Pipe Slope/Sewer Depth

Alternative D will connect to the existing 30-inch diameter Franklin trunk sewer at the intersection of Franklin Boulevard and Concord Street. The invert elevation of the existing trunk sewer at this location is 427.76 feet and the resulting depth of the pipe is approximately 15 feet deep. In order to provide maximum flexibility to serve current and future development in the service area, the trunk sewer should be installed at the minimum standard pipe slope from the downstream connection to the upstream terminus near the CORP. Between Franklin Boulevard and Nugget Way the depth of Alternative D is the same as Alternative C and ranges from approximately 12 to 15 feet deep. Along 19th Avenue the pipe depth varies from 10 to 15 feet deep. Along McVay Highway the pipe depth closely matches the depths of Alternatives A and B. At the upstream terminus of the trunk sewer extension, Alternative D is approximately 12 feet deep.

By routing Alternative D along McVay Highway, this route provides greater flexibility than Alternative C to provide gravity sewer service to the portions of the intended service area that are located adjacent to the Willamette River. However, similar to Alternative C, a separate sewer extension constructed southerly from the existing upstream end of the Franklin trunk sewer in McVay Highway may be necessary to serve the area north of the UPRR along McVay Highway. For these reasons, Alternative D is more favorable than Alternative C for providing gravity sewer service to the intended service area, but less favorable than Alternatives A and B.

Permitting

Alternative D will require permits from UPRR, ODOT, Lane County and the City of Springfield.

A UPRR Railroad Crossing Permit will be required for the bored and jacked crossing of the railroad. Per UPRR specifications, casings must extend at least 30 feet or twice the depth of the bottom of the casing below railroad subgrade plus 20 feet, whichever is greater, each side from (measured at right angles to) centerline of the outside track. The casing is to extend beyond the limit of the railroad right-of-way as required to obtain the specified length.

An ODOT Permit to Occupy or Perform Operations upon a State Highway will be required for work within the ODOT right-of-way at the downstream connection in Franklin Boulevard and in the McVay Highway right-of-way south of 19th Avenue. Submission and acceptance of a traffic control plan will be required prior to issuance of these permits.

A Lane County Facility Permit will be required for installation of the trunk sewer extension along Concord Street and 19th Avenue. Submission of this permit is required at least four (4) weeks prior to the onset of construction. A condition of the permit is that a traffic control plan be submitted for approval by both the City of Springfield and Lane County two (2) weeks prior to the start of any construction that will affect traffic.

A City of Springfield Land and Drainage Alteration Permit will be required for ground disturbing activities on the portion of the alignment that routes through private property. The construction contractor would obtain this permit prior to construction.

Easements

Alternative D will require the same easement as Alternative C.

Traffic Control

Alternative D will require several different phases of traffic control to be set up during construction. This alternative will impact traffic on Franklin Boulevard, Concord Street, 19th Avenue and McVay Highway.

Alternative D will require the same level of traffic control as Alternative C for work on Franklin Boulevard and Concord Street.

The portions of Alternative C located along 19th Avenue between Nugget Way and McVay Highway will require road closure with detours to be established around the work zone. It is expected that a relatively short detour would be established using Nugget Way during work on 19th Avenue.

Alternative D will require the same level of traffic control as Alternative A for work on McVay Highway between 19th Avenue and Nugget Way.

Because Alternative D impacts traffic on several different roads, including McVay Highway, the volume of traffic impacted by construction of this alternative is expected to be greater than alternative C, but less than Alternatives A and B.

Construction Considerations

Construction considerations along Alternative D will be similar to construction considerations along Alternative C from Franklin Boulevard to Nugget Way. For the portion of the alignment in the McVay Highway right-of-way, construction considerations are expected to be similar to Alternative A. No unique construction considerations are expected for work along 19th Avenue.

Alternative D is the longest of the alternatives. It is expected that the overall time to complete construction for this alternative would be greater than the other alternatives.

Local Community Impacts

Alternative D would have the same local community impacts as alternative C to the neighborhood surrounding Concord Street. In addition, Alternative D would impact traffic and local residents and businesses along McVay Highway, similar to Alternative A for the portion of the alignment from 19th Avenue to Nugget Way.

Utility Impacts

Based on review of the information obtained from the various utility providers, the proposed trunk sewer elevations were reviewed for potential conflicts with existing utilities that are estimated to be at or near the same elevation as the trunk sewer. Utilities that are crossed by the trunk sewer at different elevations (typically above the trunk sewer) are not considered to be conflicts and will be supported and protected during construction. Conflicting utilities may require relocation prior to construction of the trunk sewer. Potential utility conflicts for Alternative D are shown on Figure 6 and further described below:

- At Station 14+00, Level 3 Communications has two (2) fiber optic duct banks crossing the alignment parallel to the UPRR. These are extensions of the duct banks described in Alternative A. The duct banks are at unknown depths, estimated to be 5 feet to 12 feet deep.
- At Station 52+00 there is an existing City of Springfield 8-inch diameter sewer main that crosses McVay Highway. This portion of the sewer main is not currently being used and could potentially be replaced by the new trunk sewer.

The potential conflicts identified above are based on the available information at the time of this reporting. Additional conflicts may exist that are not identified herein. Additional potential utility conflicts will be addressed during final design as new information becomes available.

Nugget Way Pump Station

Similar to alternative C, diverting flow from the Nugget Way pump station to the Alternative D trunk sewer extension by gravity is possible; however, in order to achieve this, the portion of the trunk sewer extension from the connection to the existing 30-inch diameter Franklin trunk sewer to the Nugget Way pump station would not meet the City's engineering design standards.

Costs

A brief summary of cost considerations for Alternative D is presented below:

- Relatively deep excavation in unstable soils.
- High groundwater and dewatering.
- Potential full width roadway reconstruction/resurfacing.
- Bored and jacked cased crossing under the UPRR.
- Traffic control, road closures and detours.
- Narrow construction corridor along Concord Street.
- Longest overall sewer length.
- Easement acquisition.

Summary and Recommendations

This report presents a detailed review of four (4) primary routing alternatives and recommends a route that provides the highest value to the City through the service life of the proposed trunk sewer extension.

Construction cost estimates were prepared for each alternative with the following assumptions:

- Based on prior City projects, it is understood that poor soil conditions exist that are likely to require wide excavations and full width roadway reconstruction in certain places including imported crushed rock trench backfill and road base.
- Roadway reconstruction does not include improvements outside the existing edge of pavement.
- UPRR crossing of Alternatives A and B would be open trench while UPRR crossing of Alternatives C and D would be bored and jacked with the trunk sewer installed in a steel casing.
- Trench backfill within the roadway will consist of imported crushed rock.

- Trench backfill outside the roadway will consist of imported crushed rock in the pipe zone and select native material above the pipe zone.
- Decommissioning of the existing Nugget Way sewage pump station is included in the estimated costs for Alternatives C and D.
- Easement acquisition costs are included in the estimates.
- Cost estimates are general planning-level estimates.
- A 30% construction contingency is included for construction items.

Table 4 presents the key interests and challenges for each of the route alternatives. This table is provided to help differentiate between the alignment alternatives and to assist in selecting a preferred route. Alternatives shown with shading appear to represent more favorable routing conditions for the various comparison criteria. In some cases multiple alternatives may be equally favorable and more than one alternative is shaded.

**Table 4
Comparison of Alignment Alternatives**

Criteria	Alternative A	Alternative B	Alternative C	Alternative D
Geotechnical Conditions	<ul style="list-style-type: none"> • High groundwater • Unstable soils anticipated 	<ul style="list-style-type: none"> • High groundwater • Unstable soils anticipated 	<ul style="list-style-type: none"> • High groundwater • Unstable soils anticipated 	<ul style="list-style-type: none"> • High groundwater • Unstable soils anticipated
Pipe Slope/Sewer Depths	<ul style="list-style-type: none"> • Favorable for serving the proposed area 	<ul style="list-style-type: none"> • Favorable for serving the proposed area 	<ul style="list-style-type: none"> • Least Favorable for serving the proposed area 	<ul style="list-style-type: none"> • Less Favorable for serving the proposed area
Permitting Requirements	<ul style="list-style-type: none"> • ODOT, UPRR 	<ul style="list-style-type: none"> • ODOT, UPRR, City of Springfield LDAP 	<ul style="list-style-type: none"> • ODOT, UPRR, Lane County, City of Springfield LDAP 	<ul style="list-style-type: none"> • ODOT, UPRR, Lane County, City of Springfield LDAP
Easement Requirements	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • 8 easements 	<ul style="list-style-type: none"> • 1 easement 	<ul style="list-style-type: none"> • 1 easement
Traffic Control	<ul style="list-style-type: none"> • Heavy traffic control 	<ul style="list-style-type: none"> • Slightly reduced traffic control 	<ul style="list-style-type: none"> • Moderate traffic control 	<ul style="list-style-type: none"> • Moderate/heavy traffic control
Construction Considerations	<ul style="list-style-type: none"> • Entirely within right-of-way • Roadway reconstruction • Traffic control • UPRR crossing (open trench) • Deep excavation • Dewatering • Fewest manholes 	<ul style="list-style-type: none"> • Partially within private property • Reduced roadway impacts • Traffic control • UPRR crossing (open trench) • Deep excavation • Dewatering 	<ul style="list-style-type: none"> • Entirely within right-of-way • Narrow corridor • Traffic control • UPRR crossing (bore and jack) • Deep excavation • Dewatering • Existing utilities 	<ul style="list-style-type: none"> • Entirely within right-of-way • Narrow corridor • Traffic control • UPRR crossing (bore and jack) • Deep excavation • Dewatering
Local Community Impacts	<ul style="list-style-type: none"> • Impacts to traffic, LTD, businesses and mobile home parks 	<ul style="list-style-type: none"> • Impacts to traffic, LTD, businesses and mobile home parks 	<ul style="list-style-type: none"> • Impacts to traffic, businesses and residential neighborhood 	<ul style="list-style-type: none"> • Impacts to traffic, transit, businesses, neighborhoods and mobile home parks
Utility Impacts	<ul style="list-style-type: none"> • Minimal utility conflicts within center of roadway 	<ul style="list-style-type: none"> • Minimal utilities within center of roadway • Crosses utilities to get outside right-of-way 	<ul style="list-style-type: none"> • Increased utility conflicts along Nugget Way 	<ul style="list-style-type: none"> • Minimal utilities within center of roadway • Increased conflicts/greater length in roadway
Nugget Way Pump Station	<ul style="list-style-type: none"> • Decommission not feasible 	<ul style="list-style-type: none"> • Decommission not feasible 	<ul style="list-style-type: none"> • Decommission possible – not to City standards 	<ul style="list-style-type: none"> • Decommission possible – not to City standards
Length	<ul style="list-style-type: none"> • 4,670 feet 	<ul style="list-style-type: none"> • 5,050 feet 	<ul style="list-style-type: none"> • 6,230 feet 	<ul style="list-style-type: none"> • 6,670 feet
Costs	<ul style="list-style-type: none"> • \$1,900,000 	<ul style="list-style-type: none"> • \$2,100,000 	<ul style="list-style-type: none"> • \$2,900,000 	<ul style="list-style-type: none"> • \$3,200,000

Note: Alternatives shown with shading appear to represent more favorable routing conditions for the various comparison criteria. In some cases multiple alternatives may be equally favorable and more than one alternative is shaded.

Alternative A, at an estimated construction cost of \$1.9 million, is the lowest cost alternative, shortest of the reviewed alternatives, is contained completely within existing right-of-way and maximizes the ability to provide gravity sewer service to the intended service area. While no single alternative is the most favorable in all of the criteria categories, alternative A appears to be the most economical alternative to provide sewer service to the intended service area, while also balancing the other competing interest, such as traffic, roadway and local community impacts. With this, or any of the alternatives, it is recommended that detailed traffic control plans should be prepared prior to construction with collaboration and input from ODOT, Lane County, the City of Springfield, and businesses and residents impacted by the road closures. Prior to construction, information could be shared with local businesses and residents regarding the details of proposed lane closures and detours through a public outreach program.

Based on the evaluations described herein, the recommended route for the Franklin/McVay Sewer is Alternative A.

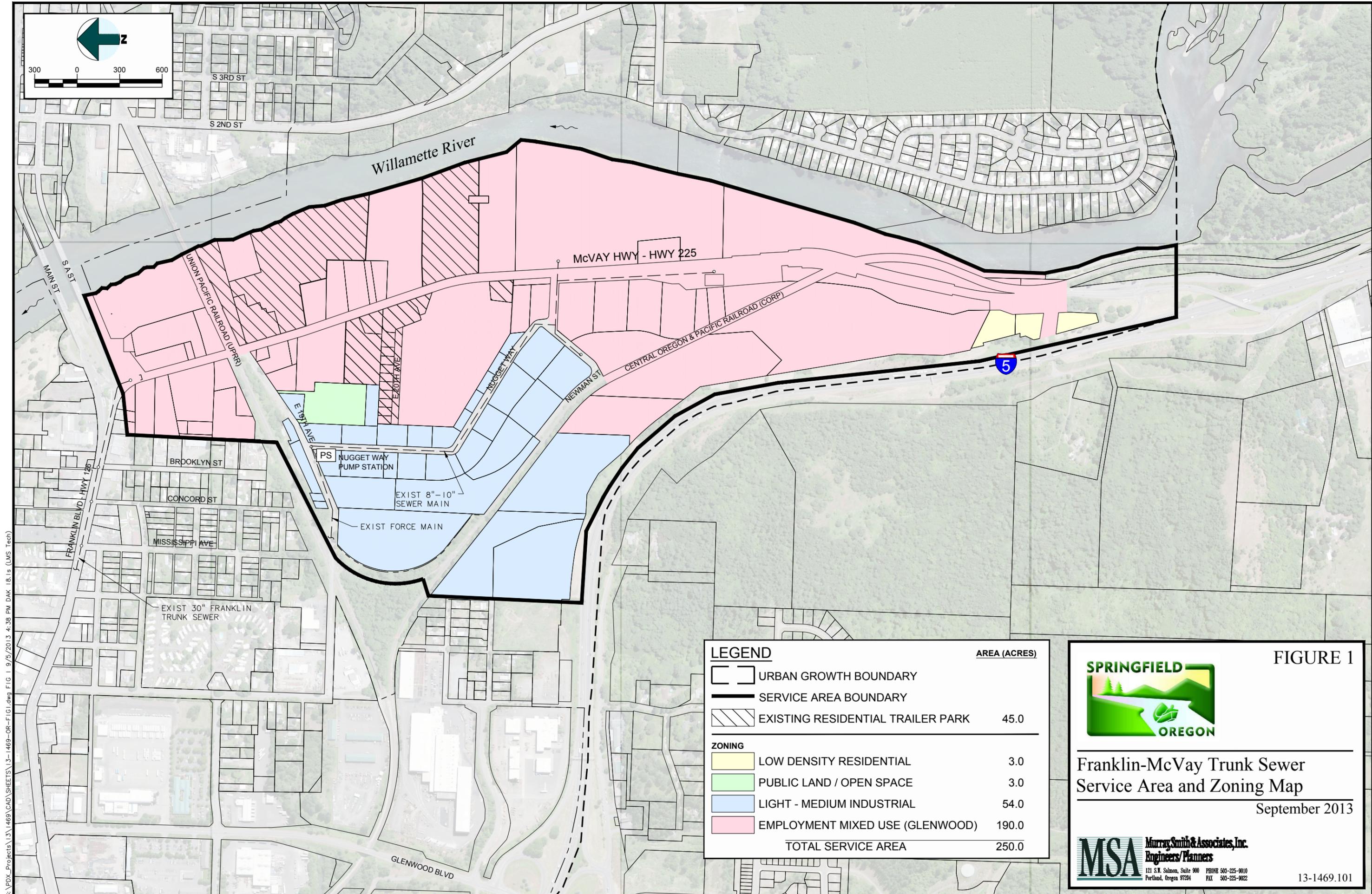
ATTACHMENTS

Figures

- Figure 1 – Service Area and Zoning Map
- Figure 2 – Routing Alternatives Overview
- Figure 3 – Preliminary Profile – Alternative A
- Figure 4 – Preliminary Profile – Alternative B
- Figure 5 – Preliminary Profile – Alternative C
- Figure 6 – Preliminary Profile – Alternative D

REFERENCES

- As-Built Drawings for the “Glenwood Wastewater Trunk Pipe; Franklin Boulevard and McVay Highway; Springfield, Lane County Oregon, June, 2004”, EGR & Associates, Inc., Eugene, Oregon.
- As-Built Drawings for “Wildish Wastewater Gravity System, City of Springfield, Oregon, City Project #3487, July 1995”, Poage Engineering & Surveying, Inc.
- Wastewater Master Plan, City of Springfield, June 2008, CH2M HILL.
- Memorandum, “Franklin/McVay Sanitary Sewer Extension – Preliminary (Phase I) Geotechnical Reconnaissance”, August 2013, Foundation Engineering, Inc.
- Memorandum, “Franklin Blvd/McVay Hwy Sanitary Sewer Line Extension – Identification of Required Permits and Agency Consultations”, August 2013, OBEC Consulting Engineers.



G:\PDX_Projects\13\1469\CAD\SHEETS\13-1469-OR-FIG1.dwg FIG 1 9/5/2013 4:38 PM DAK 18.1s (LMS Tech)

LEGEND		AREA (ACRES)
	URBAN GROWTH BOUNDARY	
	SERVICE AREA BOUNDARY	
	EXISTING RESIDENTIAL TRAILER PARK	45.0
ZONING		
	LOW DENSITY RESIDENTIAL	3.0
	PUBLIC LAND / OPEN SPACE	3.0
	LIGHT - MEDIUM INDUSTRIAL	54.0
	EMPLOYMENT MIXED USE (GLENWOOD)	190.0
TOTAL SERVICE AREA		250.0



SPRINGFIELD
OREGON

FIGURE 1

**Franklin-McVay Trunk Sewer
Service Area and Zoning Map**

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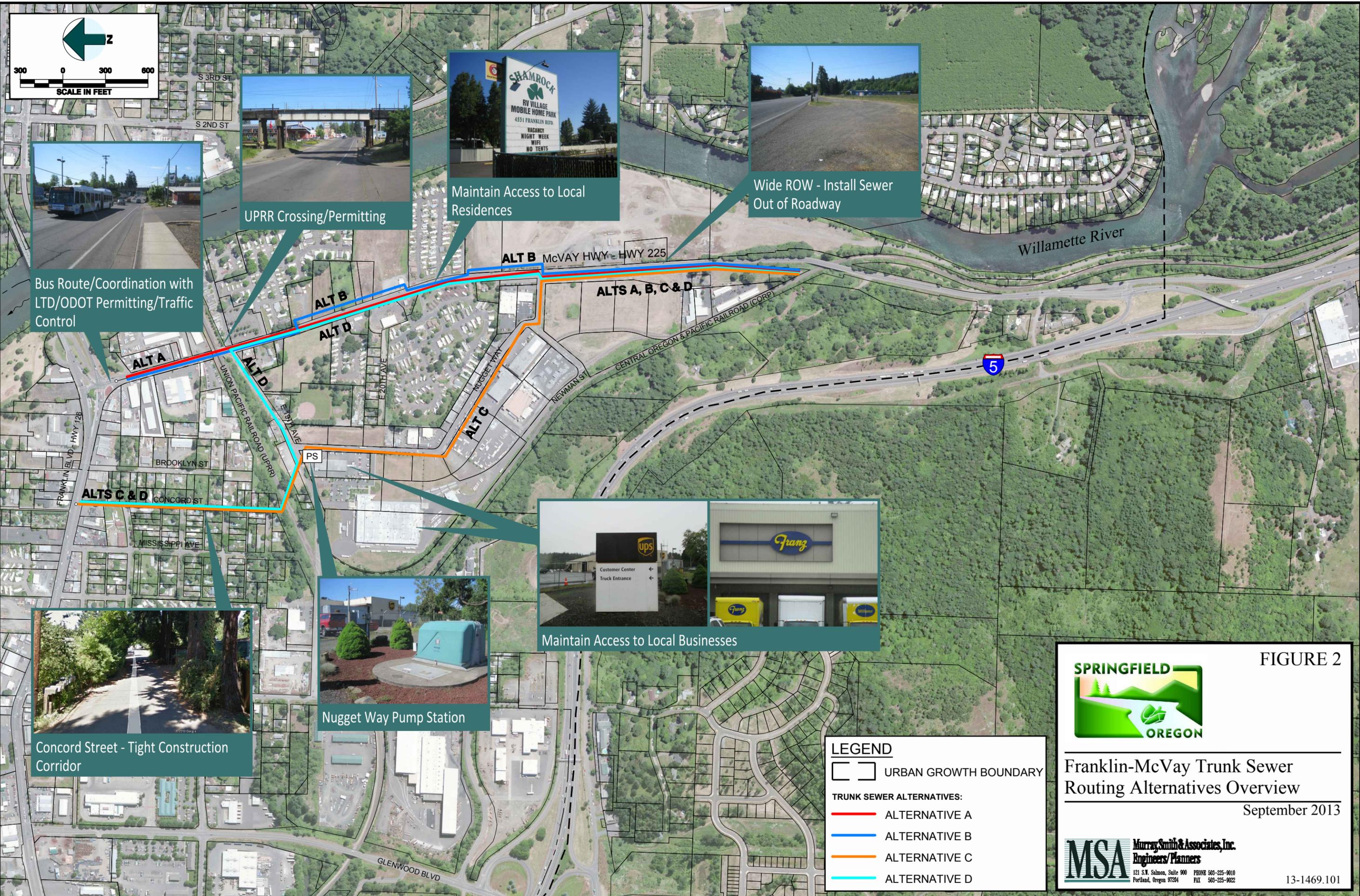


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Bus Route/Coordination with LTD/ODOT Permitting/Traffic Control

UPRR Crossing/Permitting

Maintain Access to Local Residences

Wide ROW - Install Sewer Out of Roadway

Maintain Access to Local Businesses

Nugget Way Pump Station

Concord Street - Tight Construction Corridor

LEGEND

URBAN GROWTH BOUNDARY

TRUNK SEWER ALTERNATIVES:

- ALTERNATIVE A
- ALTERNATIVE B
- ALTERNATIVE C
- ALTERNATIVE D



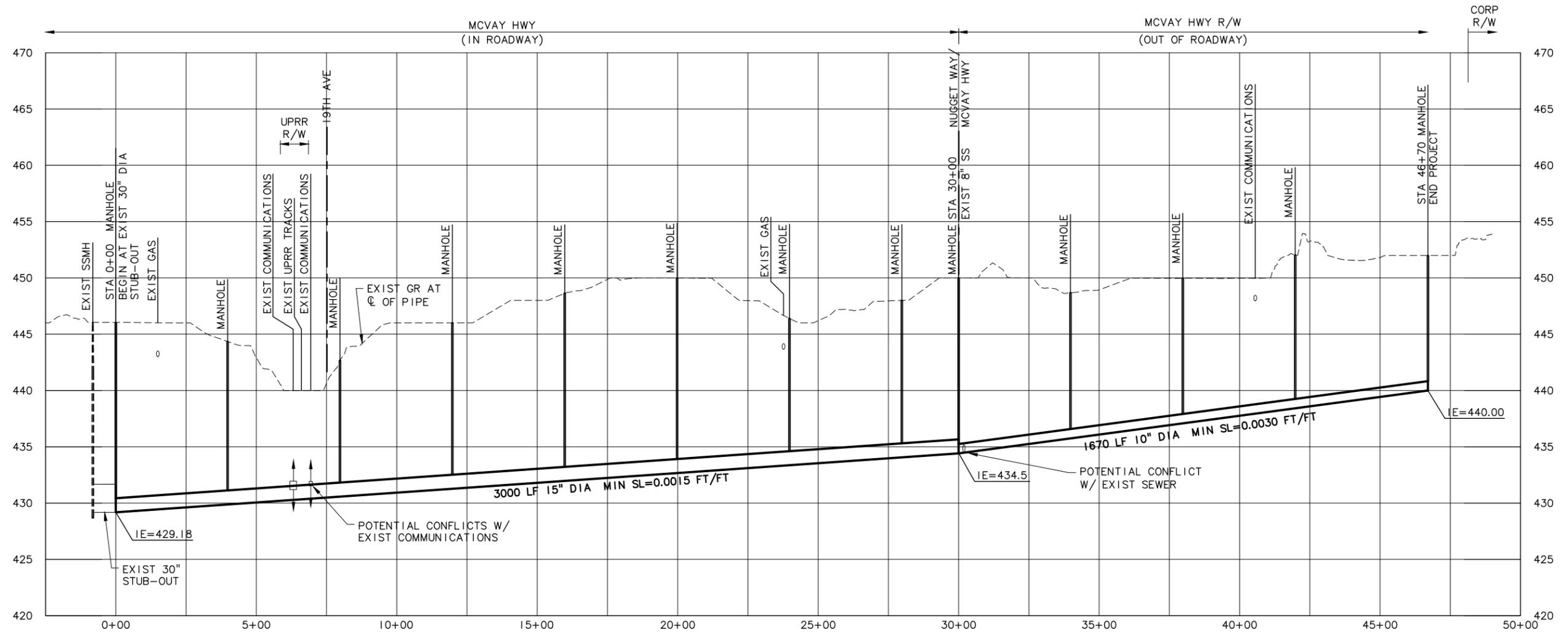
FIGURE 2

Franklin-McVay Trunk Sewer Routing Alternatives Overview

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PROFILE - ALTERNATIVE A

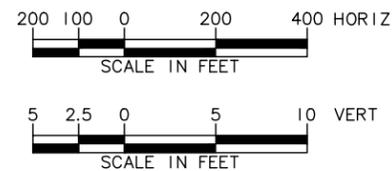


FIGURE 3



Franklin-McVay Trunk Sewer
Preliminary Profile Alternative A

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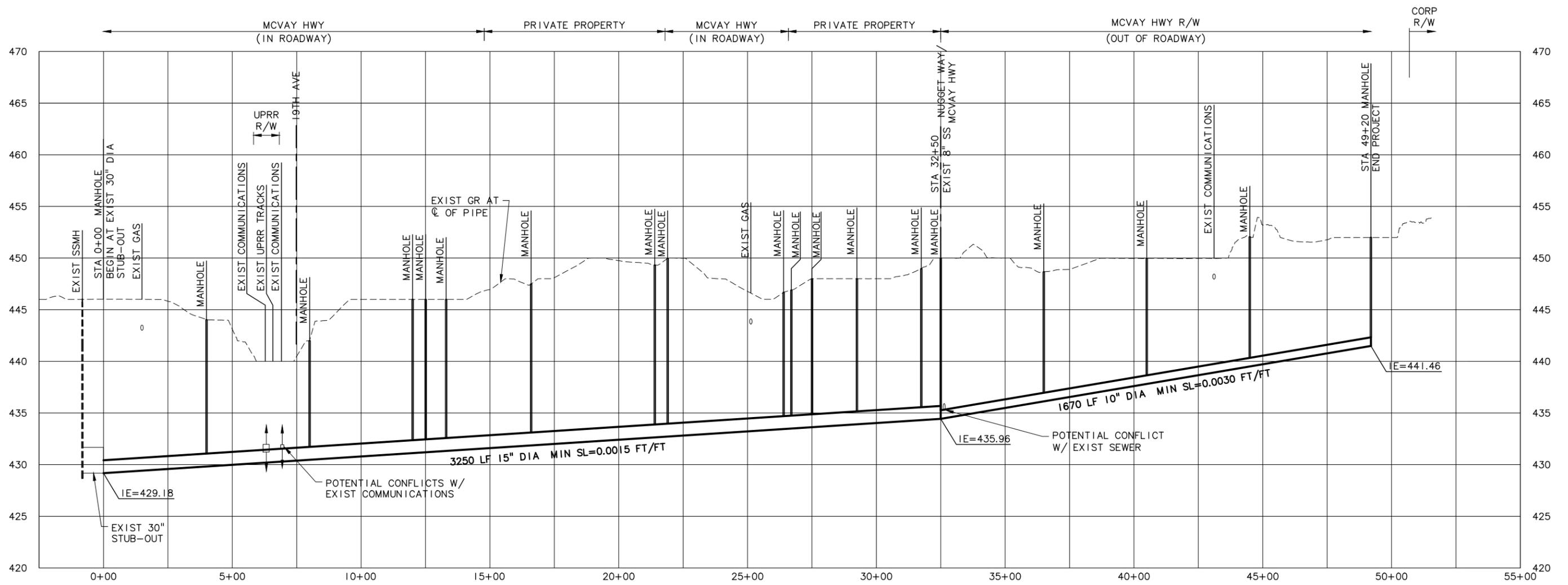


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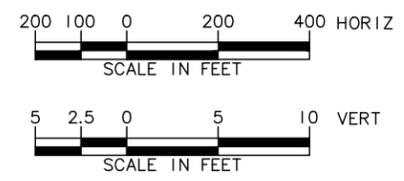
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PROFILE - ALTERNATIVE B



SPRINGFIELD OREGON

FIGURE 4

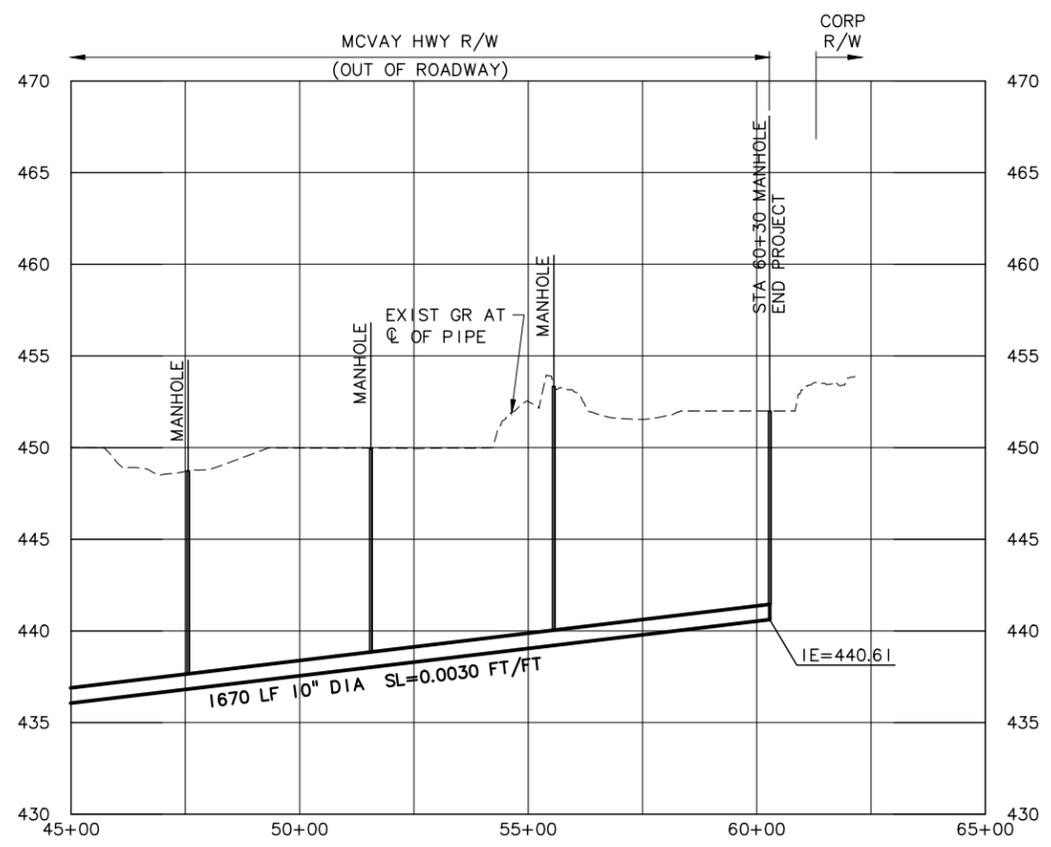
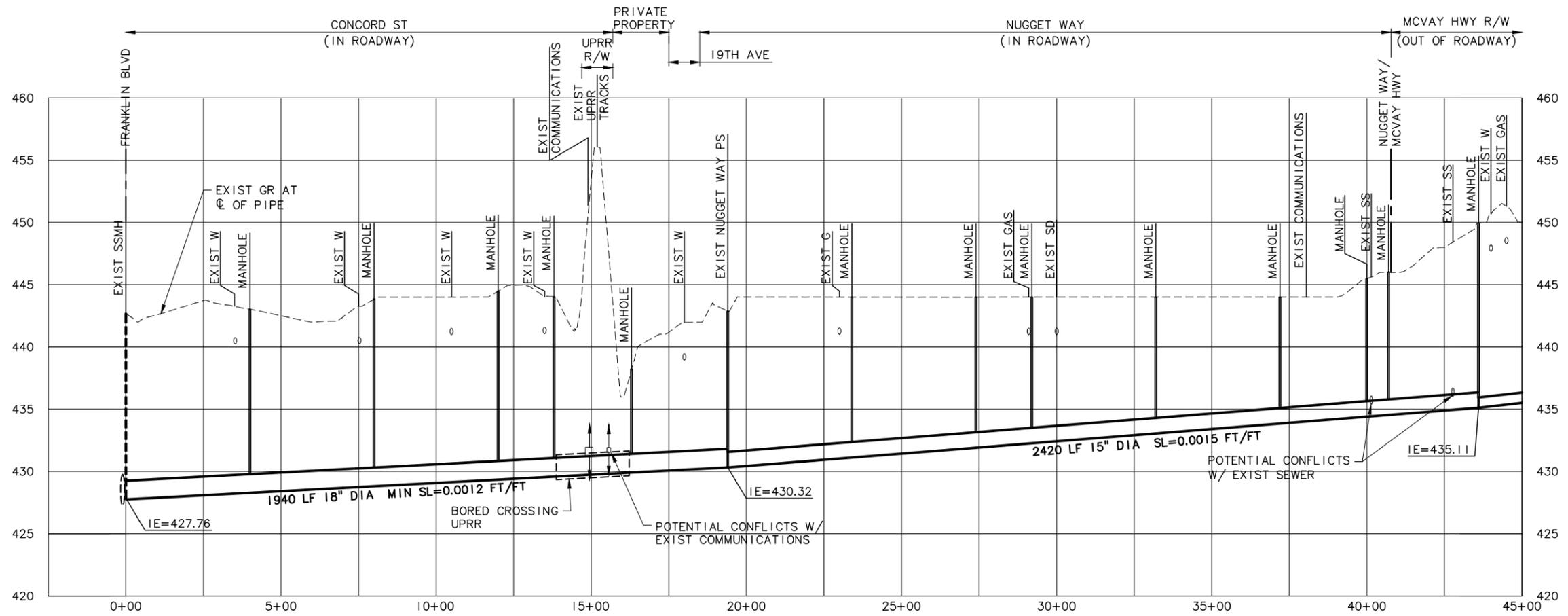
Franklin-McVay Trunk Sewer
Preliminary Profile Alternative B

September 2013

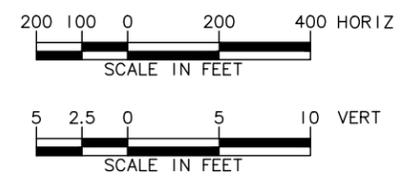
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PROFILE - ALTERNATIVE C



NOTE:
 THIS PROFILE INCLUDES AN 18" PIPE FROM THE DOWNSTREAM CONNECTION AT FRANKLIN BOULEVARD TO NUGGET WAY PUMP STATION TO ALLOW FOR DECOMMISSIONING OF THE PUMP STATION. 18" PIPE IS OVERSIZED TO ACCOMMODATE SLOPE REQUIREMENTS BETWEEN FRANKLIN BOULEVARD AND PUMP STATION. 15" PIPE IS ADEQUATE BASED ON ANTICIPATED FLOW FROM SERVICE AREA.



SPRINGFIELD
OREGON

FIGURE 5

**Franklin-McVay Trunk Sewer
 Preliminary Profile Alternative C**

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