MACKENZIE.

METRO RESERVES GOAL 14 – UTILITY ANALYSIS

To
Metro

Dated
June 3, 2024

Project Number
2230233.00

MACKENZIE
Since 1960

RiverEast Center | 1515 SE Water Avenue, Suite 101, Portland, OR 97214
T 503.224.9560 | www.mcknze.com

TABLE OF CONTENTS

PROJECT PURPOSE

The goal of this project is to complete a comparative analysis of Metro's urban reserves to identify land suitable for addition to the Urban Growth Boundary (UGB). The analysis must comply with Oregon Administrative Rules (OAR) Chapter 660, which requires an evaluation and comparison of the relative costs, advantages, and disadvantages of alternative UGB expansion areas with respect to the provision of public facilities and services (water, sanitary sewer, stormwater management, and transportation facilities) that would be needed for urban development of those alternative locations. Mackenzie has completed the water, sanitary sewer and stormwater components in this report.

The purpose of this project is to analyze:

- The capacity of the existing public water, sanitary sewer, and stormwater facilities to serve areas already inside the UGB.
- The capacity of the existing water, sanitary sewer, and stormwater facilities to serve areas that may be proposed for addition to the UGB (i.e. the 27 Metro urban reserves).
- The impacts to existing water, sanitary sewer, and stormwater facilities that serve nearby areas already inside the UGB.

The Metro Goal 14 Utility Analysis was divided into 6 tasks:

Task 1: Kickoff meeting and refinement of work program. The project began with a meeting to clarify and refine the work program, define the format of the products, and finalize data needs to be provided by Metro. It was also discussed whether the analysis should assume only urban residential development or other urban uses (e.g. commercial, industrial, or institutional uses). Metro provided maps, acreage, base maps, assumed number of dwelling units and preliminary arterial and collector roadway networks for all 27 urban reserves.

Tasks 2-4: Assessment of the capacity of existing water, sanitary sewer and stormwater facilities to serve areas already inside the UGB, areas proposed for addition to the UGB, and the impacts that serving areas proposed for addition to the UGB to areas currently inside the UGB. Mackenzie used the data and documents provided by Metro, as well as publicly available GIS information to analyze the size and location of existing public water, sanitary sewer, and stormwater infrastructure. In addition, jurisdictional master plans were reviewed, and for some sites, contact was made with City or County staff when information was absent or incomplete.

Task 5: Development of preliminary cost estimates for providing water, sanitary sewer, and stormwater services to each of the 27 urban reserves. Mackenzie put together Cost Estimate Tables for each of the 27 urban reserves based on utility demands as calculated for the assumed dwelling units per net acre provided by Metro.

Task 6: Final report. A draft report was provided to Metro for comments and questions, which were incorporated into the final report. The final report includes Utility Analysis Maps and Cost Estimate Tables.

ASSUMPTIONS

- All buildable land will be developed as residential, at a rate of 20 dwelling units per residential acre (as provided by Metro). Mackenzie has reviewed the capacity needs for this level of residential development versus non-specific commercial, industrial, and institutional development and their typical lot or area coverage. In general, environmental constraints have equal impact across all development types, with the expectation that residential may have higher potential on greater slopes. For water, sanitary sewer, and stormwater utility service needs, the assumption of residential development provides sufficient comparison for comparison to other uses.
- Franchise utilities such as natural gas, electricity, and telecommunications were not included in the study. In general, these utilities install infrastructure on demand as development occurs. This is not to suggest that these utilities do not need to plan for future growth and expansion of their distribution systems; however, since they are not public agencies, their long-range planning objectives may not be publicly available. In our experience, coordination with franchise utility providers is an important step for new development, and public infrastructure improvements – roadways in particular – should consider providing franchise utility easements or other access to the infrastructure backbone.
- Residents per dwelling unit: 2.2 (as provided by Metro)
- Residential water demand = 150 gallons per capita per day (gpcpd)
- Residential sanitary demand = residential water demand

COST DETERMINATION

Cost estimates presented in this analysis have been developed at a planning level. Unit costs for water, sewer, and storm drainage system upgrades are based on linear feet of pipe through a development area and are meant to reflect construction of the various parts of the overall conveyance system such as pipe, manholes, inlets, valves, etc. The cost estimates do not include soft costs such as design, permitting, and system development charges. Construction cost updates have been estimated based on cost factors reported by RS Means, Engineering News Record, local utility master plans, and recent bid tabulations. The following tables summarize the unit costs used for this study.

General Cost Determination Assumptions:

- Large diameter pipes will be located in existing and planned arterials and collectors within the urban reserve area (URA) as shown in the Preliminary Urban Growth Boundary Transportation Analysis provided by Metro. For some sites where a master plan has already indicated a size and location for large diameter pipes, those are shown in lieu of placing within the arterials and collectors. Construction for on-site utilities, such as private water, sewer, and storm drainage piping or treatment facilities, is not included in the study methodology and cost estimate.

- Costs associated with capital improvement projects identified in jurisdictional master plans outside the URA boundary and required to provide service to URAs are included unless the project is identified as currently funded.

- Required improvements to existing jurisdictional facilities outside the URA may be discussed in the narrative, but costs are not included in the Cost Estimate Tables.

Water

- Storage Reservoirs – It is assumed each URA will be required to provide additional storage (unless surplus capacity is identified in jurisdictional master plans as specifically serving URAs in this report) and is calculated based on number of dwelling units as provided by Metro assuming the required storage volume is for a 24-hour period. Additional storage could be an expansion of an existing facility or a new facility depending on when development of URAs occur and other development occurring outside the URA at the same time. For this reason, storage is not shown on the Utility Analysis Maps.

- Pump Stations – Costs for pump stations are included for URAs that are projected to be served by pressure zones that require pumping as indicated in jurisdictional master plans and is calculated based on number of dwelling units as provided by Metro.

- Water Mains – Located in existing and planned arterials and collectors within the URA.

Table 1: Water Construction Unit Costs		
Item	**Units**	**Unit Cost**
10” Pipe	Linear Feet (LF)	$350
12” Pipe	Linear Feet (LF)	$400
15” Pipe	Linear Feet (LF)	$500
Pump Station	Million Gallons/Day (MGD)	$5,800,000
Storage Reservoir	Million Gallons (MG)	$200,000

Sanitary Sewer

- Locations for sanitary mains are identified based on topography and shown in existing or proposed arterials and collectors where possible.

- Pump Stations – where topography indicates a need, pumps and force mains are shown on the Utility Analysis Maps and included in Cost Estimate Tables. Proposed force mains are combined into one unit cost; force main sizing considers several design factors and is beyond the scope of this analysis.

Table 2: Sanitary Sewer Construction Unit Costs		
Item	**Units**	**Unit Cost**
10” Pipe	Linear Feet (LF)	$275
12” Pipe	Linear Feet (LF)	$350
15” Pipe	Linear Feet (LF)	$375
Force Main	Linear Feet (LF)	$310
Pump Station	Million Gallons/Day (MGD)	$1,800,000

Stormwater

- Locations for storm mains are identified based on topography and shown in existing or proposed arterials and collectors where possible. Outfalls are strategically located to convey presumably treated storm runoff to local creeks and tributaries in as few locations as required to reduce the number of concentrated flows introduced to the watershed.

- Water quality/detention – calculated using a sizing factor based on linear feet of roadway as given by Metro in the Preliminary Urban Growth Boundary Transportation Analysis which gives locations for existing and proposed arterials and collectors in and around the Urban Reserve Areas. For the calculation, it is assumed that the width of a collector is 24-feet and the width of an arterial is 48-feet.

Table 3: Stormwater Construction Unit Costs		
Item	**Units**	**Unit Cost**
18” Pipe	Linear Feet (LF)	$400
24” Pipe	Linear Feet (LF)	$425
30” Pipe	Linear Feet (LF)	$500
Water Quality/Detention	Square Feet (SF)	$150

UTILITY ANALYSIS

BEAVER CREEK BLUFFS

Water

The Beaver Creek Bluffs URA would likely be served by Oregon City and Clackamas River Water (CRW) as it is located adjacent to existing Oregon City limits/service area and partially within existing service/planning area for CRW. Beaver Creek Bluffs is adjacent to Oregon City Upper Pressure Zone which serves the CRW Meyers Pressure Zone. The Oregon City Upper Pressure Zone is supplied by the Boynton Reservoir (served by the Mountainview Pump Station) and Henrici Reservoir (no pump station).

Both Clackamas River Water (South System) and Oregon City receive water from the South Fork Water Board (SFWB), with plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant in the future.

The following assessment is based on information from the City of Oregon City Water Distribution System Master Plan, dated January 2012. The Clackamas River Water - Water System Master Plan, South System, dated April 2019, does not discuss the Meyers Pressure Zone as it is small and contains mostly undeveloped land. For the assessment, buildout conditions for Oregon City are within the existing UGB only and do not include development of the Beaver Creek Bluffs URA.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Based on the following information, the existing water facilities have capacity to serve areas already inside the UGB (within the Upper Pressure Zone).

- Storage – Under existing conditions, the Boynton, Henrici and Mountainview Reservoirs have a combined surplus of 5.89 MG.
- Pump – the Mountainview Pump Station has a surplus of 3,408 gpm under existing conditions.
- Distribution – according to the Oregon City Master Plan, the existing Oregon City distribution system performs adequately with fire flow deficiencies generally isolated to small diameter or dead-end pipes.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on the following information, there is some surplus capacity available to serve areas proposed for addition to the UGB within the Upper Pressure Zone, however the surplus is not enough to support the development of the entire Beaver Creek Bluffs URA.

- Storage – the Boynton and Henrici Reservoirs have a combined surplus of 0.38 MG under buildout conditions.
- Pump – The Mountainview Pump Station has a surplus of 236 gpm under buildout conditions.
- Distribution – according to the Oregon City Master Plan, the future Oregon City distribution system performs adequately with fire flow deficiencies generally isolated to small diameter or dead-end pipes.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Oregon City reservoirs and pump station that would serve the Beaver Creek Bluffs URA all have surplus capacity under full buildout conditions however the calculated demand of the URA exceeds the surplus available. The existing system would experience storage and pumping deficits if additional capacity were not provided at the time of development.

Sanitary Sewer

The Beaver Creek Bluffs URA would likely be served by the City of Oregon City based on proximity. Based on topography, which generally flows south away from existing City infrastructure, sanitary for this URA will need to be pumped north to join existing Oregon City infrastructure. Due to the shape of the Beavercreek Bluffs URA, there are various connections points to the existing infrastructure along the City limits. Based on these points of connection, this URA will be served by the Parish Road and Nobel Ridge Pump Stations.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Resource Recovery Facility (WRRF), all of which is owned and operated by Water Environment Services (WES).

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014 and Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019. The Master Plan considers the future condition to include development areas at the boundaries of the City's UGB, expected development within City limits (considered by the City to be developable), and individual parcels within City limits with redevelopment potential. Beaver Creek Bluffs URA is not included in the future condition.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

There are several locations within the existing system that have predicted flooding under future conditions.

Neither pump station that would serve the Beaver Creek Bluffs URA have capacity issues under future conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Some of the surcharged pipes indicated in the master plan are downstream of the Beaver Creek Bluffs URA. Development of this URA will contribute to further surcharging of these pipes if they aren't corrected.

The Parish Road Pump Station has a total capacity of 760 gpm and a future demand of 535 gpm, leaving a surplus of 225 gpm. The Nobel Ridge Pump Station has a total capacity of 140 gpm and a future demand of 55 gpm, leaving a surplus of 85 gpm. These surpluses are not significant enough to serve the development of the Beaver Creek Bluffs URA in its entirety and additional pump capacity will be needed to avoid creating a pumping deficit for the existing system.

Storm

City of Oregon City is the likely provider for Beaver Creek Bluffs URA, as it is located within the Beaver Basin and is adjacent to the City service area boundary. The Beaver Basin does not contain any existing stormwater infrastructure and based on topography generally flows south away from City limits toward Beaver Creek, which flows west and outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from City of Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

The Master Plan identifies problem areas within the existing stormwater system, categorized as issues related to flooding, infrastructure, maintenance or natural channels.

As described above, Beaver Creek Bluffs URA would likely join City infrastructure near the existing City limits. Infrastructure downstream of these connection points appear to potentially occur within the South End, Central Point, Mud, Coffee, and Amanda Court basins. These basins contain several identified problem areas in all four categories, with capital improvement projects identified to address these issues. The following is a summary of capacity issues in relevant basins:

- Central Point Basin has an undersized conveyance system in the vicinity of Central Point Road that is further complicated by a series of irregular flow patterns and structure connections.
- The Coffee Creek area near Hazelwood Drive is an ongoing capacity concern that impacts private properties.
- The South End Basin will need an upsized conveyance system to support future development and expansion of South End Road.

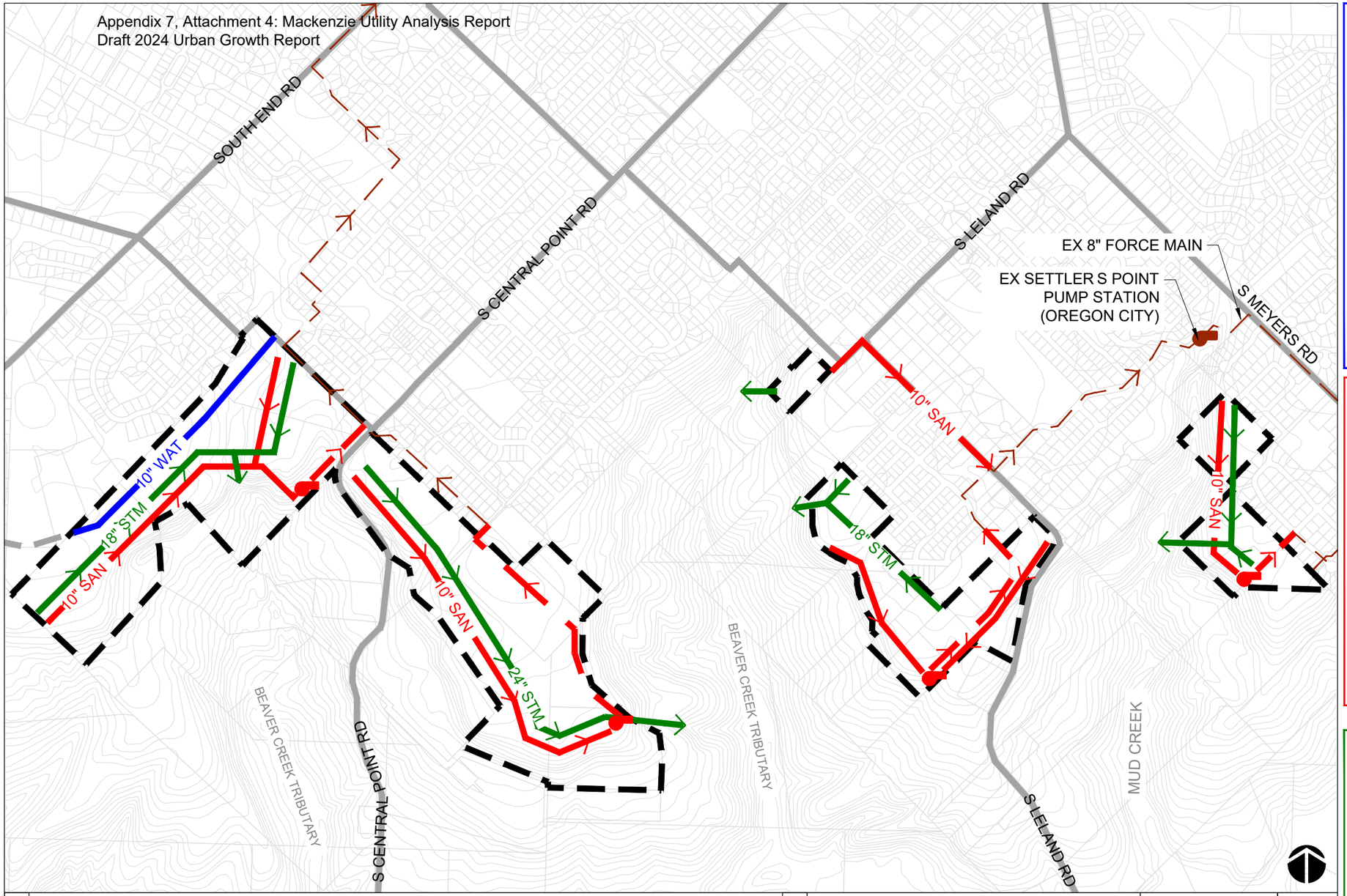
Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Beaver Basin as it drains to Beaver Creek) during a 25-year storm event.

Based on topography the Beaver Creek Bluffs URA would likely outfall directly to Mud Creek and tributaries of Beaver Creek and thus would not connect to existing City storm infrastructure. The addition of the Beaver Creek Bluffs URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: OREGON CITY/CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: UPPER (OREGON CITY)/MEYERS (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,600	$350	$910,000
12" PIPE (LF)	0	$400	0
16" PIPE (LF)	0	$500	0
PUMP STATION (MGD)	0.7	$5,800,000	$4,060,000
STORAGE RESERVOIR (MG)	0.7	$200,000	$146,000
TOTAL			$5,116,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

ZONE: SOUTH/CENTRAL

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,300	$275	$3,932,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.7	$1,800,000	$1,260,000
SAN FORCE (LF)	5,200	$310	$1,612,000
TOTAL			$6,804,500

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: BEAVER CREEK

PROPOSED IMPROVEMENTS

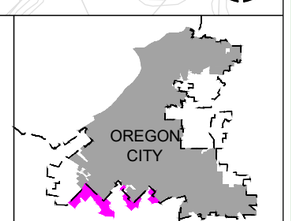
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	8,000	$400	$3,200,000
24" PIPE (LF)	4,100	$425	$1,742,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	7,540	$150	$1,131,000
TOTAL			$6,073,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

CRW	CLACKAMAS RIVER WATER
EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

EAVER REE LUFFS

MACKENZIE.

0 500 1000

BENDEMEER

Water

Bendemeer URA would most likely be served by Tualatin Valley Water District (TVWD) as it is adjacent to their existing service area boundary and City of Hillsboro facilities do not extend north of Highway 26. TVWD does not have a publicly available Master Plan.

The following assessment is based on information provided by a TVWD Development Services Engineer, with specific regard to the Bendemeer site and assuming residential development at a density of 20 units per acre.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

TVWD's existing water facilities have adequate capacity to serve customers in areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on current development projections for areas already inside the UGB, and assuming a density of 20 units per acre within the URA, TVWD's existing water facilities have adequate capacity to serve the URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from adding the URA, assuming a density of 20 units per acre. Changes in densities or development types within the URA could introduce or increase impacts that may require water facility upgrades.

Sanitary Sewer

Clean Water Services (CWS) is the likely provider for the Bendemeer URA as there is existing CWS sanitary sewer infrastructure south of NW West Union Road and running through the southeast corner of the URA near Rock Creek.

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

CWS did not indicate whether the existing sanitary sewer system as a whole had the capacity to serve areas already inside the UGB. They did provide information related to the likely point of connection for the Bendemeer URA specifically (an existing 24-inch sanitary trunk running parallel to Rock Creek), which has adequate capacity to serve the addition of the Bendemeer URA to the UGB, which presumably means it has capacity to serve existing areas.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Bendemeer URA. Full development of areas inside the UGB does not happen prior to the addition of the URA into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in the URA added to the UGB. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Storm

Bendemeer URA would be served by the City of Hillsboro and Clean Water Services. Bendemeer is included in the planning area of the City of Hillsboro Master Plan (Rock Creek Basin). Bendemeer is currently unincorporated Washington County, and the City of Hillsboro has not yet started the long-term planning for this area.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area in the Master Plan includes the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City intends to begin planning in the next several years (including the Bendemeer URA).

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

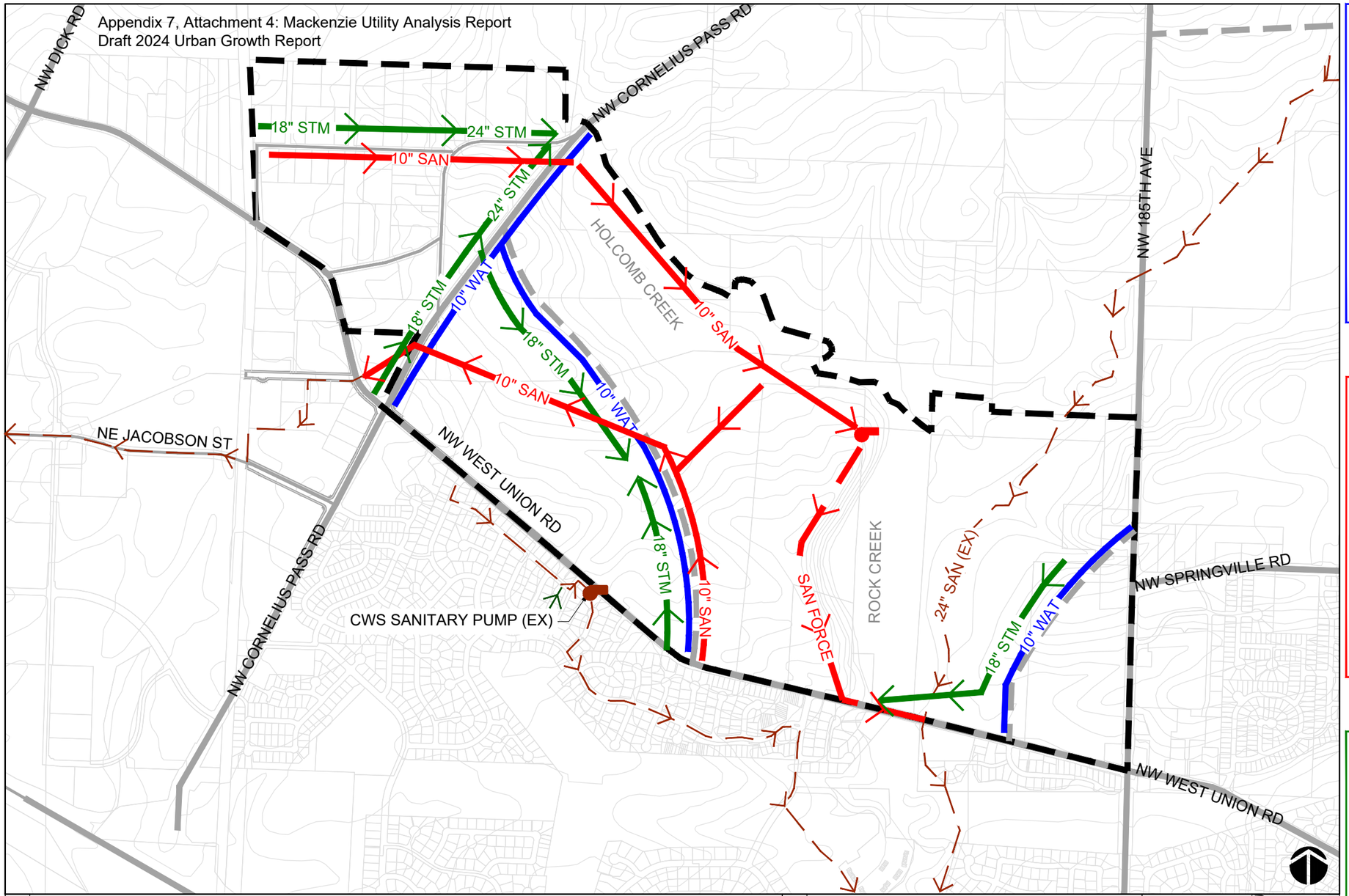
The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Rock Creek and would not impact the capacity of existing stormwater infrastructure. Per CWS, it is expected that treatment and detention be provided on development sites so that discharge to Holcomb Creek and Rock Creek does not have any negative impacts.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Rock Creek and would not impact the capacity of existing stormwater infrastructure. Per CWS, it is expected that treatment and detention be provided on development sites so that discharge to Holcomb Creek and Rock Creek does not have any negative impacts.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Clean Water Services standards require on-site detention for expansion areas, which includes the Bendemeer URA. Based on topography, the Bendemeer URA would discharge directly to Holcomb Creek and Rock Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to or impact any of the existing City of Hillsboro infrastructure.



WATER PROVIDER: TUALATIN VALLEY WATER DISTRICT

PROPOSED IMPROVEMENTS

WATER	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	9,450	$350	$3,307,500
	12" PIPE (LF)	0	$400	$0
	16" PIPE (LF)	0	$500	$0
	PUMP STATION (MGD)	0	$5,800,000	$0
	STORAGE RESERVOIR (MG)	1.6	$200,000	$320,000
	TOTAL			$3,627,500

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

SANITARY	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	12,300	$275	$3,382,500
	12" PIPE (LF)	0	$350	$0
	15" PIPE (LF)	0	$375	$0
	PUMP STATION (MGD)	0.8	$1,800,000	$1,440,000
	SAN FORCE (LF)	3,300	$310	$1,023,000
	TOTAL			$5,845,500

STORM PROVIDER: CITY OF HILLSBORO

WATERSHED: ROCK CREEK-TUALATIN RIVER

SUB-WATERSHED: UPPER ROCK CREEK

PROPOSED IMPROVEMENTS

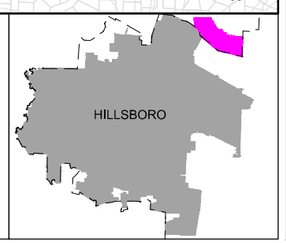
STORM	ITEM	UNITS	UNIT COST	TOTAL COST
	18" PIPE (LF)	8,600	$400	$3,440,000
	24" PIPE (LF)	3,400	$425	$1,445,000
	30" PIPE (LF)	0	$500	$0
	WATER QUALITY/ DETENTION (SF)	59,600	$150	$8,940,000
	TOTAL			$13,825,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ENDEMEER

MACKENZIE.

0 500 1000

BETHANY WEST

Water

Bethany West URA would most likely be served by Tualatin Valley Water District (TVWD) as it partially within and otherwise adjacent to their existing service area boundary. TVWD does not have a publicly available Master Plan.

The following assessment is based on information provided by a TVWD Development Services Engineer, with specific regard to the Bethany West site and assuming residential development at a density of 20 units per acre.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

TVWD's existing water facilities have adequate capacity to serve customers in areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Based on current development projections for areas already inside the UGB, and assuming a density of 20 units per acre within the URA, TVWD's existing water facilities have adequate capacity to serve the URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It does not appear at this time that TVWD's water facilities already inside the UGB will experience marked impacts resulting from adding the proposed URAs, assuming a density of 20 units per acre. Changes in densities or development types within the URA could introduce or increase impacts that may require water facility upgrades.

Sanitary Sewer

Clean Water Services (CWS) is the likely provider for the Bethany West URA as there is an existing 24-inch CWS sanitary sewer main running northeast to southwest through the site (adjacent to Rock Creek).

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

CWS did not indicate whether the existing sanitary sewer system as a whole had the capacity to serve areas already inside the UGB. They did provide information related to the likely point of connection for the Bethany West URA specifically (an existing 24-inch sanitary trunk running parallel to Rock Creek), which has adequate capacity to serve the addition of the Bethany West URA to the UGB, which presumably means it has capacity to serve existing areas.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Bethany West URA. Full development of areas inside the UGB does not happen prior to the addition of URAs into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URA added to the UGB. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bendemeer URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands. According to CWS, the existing 24-inch sewer running parallel to Rock Creek has adequate capacity to serve the Bethany West URA.

Storm

Clean Water Services (CWS) is the likely storm provider for the Bethany West URA based on topography it would outfall to Rock Creek which generally flows south through CWS service area until it reaches the Tualatin River.

Clean Water Services standards require on-site detention for expansion areas, which includes the Bethany West URA. Based on topography, the Bethany West URA would discharge directly to Rock Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing CWS infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

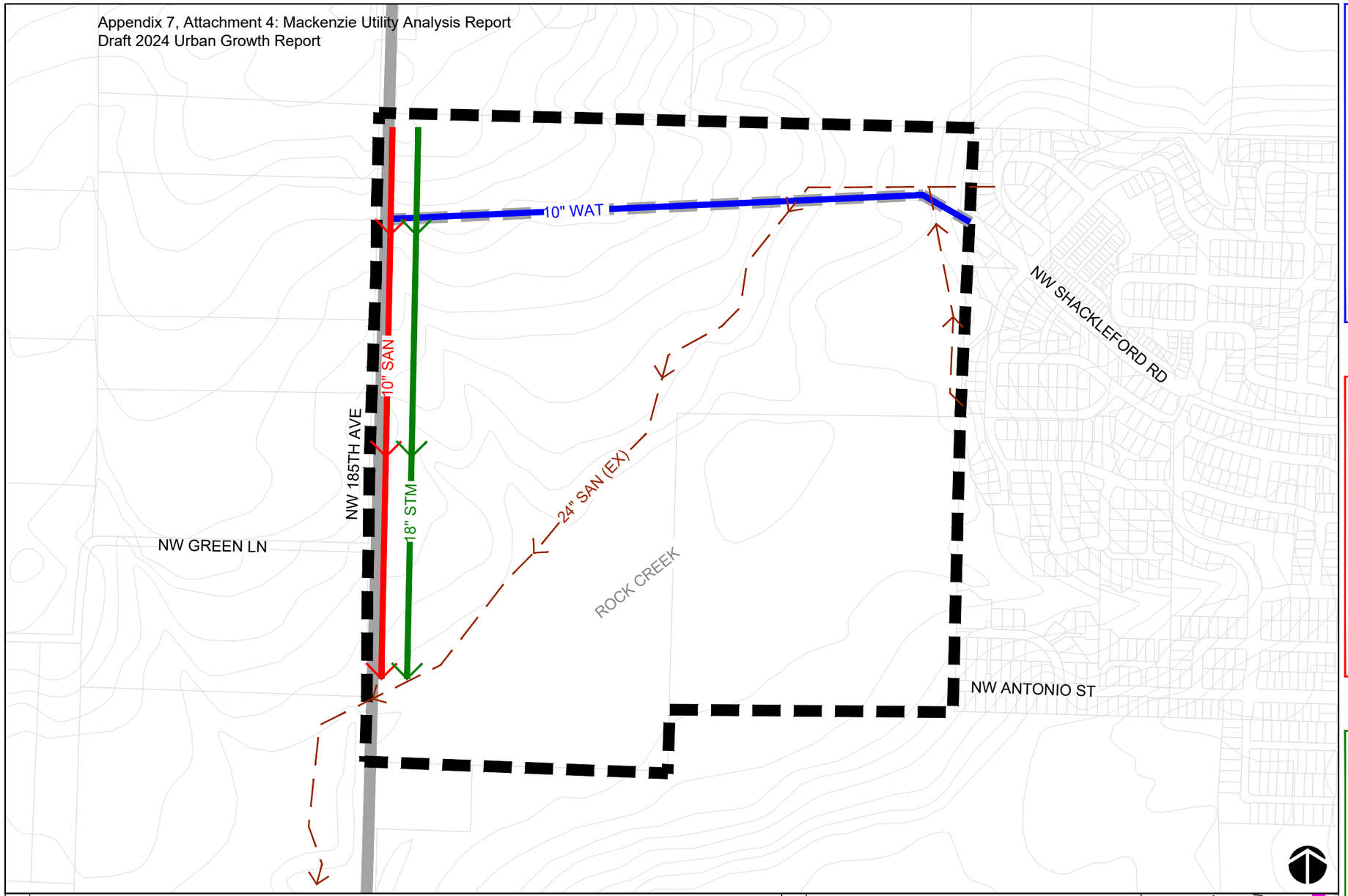
CWS did not indicate whether the existing stormwater system had the capacity to serve areas already inside the UGB.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Based on topography, the Bethany West URA would discharge directly to Rock Creek. CWS requires that stormwater from development areas be treated and detained on-site therefore having no negative impacts on the existing system.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

CWS requires that stormwater from development areas be treated and detained on-site so as not to negatively impact the existing system.



WATER

WATER PROVIDER: TUALATIN VALLEY WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,655	$350	$929,250
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.3	$200,000	$60,000
TOTAL			$989,250

SANITARY

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,500	$275	$687,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$687,500

STORM

STORM PROVIDER: CLEAN WATER SERVICES

WATERSHED: ROCK CREEK-TUALATIN RIVER

SUB-WATERSHED: UPPER ROCK CREEK

PROPOSED IMPROVEMENTS

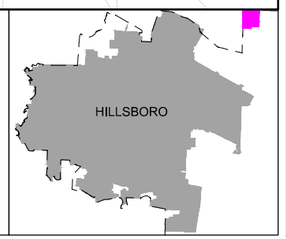
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,500	$400	$1,000,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	12,200	$150	$1,830,000
TOTAL			$2,830,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ETHANY WEST

MACKENZIE.

0 250 500

BORING

Water

The Boring URA would likely be served by the Boring Water District based on proximity.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks. Two tanks are located at Meier Dairy, one at 352,000 gallons and another at 443,000 gallons. The other tank is located at SE Wally Road at the top of Polivka Hills with a capacity of 100,000 gallons.

The following assessment is based on information from Boring Water District Water System Master Plan, dated April 2003 and the Boring Water District System Master Plan Update, dated November 2009. The Master Plan Update indicates that development of urban reserve areas is planned for a 50-year time horizon and are not included in future demands calculations.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the total pumping capacity being drawn from the wells is 1.69 MGD. The Master Plan cites the source capacity as the total capacity from all wells assuming the highest producing well is offline. The Marx well is the highest producing well and draws 0.65 MGD. With the Marx well offline, there is an existing deficit of 0.18 MGD. This is a conservative approach presented in the Master Plan Update for calculating capacity and does not actually indicate there is a supply deficit for existing facilities.
- Storage –Total storage capacity is 895,000 gallons (0.895 MG) and existing demand (as of 2009) is 1.55 MG, creating a deficit of 0.655 MG. This deficit indicates there is not sufficient storage capacity to provide for peak day demands and fire requirements.
- Distribution – the Boring Water District distribution network provides sufficient delivery of water for existing demands (as of 2009).

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There is a future deficit from the wells of 120 gpm (0.17 MGD) assuming that the largest well, the Marx well, is offline (conservative approach presented in the Master Plan Update for calculating capacity). According to the Master Plan, the future deficit is not within the range of accuracy of the estimates and describes a reasonable expectation that future peak demand can be met without the Marx well, but only if additional wells are drilled, developed and reliably productive. This applies to the development of Boring URA.
- Storage – Current storage is 0.895 MG and estimated future storage (2029) is 2.55 MG, resulting in a storage deficit of 1.65 MG.
- Distribution – According to the Master Plan Update, the Boring Water District distribution network provides sufficient delivery of water for future 2029 demands.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – A future supply deficit exists without considering the development of Boring URA. Without additional supply, there will be negative impacts on the existing system.
- Storage – A future storage deficit exists without considering the development of Boring URA. Without additional storage, there will be negative impacts on the existing system.
- Distribution – It is unclear whether the future 2029 demands from the Master Plan include the capacity to serve Boring URA.

Sanitary Sewer

The Boring URA would likely be served by Clackamas County Water Environment Services (WES) based on proximity and a southern portion of the Boring URA falls within the WES Rate Zone 2. This portion of area routes sanitary from 60 households and businesses to the Boring Water Resource Recovery Facility (Boring WRRF) for treatment. The Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day (0.02 MGD).

The following assessment is based on information from the Water Environment Services (WES) Capital Improvement Plan Fiscal Years 2024/25-2028/29 and the Boring WRRF Facilities Plan Technical Memorandum, dated August 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

According to a study summarized in the Boring WRRF Facilities Plan, the design capacity of the Boring WRRF is 0.018 MGD and the existing (2018) average annual flow is 0.019 MGD. The WRRF can therefore adequately serve the current service area, with no capacity for future development.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Boring WRRF struggles to meet treatment requirements for existing demands, let alone additional demands from future urban reserve areas. The report summarized in the Boring WRRF Facilities Plan advises that the Boring WRRF be abandoned, and wastewater be pumped to another facility for treatment, either a town of Sandy facility or other WES facility.

The closest WES sewer main connection point would be at the intersection of Hwy 212 and Hwy 224. The sewer mainline extension would follow Hwy 212 to Boring, and it would be approximately 8.5 miles of pipeline to extend to the URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The existing sanitary sewer infrastructure does not have the capacity to serve additional area. Extensive improvements (as described above), including approximately 8.5 miles of sanitary piping, would be required to serve the Boring URA.

Storm

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring as it remains an unincorporated community in Clackamas County. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Boring to the west.

The following assessment is based on information from communication with a Clackamas County Principal Planner.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

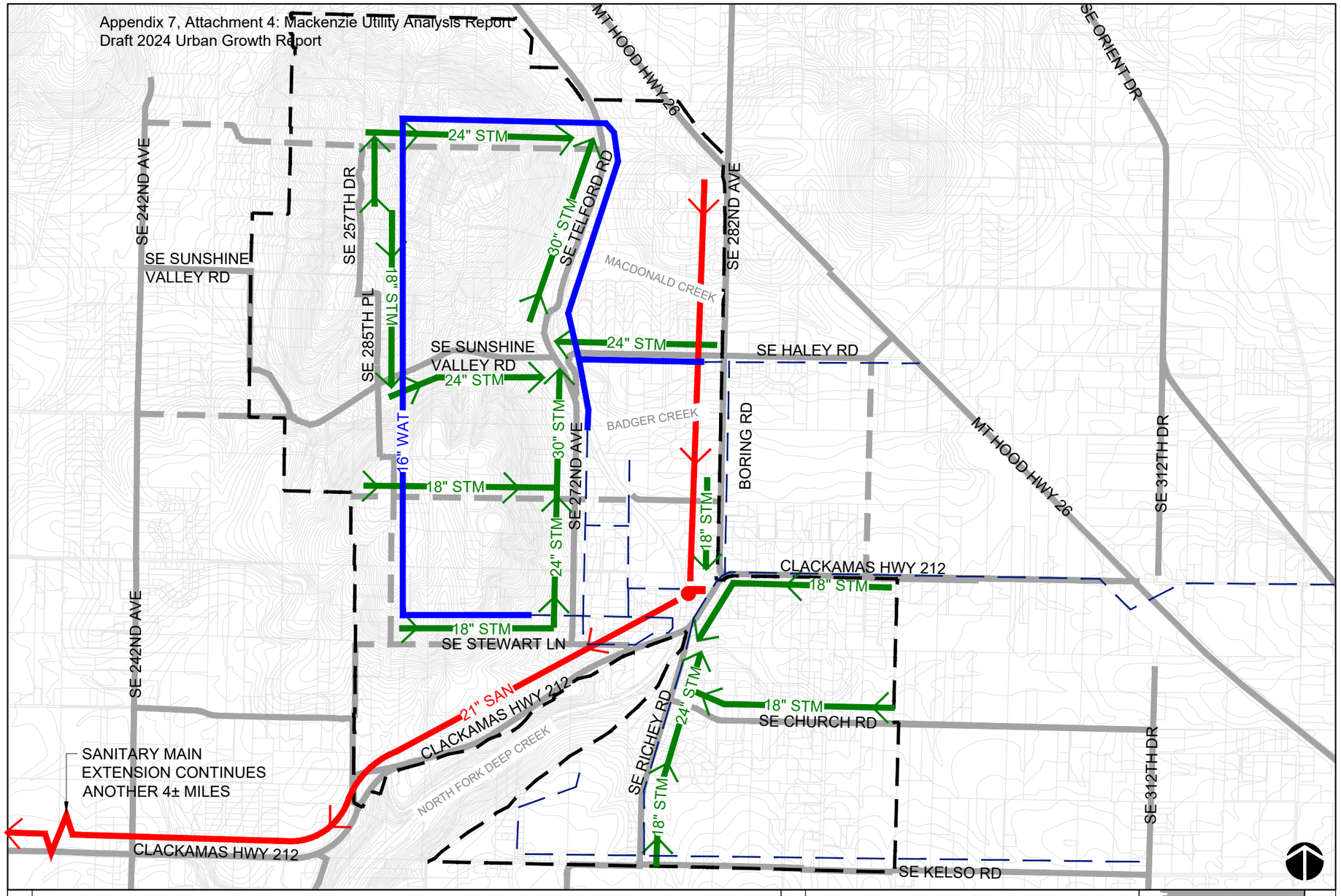
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon. Based on existing topography, it seems likely that the Boring URA could outfall directly to North Fork Deep Creek and not impact any existing stormwater infrastructure.



WATER

WATER PROVIDER: BORING WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	23,100	$500	$11,550,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	6.6	$200,000	$1,320,000
TOTAL			$12,870,000

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

ZONE: RATE ZONE 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	0	$350	$0
21" PIPE (LF)	44,800	$425	$19,040,000
PUMP STATION (MGD)	9.2	$1,800,000	$16,560,000
SAN FORCE (LF)	0	$0	$0
TOTAL			$35,600,000

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: JOHNSON CREEK, LOWER CLACKAMAS RIVER

SUB-WATERSHED: UPPER JOHNSON CREEK, NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

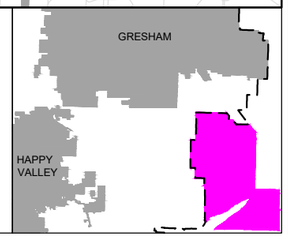
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	24,000	$400	$9,600,000
24" PIPE (LF)	12,900	$425	$5,482,500
30" PIPE (LF)	5,500	$500	$2,750,000
WATER QUALITY & DETENTION	128,150	$150	$19,222,500
TOTAL			$37,055,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

BORING

MACKENZIE.

0 500 1000

BORING – HIGHWAY 26

Water

The Boring – Highway 26 URA would likely be served by the Boring Water District based on proximity.

The Boring Water District has four wells in the deep Troutdale Aquifer and has been granted water rights by Oregon Water Resources Department (OWRD) to withdraw up to 5.8 MGD. Existing storage is provided by three tanks. Two tanks are located at Meier Dairy, one at 352,000 gallons and another at 443,000 gallons. The other tank is located at SE Wally Road at the top of Polivka Hills with a capacity of 100,000 gallons.

The following assessment is based on information from Boring Water District Water System Master Plan, dated April 2003 and the Boring Water District System Master Plan Update, dated November 2009. The Master Plan Update indicates that development of urban reserve areas is planned for a 50-year time horizon and are not included in future demands calculations.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the total pumping capacity being drawn from the wells is 1.69 MGD. The Master Plan cites the source capacity as the total capacity from all wells assuming the highest producing well is offline. The Marx well is the highest producing well and draws 0.65 MGD. With the Marx well offline, there is an existing deficit of 0.18 MGD. This is a conservative approach presented in the Master Plan Update for calculating capacity and does not actually indicate there is an existing supply deficit for existing facilities.
- Storage – Total storage capacity is 895,000 gallons (0.895 MG) and existing demand (as of 2009) is 1.55 MG, creating a deficit of 0.655 MG. This deficit indicates there is not sufficient storage capacity to provide for peak day demands and fire requirements.
- Distribution – the Boring Water District distribution network provides sufficient delivery of water for existing demands (as of 2009).

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There is a future deficit from the wells of 120 gpm (0.17 MGD) assuming that the largest well, the Marx well, is offline. According to the Master Plan, the future deficit is not within the range of accuracy of the estimates and describes a reasonable expectation that future peak demand can be met without the Marx well, but only if additional wells are drilled, developed and reliably productive. This applies to the development of Boring – Highway 26 URA.
- Storage – Current storage is 0.895 MG and estimated future storage (2029) is 2.55 MG, resulting in a storage deficit of 1.65 MG.
- Distribution – According to the Master Plan Update, the Boring Water District distribution network provides sufficient delivery of water for future 2029 demands.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – A future supply deficit exists without considering the development of Boring – Highway 26 URA. Without additional supply, there will be negative impacts on the existing system.
- Storage – A future storage deficit exists without considering the development of Boring – Highway 26 URA. Without additional storage, there will be negative impacts on the existing system.
- Distribution – It is unclear whether the future 2029 demands from the master plan include the capacity to serve Boring – Highway 26 URA.

Sanitary Sewer

The Boring – Highway 26 URA would likely be served by Clackamas County Water Environment Services (WES) based on proximity and a southern portion of the Boring – Highway 26 URA falls within the WES Rate Zone 2. This portion of area routes sanitary from 60 households and businesses to the Boring Water Resource Recovery Facility (Boring WRRF) for treatment. The Boring WRRF consists of lagoons and a sand filter to provide tertiary treatment for up to 20,000 gallons per day (0.02 MGD).

The following assessment is based on information from the Water Environment Services (WES) Capital Improvement Plan Fiscal Years 2024/25-2028/29 and the Boring WRRF Facilities Plan Technical Memorandum, dated August 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

According to a study summarized in the Boring WRRF Facilities Plan, the design capacity of the Boring WRRF is 0.018 MGD and the existing (2018) average annual flow is 0.019 MGD. The WRRF can therefore adequately serve the current service area, with no capacity for future development.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Boring WRRF struggles to meet treatment requirements for existing demands, let alone additional demands from future urban reserve areas. The report summarized in the Boring WRRF Facilities Plan advises that the Boring WRRF be abandoned, and wastewater be pumped to another facility for treatment, either a town of Sandy facility or other WES facility.

The closest WES sewer main connection point would be at the intersection of Hwy 212 and Hwy 224. The sewer mainline extension would follow Hwy 212 to Boring, and it would be approximately 8.5 miles of pipeline to extend to the URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The existing sanitary sewer infrastructure does not have the capacity to serve additional area. Extensive improvements (as described above), including approximately 8.5 miles of sanitary piping, would be required to serve the Boring – Highway 26 URA.

Storm

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring as it remains an unincorporated community in Clackamas County. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Boring to the west.

The following assessment is based on information from communication with a Clackamas County Principal Planner.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

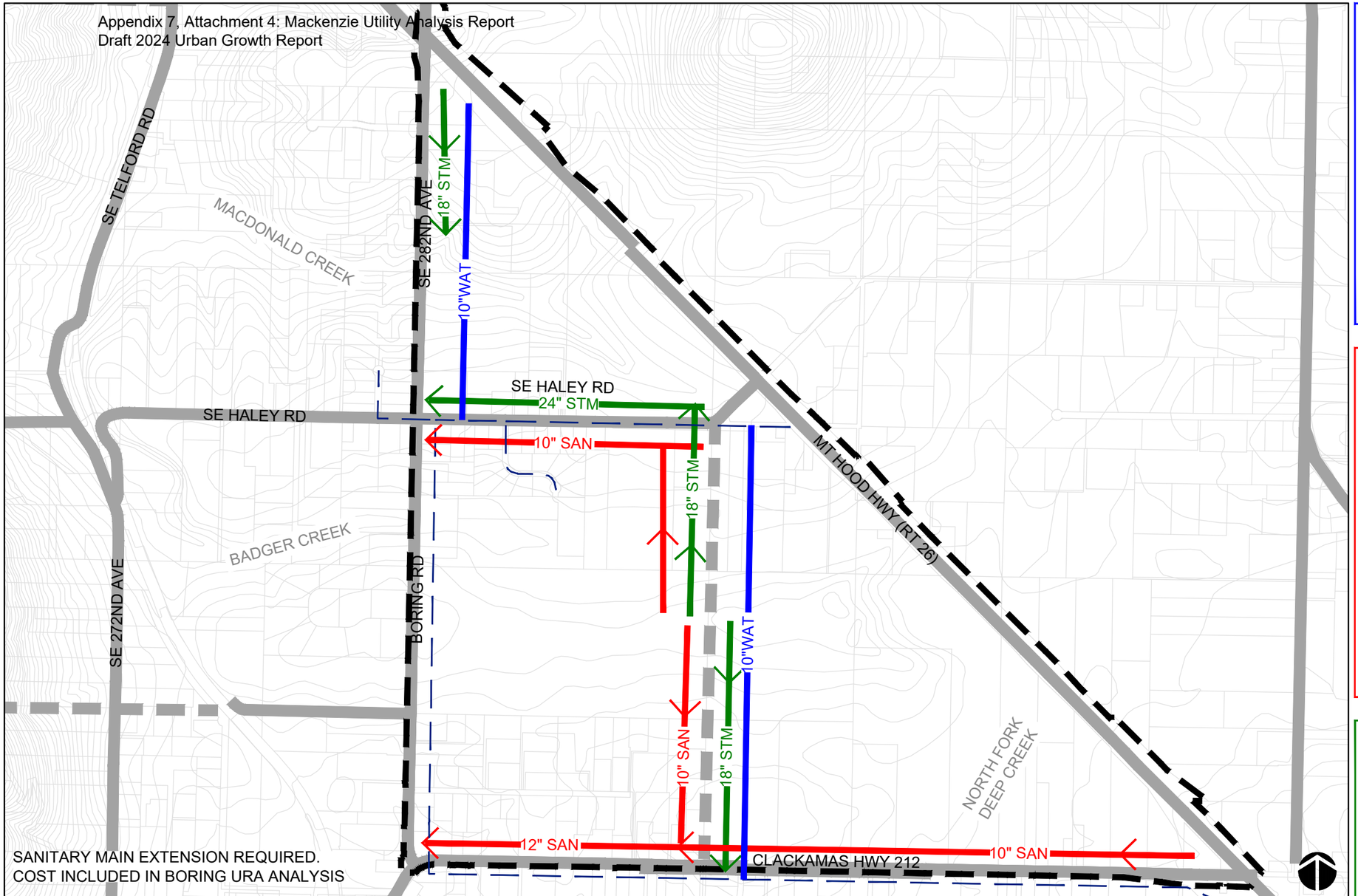
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Boring, Oregon.



LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- STORM LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET

WATER

WATER PROVIDER: BORING WATER DISTRICT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	9,100	$350	$3,185,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	2.5	$200,000	$500,000
TOTAL			$3,685,000

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

ZONE: RATE ZONE 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,300	$275	$2,832,500
12" PIPE (LF)	2,300	$350	$805,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$3,637,500

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: JOHNSON CREEK, LOWER CLACKAMAS RIVER

SUB-WATERSHED: UPPER JOHNSON CREEK, NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	5,400	$400	$2,160,000
24" PIPE (LF)	2,500	$425	$1,062,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	82,750	$150	$12,412,500
TOTAL			$15,635,000

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ORING HWY

MACKENZIE.

0 500 1000

BORLAND

Water

The Borland URA would most likely be served by the City of Tualatin based on proximity and would be part of the B pressure zone. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both of these pump stations have reached the end of their usable lives and do not currently operate. Pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which Norwood is not included.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for pressure zone B under current (2020) conditions.
- Distribution – There are existing industrial deficiencies in pressure zone B. Existing transmission line capacity is also deficient in pressure zone B.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage deficit of 1.0 MG for pressure zone B under buildout conditions.
- Distribution – new customers requiring large fire flows in pressure zone B are required to install fire flow pumps.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding Borland URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of Borland would cause a greater deficit without the addition or expansion of storage facilities.
- Distribution – transmission line improvements are identified in the Master Plan capital improvement projects.

Sanitary Sewer

The Borland URA would most likely be served by the City of Tualatin and/or City of West Linn based on proximity and topography. The likely point of connection to the City of Tualatin infrastructure would be either the Orchard Hill Pump Station or the Borland Pump Station (both in the Nyberg basin). The likely connection point to the City of West Linn infrastructure would be an existing gravity sanitary main in Willamette Falls Drive (in the Willamette Town basin).

Downstream of the likely point of connection to the City of Tualatin sanitary infrastructure is the Nyberg Trunk which eventually flows to the Durham Advanced Wastewater Treatment Facility (AWWTF). The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

From the likely point of connection at Willamette Falls Drive, sanitary flows southeast toward the Willamette River toward the Willamette Pump Station (owned by Water Environment Services). The Willamette Falls force main follows Interstate 205 and the Willamette River toward. At the downstream end of the City of West Linn sanitary system as Clackamas County Water Environment Services (WES) owned pumps and force mains. Sanitary ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019, the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021, the City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, and the Water Environment Services Sanitary Sewer System Master Plan, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Tualatin

Both the Borland and Orchard Hill Pump Stations have surplus capacity under existing (2020) conditions (per CWS). Per the City of Tualatin Master Plan, there are several sections of the Nyberg Trunk with no remaining capacity under existing conditions.

West Linn

There do not appear to be any capacity issues downstream of the assumed point of connection to the City of West Linn infrastructure under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Tualatin

The Borland and Orchard Hill Pump Stations have a surplus capacity through 2040 (based on estimated peak hour flows) per CWS. By 2075 the Borland pump station has a deficiency of 1.8 MGD. Per the City of Tualatin Master Plan, under buildout conditions there are several sections of the Nyberg Trunk with deficient capacity where backwatering occurs.

West Linn

There are two identified deficiencies downstream of the assumed point of connection to the City of West Linn infrastructure under buildout conditions. They both occur in gravity piping near where the City system crosses the Willamette River. There is a WES capital improvement project currently in the design phase to increase capacity of the Willamette Pump Station to meet future wet weather flows, with an expected completion in 2027. The Master Plan does not address what the current or increased capacity would be.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Tualatin

According to CWS Master Plan, there is surplus capacity of 0.3 MG at the Orchard Hill Pump Station through 2075, and a surplus capacity of 0.1 MG at the Borland Pump Station through 2040. Based on preliminary calculations, this surplus capacity would not be enough to serve the entire Borland URA, so additional capacity will be needed. There are several pipe capacity deficiencies in the Nyberg basin under buildout conditions. The addition of the Borland URA would further contribute to these deficiencies.

West Linn

The Willamette Pump Station improvements discussed above will increase capacity to meet future wet weather flows, however the amount of additional capacity and whether it could serve the Borland URA is not clear and is dependent on when development occurs.

Storm

Borland URA would likely be served by the City of West Linn and City of Tualatin for stormwater based on proximity and topography. A majority of the Borland URA flows northeast toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019 and the City of West Linn Storm Drainage Master Plan, dated September 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

Tualatin

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows.

West Linn

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. There are four high priority capital improvement projects recommended in the Master Plan to address capacity related issues, all of which occur at the downstream end of the stormwater system near the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Tualatin

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. A small portion of the Borland URA is within the Saum Creek Basin which does not have any identified capacity related issues.

West Linn

The same capacity issues identified in the Master Plan for the existing service area are problematic when considering serving additional areas and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Borland URA is does not fall within any of the currently defined City of West Linn basins.

Because the Borland URA is outside both City of West Linn and City of Tualatin City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Borland URA flows northeast toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

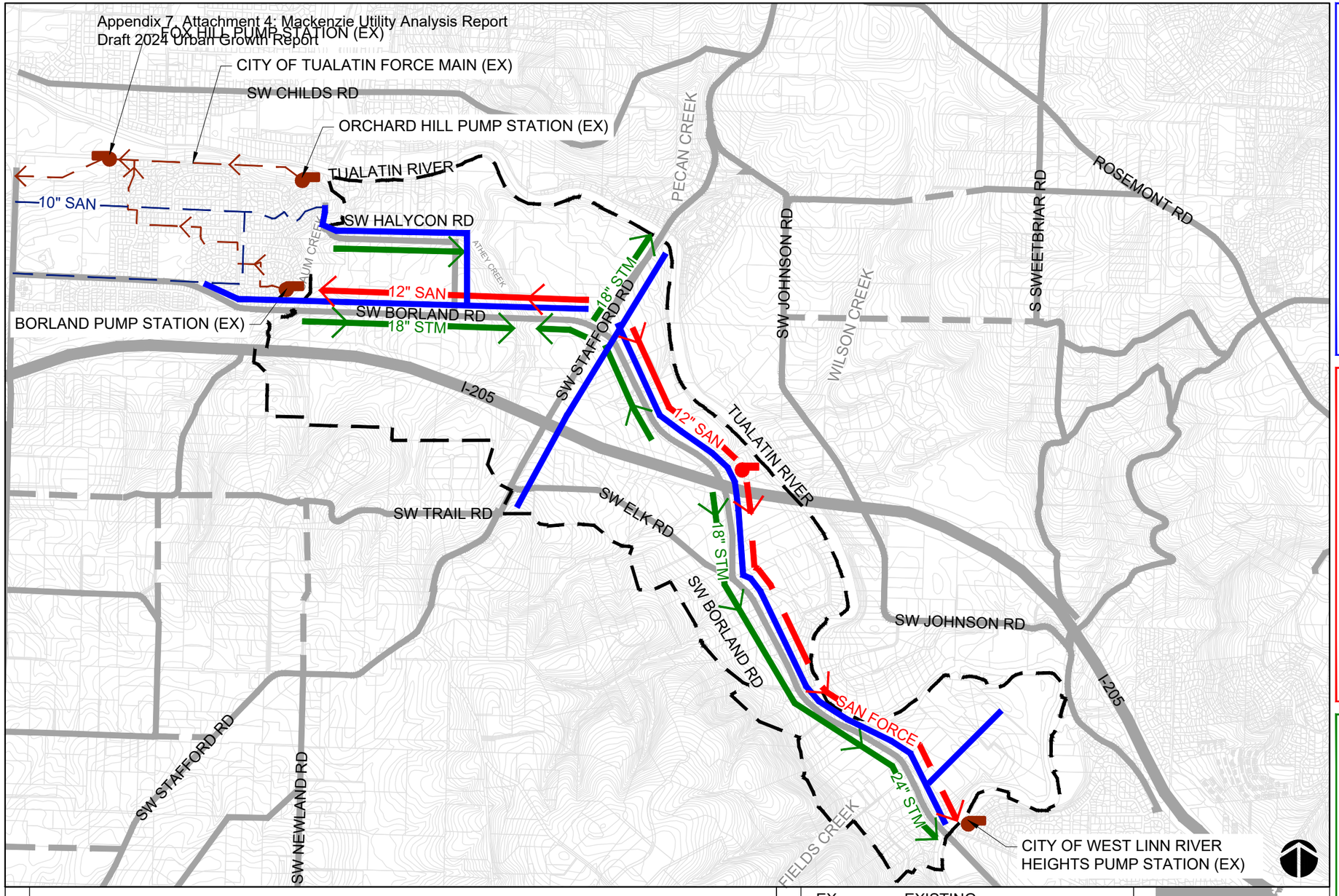
Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Tualatin

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Borland URA would discharge directly to tributaries of the Tualatin River via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

West Linn

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding Borland URA land to the UGB. Based on topography, the Borland URA could discharge directly to the Tualatin River and thus not connect to or impact any existing City of West Linn stormwater infrastructure.



WATER				
WATER PROVIDER: CITY OF TUALATIN				
PRESSURE ZONE: B				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	27,300	$350	$9,555,000
	12" PIPE (LF)	0	$400	$0
	16" PIPE (LF)	0	$500	$0
	PUMP STATION (MGD)	0	$5,800,000	$0
	STORAGE RESERVOIR (MG)	2.8	$200,000	$560,000
	TOTAL			$10,115,000

SANITARY				
SANITARY PROVIDER: CITY OF TUALATIN AND/OR CITY OF WEST LINN				
ZONE: NYBERG (TUALATIN), 9D/10A (WEST LINN)				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	0	$275	$0
	12" PIPE (LF)	8,000	$350	$2,800,000
	15" PIPE (LF)	0	$375	$0
	PUMP STATION (MGD)	1.4	$1,800,000	$2,520,000
	SAN FORCE (LF)	7,600	$310	$2,356,000
	TOTAL			$7,676,000

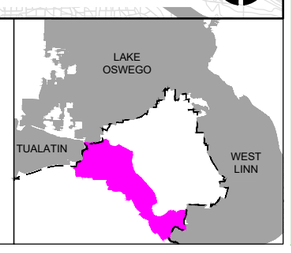
STORM				
STORM PROVIDER: CITY OF TUALATIN, CITY OF WEST LINN				
WATERSHED: FANNO CREEK-TUALATIN RIVER				
SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	18" PIPE (LF)	12,600	$400	$5,040,000
	24" PIPE (LF)	6,000	$425	$2,550,000
	30" PIPE (LF)	0	$500	$0
	WATER QUALITY/ DETENTION (SF)	70,750	$150	$10,612,500
	TOTAL			$18,202,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ORLAND

MACKENZIE.

0 500 1000

BROOKWOOD PARKWAY

Water

Brookwood Parkway would most likely be served by the City of Hillsboro based on proximity. Brookwood Parkway is located between the future North Hillsboro service area and an area served by Tualatin Valley Water. The City of Hillsboro Water Master Plan includes the evaluation of distribution system and storage system under both existing and projected future water demand, which includes Brookwood Parkway as a future growth area (FGA).

The City of Hillsboro owns and operates two municipal drinking water systems, City System (primary) and Upper System (secondary), served by wholesale water purchased from Joint Water Commission (JWC). The City also provides wholesale water to City of Cornelius, City of Gaston and LA Water Cooperative. The City of Hillsboro and Tualatin Valley Water District are developing the Willamette Water Suply System (WWSS), a new water supply system from the Willamette River, to address rapid growth in City of Hillsboro City System and City of Cornelius. The expected completion for this project is June 2026. There is also a planned upgrade for the existing JWC Water Treatment Plant.

The following assessment is based on information from City of Hillsboro Water Master Plan, dated June 2019. Full buildout in the Master Plan includes the existing service area, as well as new areas being developed (referred to as “SoHi”, “NoHi”, and “Future Growth Areas (FGA)” and is assumed to occur by 2070.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – The WWSS has sufficient capacity to meet demands within the existing service area.

- Storage – additional storage of 6.4 MG is needed for areas within the existing UGB to provide the desired level of service during a regional supply outage.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – without the WWSS, capacity is insufficient to meet projected buildout demands. The WWSS can likely serve a portion of the additional demands for areas outside the current UGB, however available capacity is dependent on the type of development that occurs as part of the buildout scenario.

- Storage – at a minimum, an additional 17.8 MG of storage is needed for any expansion beyond the current UGB, i.e. Brookwood Parkway URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – the WWSS is required to provide additional supply for expansion outside the UGB. With full buildout of the WWSS, a total supply (including JWC supply) of 77.95 MGD would be available. The peak daily demand of the existing service area is 45.1 MGD, leaving 32.85 MGD for future expansion outside the UGB. This supply surplus would be sufficient to serve Brookwood Parkway URA assuming other developments did not occur prior that significantly reduce the surplus.

- Storage – Areas outside the existing UGB cannot be served without additional storage capacity.

Sanitary Sewer

The City of Hillsboro and Clean Water Services work together to manage the sanitary sewer system near the Brookwood Parkway URA. The primary point of connection for this URA would likely be a Clean Water Services main in NW Meek Road.

The Master Plan for the Clean Water Services (West Basin, which includes City of Hillsboro) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Brookwood Parkway URA. Full development of areas inside the UGB does not happen prior to the addition of URA into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URA added to the UGB.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

Storm

Brookwood Parkway would most likely be served by the City of Hillsboro based on proximity. The Brookwood Parkway URA is included in the planning area of the City of Hillsboro Master Plan and is part of the McKay Creek Basin.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area included in the Master Plan is the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City plans to begin planning in the next several years (including the Brookwood Parkway URA).

City of Hillsboro and Clean Water Services standards require on-site detention for expansion areas identified in the City of Hillsboro Stormwater Master Plan, which includes the Brookwood Parkway URA.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

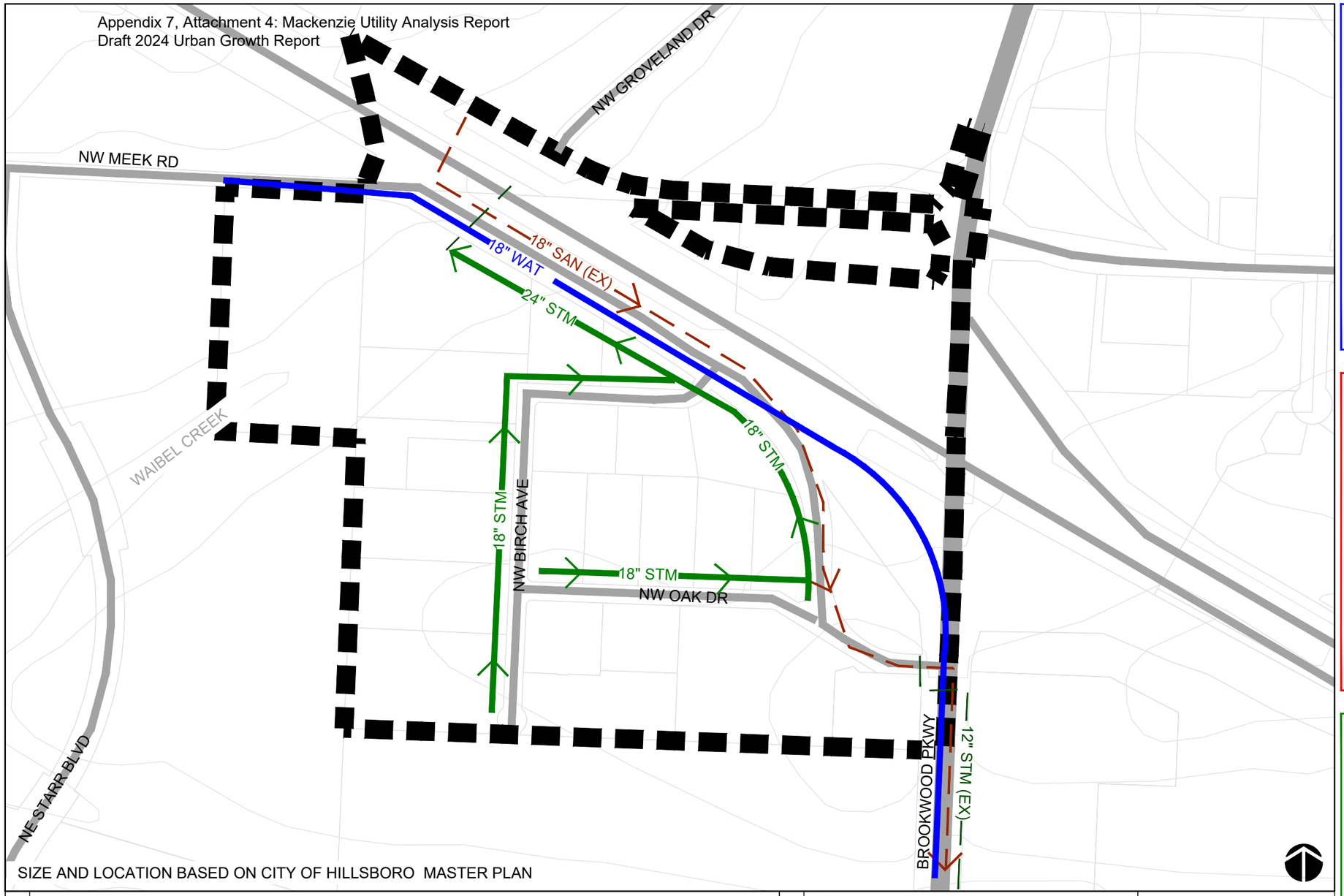
The Master Plan identifies and categorizes 475 known issues in the existing system. Of the 475 issues identified, 14% were related to water quantity, i.e. pipe, outfall and culvert capacity issues. None of the issues are immediately adjacent to the Brookwood Parkway URA.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Based on topography, the Brookwood Parkway URA would discharge directly to Waibel Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Hillsboro infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography, the Brookwood Parkway URA would discharge directly to Waibel Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to or impact any of the existing City of Hillsboro infrastructure.



WATER

WATER PROVIDER: CITY OF HILLSBORO

SERVICE AREA: NORTH HILLSBORO (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
18" PIPE (LF)	3,125	$650	$2,031,250
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.2	$200,000	$40,000
TOTAL			$2,071,250

SANITARY

SANITARY PROVIDER: CITY OF HILLSBORO/CLEAN WATER SERVICES (CWS)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$0

STORM

STORM PROVIDER: CITY OF HILLSBORO/CLEAN WATER SERVICES (CWS)

WATERSHED: DAIRY CREEK

SUB-WATERSHED: LOWER MCKAY CREEK

PROPOSED IMPROVEMENTS

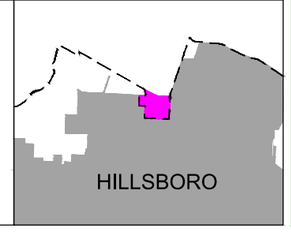
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	3,000	$400	$1,200,000
24" PIPE (LF)	700	$425	$297,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY & DETENTION	5,150	$150	$772,500
TOTAL			$2,270,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ROO WOOD PAR WAY

MACKENZIE.

0 150 300

DAMASCUS

Water

The Damascus URA would be served by Sunrise Water Authority as it is currently within their rural area as part of the Sunridge pressure zone.

The following is based on information provided by Sunrise Water Authority District Engineer.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Existing water facilities are able to serve the existing customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Water system improvements would be needed if the Damascus area were to expand by customer addition. Sunrise is planning on serving the future needs of this area as it grows.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Water system improvements would be needed if the Damascus area were to expand by customer addition, which includes the Damascus URA. The Sunrise Water Authority 20-Year Capital Improvement Plan (dated November 2017) identifies several storage, pumping, transmission line and treatment projects that would be required to serve the Damascus URA without negatively impacting their existing service area.

Sanitary Sewer

The Damascus area within the existing UGB is currently served by private septic systems and there is no existing public sanitary sewer infrastructure. The nearest sanitary district to the Damascus area is Clackamas Water Environment Services (WES) service rate Zone 2.

To serve the Damascus URA with public sanitary sewer infrastructure rather than private septic systems, a sewer trunk line would need to be installed. The closest sanitary sewer point of connection is at the intersection of Highway 212 and Highway 224. The sanitary sewer trunk would likely follow Highway 212 to the Damascus area, resulting in approximately 6 miles of pipe.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There are no existing public sanitary sewer facilities near the Damascus URA.

Storm

According to a Clackamas County Principal Planner, it is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the Damascus area. The nearest adjacent stormwater management area is Water Environment Services (WES) which borders Damascus to the west.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

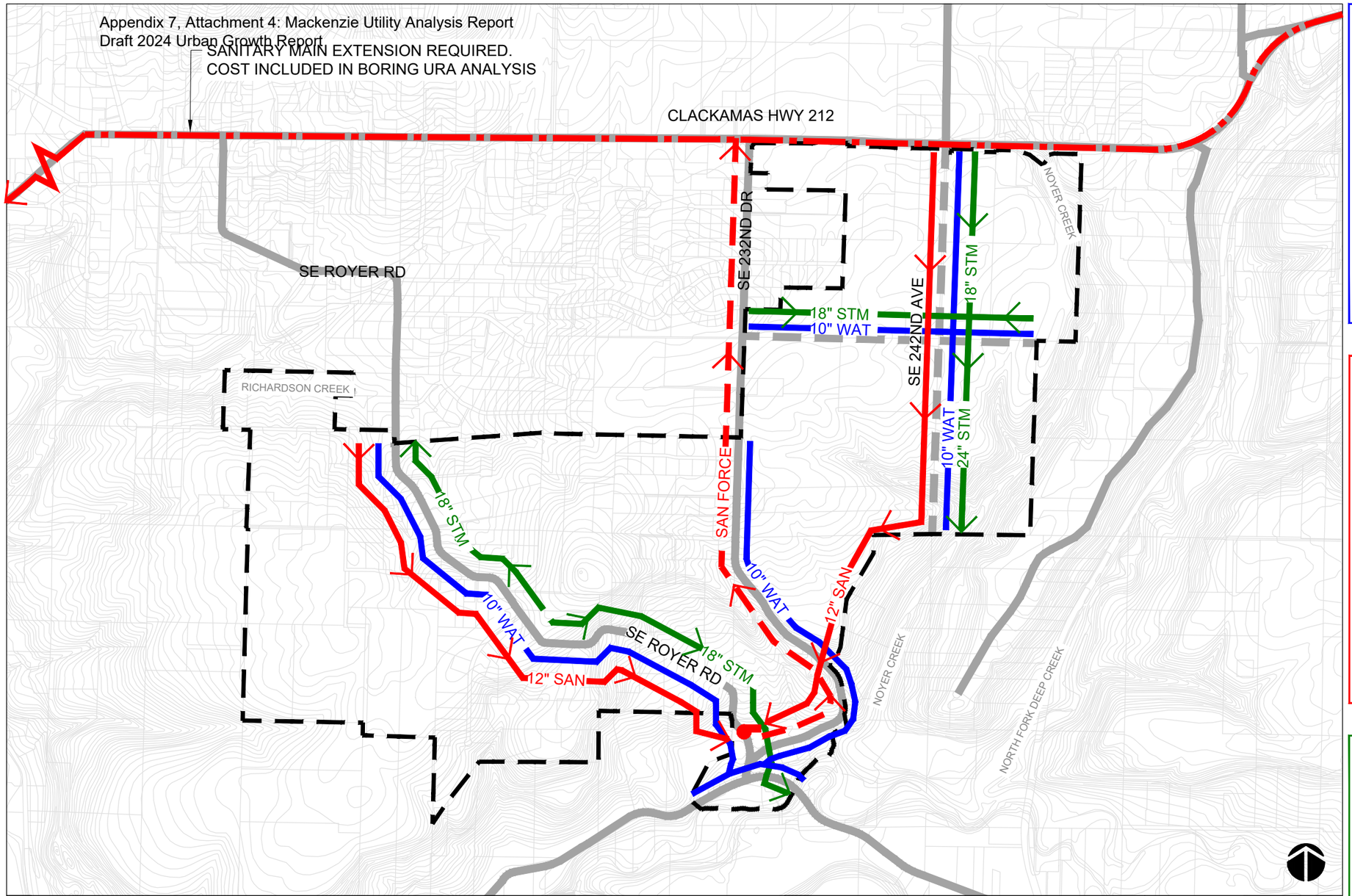
It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

It is currently unknown what municipal stormwater facilities or infrastructure, if any, serve the area in Damascus, Oregon.

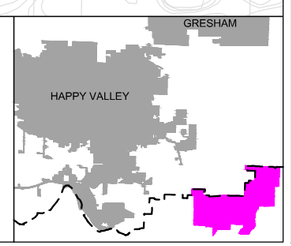


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY EXTENSION FROM BORING URA
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: SUNRISE WATER AUTHORITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	23,750	$350	$8,312,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	3.9	$200,000	$780,000
TOTAL			$9,092,500

SANITARY

SANITARY PROVIDER: CLACKAMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

RATE ZONE: 2

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	24,400	$350	$8,540,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	3.9	$1,800,000	$7,020,000
SAN FORCE (LF)	9,300	$310	$2,883,000
TOTAL			$18,443,000

STORM

STORM PROVIDER: CLACKAMAS COUNTY

WATERSHED: LOWER CLACKAMAS RIVER

SUB-WATERSHED: NORTH FORK DEEP CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	14,100	$400	$5,640,000
24" PIPE (LF)	2,800	$425	$1,190,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY & DETENTION	52,300	$150	$7,845,000
TOTAL			$14,675,000

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

DAMAS US

MACKENZIE.

0 500 1000

DAVID HILL

Water

David Hill URA would likely be served by the City of Forest Grove as it is included in the City of Forest Grove Master Plan's study area and spans the existing 435 and 540 pressure zones and future 710 and 880 pressure zones. The 435 and 540 pressure zones are supplied by the 1.0 MG David Hill Reservoir, which is served by the David Hill and Watercrest Pump Stations.

The City of Forest Grove's water supply is a combination of City supply and water from the Joint Water Commission (JWC), seasonally dependent. The water treatment plant is City owned and operated and supplies finished water to a City owned 5 MG reservoir.

The following assessment is based on information from City of Forest Grove Water System Master Plan, dated May 2022. In this assessment, future expansion refers to infill development within the existing City limits and select expansion areas, including the David Hill URA. Future development of the David Hill URA is assumed to occur after 2041.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – the City has sufficient capacity in raw water supply, treatment capacity, and finished water transmission.

- Storage – There is a storage surplus of 0.21 MG for the 435 and 540 pressure zones under current conditions.

- Pump – There is a pump capacity surplus of 373 MG for the Watercrest and David Hill Pump Stations under current conditions.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – There will be a supply deficit of 0.20 MG by 2041 and a deficit of 0.55 MG by 2071 for the 435 and 540 pressure zones. The David Hill URA is assumed to be developed after 2041, so this deficit indicates that additional supply will be needed to develop David Hill.

- Storage – System storage for all zones will be deficient in the next five years (from date of Master Plan). The City of Forest Grove Master Plan proposes the addition of a 0.5 MG reservoir to serve the 710 pressure zone.

- Pump – The existing 540 pump stations (David Hill and Watercrest) have sufficient capacity for future expansion.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – The City's capital improvement plan has identified several projects related to water supply that would be needed to provide adequate supply to this expansion without negative impacts to existing water systems.
- Storage – Storage for the 435 and 540 pressure zones becomes deficient by 2041 (it is assumed in the Master Plan that David Hill URA development would occur after 2041). Incorporation of the David Hill URA into the UGB is included in the future conditions of the City Master Plan, so additional storage will be required once this occurs. The City has capital improvement projects identified to provide this additional storage once expansion occurs.
- Pump – Without the construction of additional pumps, the Watercrest and David Hill Pump Stations, which serve existing pressure zones 435 and 540 as well as future zones 710 and 880, have a capacity deficit of 163 gpm by 2071. The City's capital improvement plan also identifies an upgrade to the existing Watercrest Pump Station to help serve the David Hill URA.

Sanitary Sewer

City of Forest Grove and Clean Water Services (CWS) are the likely providers for the David Hill URA as it is adjacent to existing Forest Grove service area and sanitary infrastructure. The City of Forest Grove facilities generally flow east through the City toward Clean Water Services trunk line running parallel to Council Creek.

The Master Plan for the Clean Water Services (West Basin) is currently in development. The following assessment is based on information from the City of Forest Grove Wastewater System Master Plan, dated November 2007, the Forest Grove West Side Development – Sanitary Sewer Capacity Memorandum, dated January 2022, the City of Forest Grove Westside Planning Program Refinement Plan, dated August 2017, as well as communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City of Forest Grove Master Plan analyzes the sanitary sewer conveyance system under existing (2010) demands and identified four areas of immediate concern. The one most closely related to the David Hill URA is the Brooke Street sewer main, is the suggested point of connection for the NW David Hill Road and NW Thatcher Road extensions per the City of Forest Grove Westside Refinement Plan. Modeling suggests some surcharging in the Brooke Street line, indicating a capacity issue.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Brooke Street surcharging as described above would become more significant with the development of the David Hill URA. The Westside Refinement Plan suggests that this line be monitored during wet weather flows to further determine capacity issues.

This area is acknowledged as part of the WBMP study area but has not been examined in detail. Sewer planning for this area was contemplated during the previous UGB expansion in northwest Forest Grove. The topography of the area will limit the density of development. Northern areas will contribute to existing sewer lines which have been analyzed and have sufficient capacity. Southern areas will contribute to a different existing trunk sewer system. Downstream trunk sewers have been sized to accommodate residential growth in this area.

Both areas are tributary to the existing 36-inch diameter Council Creek Trunk Sewer which has limited downstream capacity immediately upstream from the Hillsboro Water Resource Recovery Facility (WRRF). Plans are underway to construct capacity relief for the existing downstream deficiency. The existing downstream capacity limitations are expected to be resolved within approximately five years.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Brooke Street surcharging as described above would become more significant with the development of the David Hill URA.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

The Council Creek Trunk Sewer, which is downstream of the David Hill URA, has limited capacity and planning is currently underway to provide additional capacity that will be needed to serve the David Hill URA without negative impacts to the existing system.

Storm

City of Forest Grove and Clean Water Services are the likely providers for the David Hill URA based on proximity and topography. Stormwater from the David Hill URA generally flows south toward Highway 8 where it would discharge to an unnamed City maintained creek that runs southeast along the City boundary until it merges with Gales Creek near the south end of Forest Grove.

The following assessment is based on information from the City of Forest Grove Storm Drainage Master Plan, dated November 2007.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The City of Forest Grove Master Plan identifies nine capital improvement projects that were determined to be immediate needs to address capacity issues in the existing system based on modeling of the current city zoning and a percentage of basin buildout for the 5-year, 24-hour storm event.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to existing City storm infrastructure.

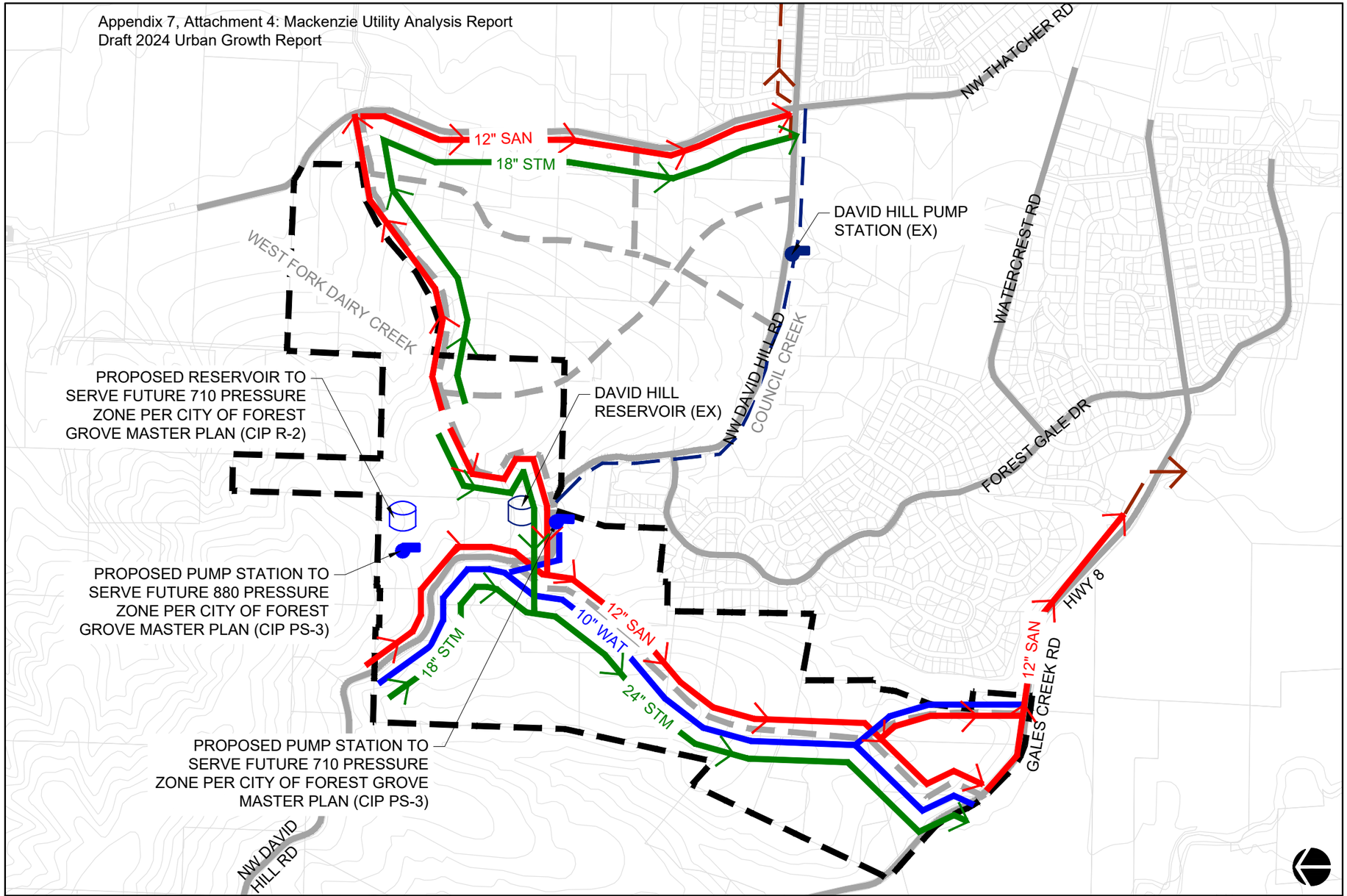
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The City of Forest Grove Master Plan identifies nine capital improvement projects that were determined to be immediate needs to address capacity issues based on modeling the buildout condition for the 25-year, 24-hour storm event.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to existing City storm infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography the David Hill URA would outfall directly to Gales Creek and would thus not connect to or impact existing City storm infrastructure.



WATER

WATER PROVIDER: CITY OF FOREST GROVE

PRESSURE ZONE: 435/540 (EXISTING), 710/880 (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	8,370	$350	$2,929,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)		$5,800,000	$1,750,000
STORAGE RESERVOIR (MG)	0.8	$200,000	$160,000
TOTAL			$4,839,500

CITY OF FOREST GROVE DOES NOT GIVE A TOTAL STORAGE VOLUME, SO COST IS PER THE MASTER PLAN

SANITARY

SANITARY PROVIDER: CITY OF FOREST GROVE, CLEAN WATER SERVICES (CWS)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	20,250	$350	$7,087,500
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$7,087,500

STORM

STORM PROVIDER: CITY OF FOREST GROVE, CLEAN WATER SERVICES (CWS)

WATERSHED: GALES CREEK, DAIRY CREEK

SUB-WATERSHED: LOWER GALES CREEK, COUNCIL CREEK, LOWER WEST FORK DAIRY CREEK

PROPOSED IMPROVEMENTS

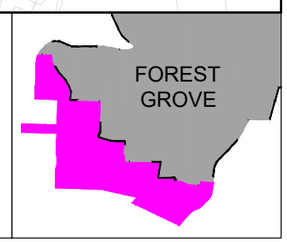
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	11,000	$400	$4,400,000
24" PIPE (LF)	4,500	$425	$1,912,500
30" PIPE (LF)	0	$500	0
WATER QUALITY/ DETENTION (SF)	24,600	$150	$3,690,000
TOTAL			$10,002,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- WATER PUMP STATION (EX)
- WATER RESERVOIR
- WATER RESERVOIR (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

DAVID HILL

MACKENZIE.

0 500 1000

ELLIGSEN ROAD NORTH

Water

Elligsen Road North URA would likely be served by the City of Wilsonville as it is partially included in their Master Plan study area. According to the City of Wilsonville Water System Master Plan, Elligsen Road North would be part of pressure zones C and D, served by the 'C' Level Reservoir.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Elligsen Road North URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Wilsonville Southwest is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of residential areas (including Elligsen Road North) is not projected to occur until 2045, so additional storage will be needed for its development.
- Pumping – A new pump station will be required to serve future development in the northeast portion of the study area, which includes Elligsen Road North.
- Distribution – the size of existing pipe trunks is adequate for future buildout.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of the Elligsen Road North URA into the UGB.

The Zone D Booster Station at C Level Tank is required to provide adequate pumping capacity to serve Elligsen Road North and is identified as a capital improvement project in the Master Plan. Without the addition of this pump, the existing system may experience pump capacity issues.

Sanitary Sewer

The Elligsen Road North URA would likely be served by the City of Wilsonville based on proximity. The majority of the Elligsen Road North Urban Reserve Area is included in the study area of the Master Plan, with the exception of the northeast corner. Elligsen Road North URA falls within the Coffee Creek, Canyon Creek and Boeckman sewer basins. Canyon Creek and Boeckman sewer basins are served by Canyon Creek and Memorial Park pump stations, respectively. There are no pump stations serving the Coffee Creek basin.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve future planning areas. The City of Wilsonville has capital improvement projects identified for both, with an estimated time frame of 6-10 years for Memorial Park and 11-20 years for Canyon Creek (relative to the report dated 2014).

There are also several trunk line extensions required to serve future development areas, including the Elligsen Road North URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional pump capacity and trunk line extensions are needed to serve this URA without negative impacts to existing sanitary sewer infrastructure within the Coffee Creek, Canyon Creek and Boeckman Basins.

Storm

City of Wilsonville is the likely provider for Elligsen Road North URA, as it is located partially within the Boeckman Creek and Coffee Lake Creek Basins and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

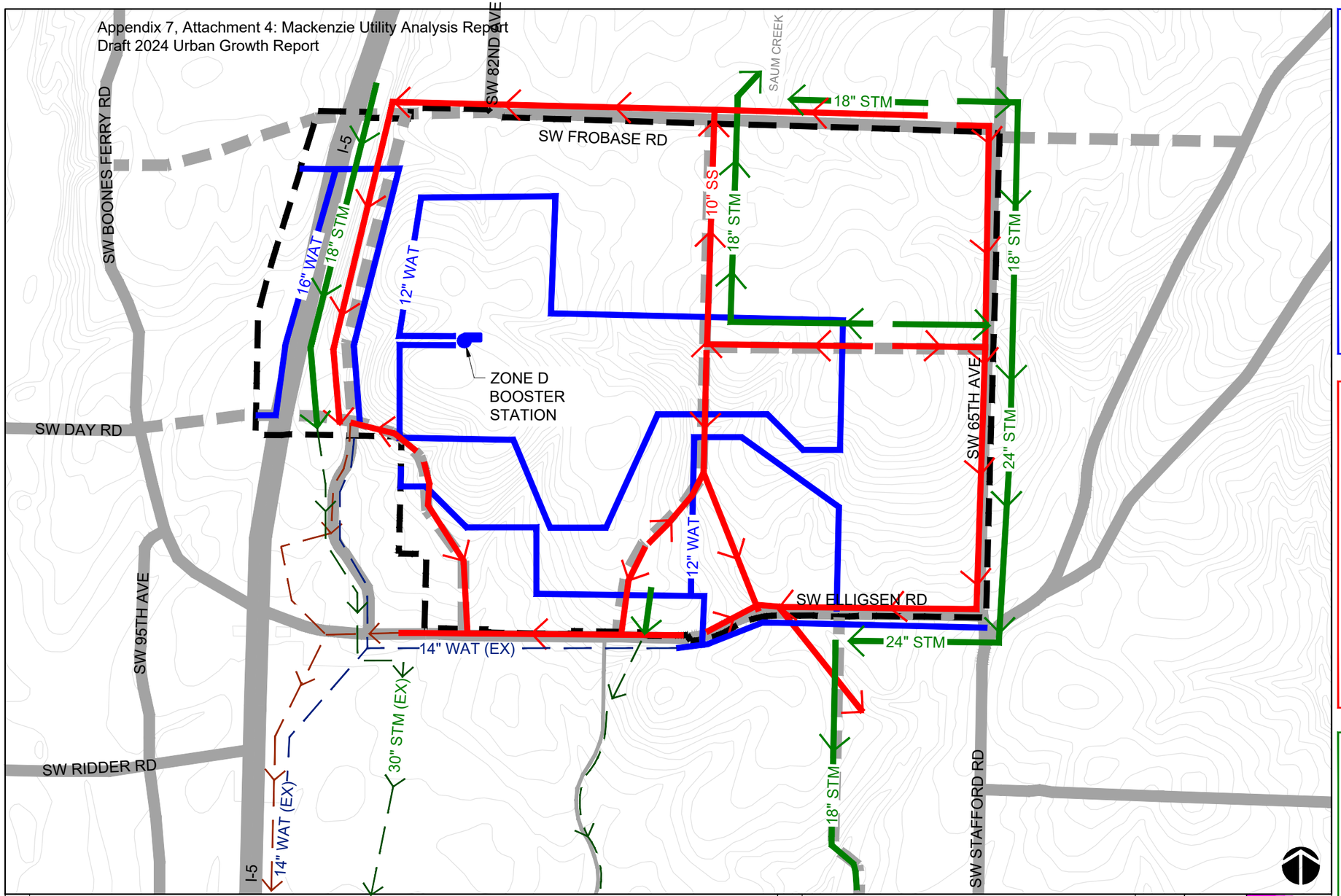
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography, portions of the Elligsen Road North URA could outfall directly to a tributary of Boeckman Creek, however the southwest quadrant flows southwest toward Interstate 5. Stormwater from this area would likely connect to existing City infrastructure near Elligsen Road and generally flow south and either outfall to Boeckman Creek or Coffee Lake Creek before flowing south to the Willamette River. The City's assessment of problem areas does not appear to include any stormwater infrastructure between the URA and either Creek.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Master Plan does not indicate capacity issues in the stormwater infrastructure that the southwest portion of the site would connect to, however this does not contemplate the addition of stormwater from a portion of this URA. It is unclear whether existing pipes have the capacity to serve the URA if added to the UGB.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: C/D

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	25,550	$400	$10,220,000
16" PIPE (LF)	2,800	$500	$1,400,000
PUMP STATION (MGD)		$5,800,000	$609,000
STORAGE RESERVOIR (MG)	2.2	$200,000	$440,000
TOTAL			$12,669,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: COFFEE CREEK/CANYON CREEK/BOECKMAN

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,700	$275	$742,500
12" PIPE (LF)	4,300	$350	$1,505,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	2.2	$1,800,000	$3,960,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$6,207,500

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

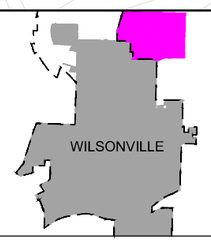
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	10,000	$400	$4,000,000
24" PIPE (LF)	6,200	$425	$2,635,000
30" PIPE (LF)	0	$500	0
WATER QUALITY/ DETENTION (SF)	61,350	$150	$9,202,500
TOTAL			$15,837,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ELLIGSEN ROAD NORTH

MACKENZIE.

0 500 1000

ELLIGSEN ROAD SOUTH

Water

Elligsen Road South URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Elligsen Road South would be part of pressure zones B and C, served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG) and C Level Reservoir (2 MG capacity) respectively. The Elligsen Reservoirs received water via gravity flow, while the C Level Reservoir receives water via the B to C Booster Station.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Elligsen Road South URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Elligsen Road South is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of residential areas (including Elligsen Road South) is not projected to occur until 2045, so additional storage will be needed for its development.
- Pumping – A pump station will be required to serve future development in the northeast portion of the study area, which includes Elligsen Road South.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of this URA into the UGB.

The Zone D Booster Station at C Level Tank is required to provide adequate pumping capacity to serve Elligsen Road South and is identified as a capital improvement project in the Master Plan. Without the addition of this pump, the existing system may experience pump capacity issues.

Sanitary Sewer

The Elligsen Road South URA would likely be served by the City of Wilsonville based on proximity. Elligsen Road South is included in the study area of the Master Plan and falls within the Canyon Creek and Boeckman sewer basins. Canyon Creek basin is served by the Canyon Creek Pump Station, and Boeckman basin is served by the Memorial Park Pump Station.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014. The study area for the Master Plan includes current service area within the UGB and urban reserve areas, which includes Elligsen Road South.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Both the Canyon Creek and Memorial Park pump stations require capacity improvements to serve Elligsen Road So. The City of Wilsonville has capital improvement projects identified for both, with an estimated time frame of 6-10 years for Memorial Park and 11-20 years for Canyon Creek (relative to the report dated 2014).

There are also several trunk line extensions required to serve the Elligsen Road South URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional pump capacity and trunk line extensions are needed to serve the Elligsen Road South URA without negative impacts to existing sanitary infrastructure within the Canyon Creek and Boeckman basins.

Storm

City of Wilsonville is the likely provider for Elligsen Road South URA, as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

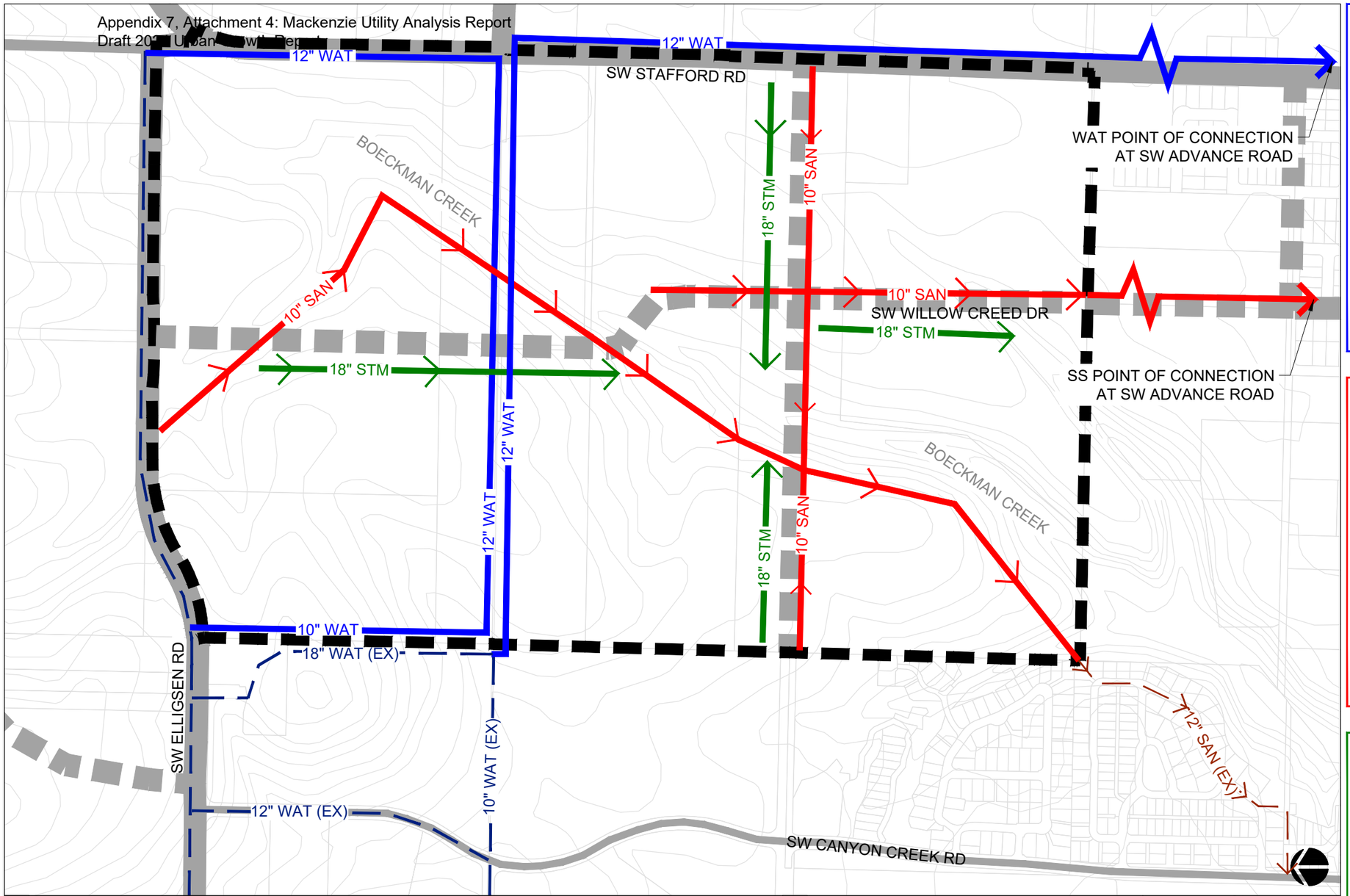
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Elligsen Road South would occur within the development area and outfall directly to Boeckman Creek without connecting to an existing public stormwater system. The City's assessment of problem areas included several areas of observed erosion along Boeckman Creek generally caused by incorrectly constructed or poorly maintained existing outfalls. While it is not the responsibility of Elligsen Road South development to correct these outfalls, any new outfalls should be properly designed and constructed to avoid additional erosion.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Elligsen Road South outfalls directly to Boeckman Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B/C

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,330	$350	$465,500
12" PIPE (LF)	9,770	$400	$3,908,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.0	$200,000	$200,000
TOTAL			$4,573,500

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: CANYON CREEK/BOECKMAN

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	12,600	$275	$3,465,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.0	$1,800,000	$1,800,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$5,265,000

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

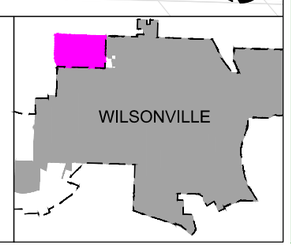
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	4,600	$400	$1,840,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	30,200	$150	$4,530,000
TOTAL			$6,370,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP
ELLIGSEN ROAD SOUTH

MACKENZIE.

0 500 1000

GRAHAMS FERRY

Water

Grahams Ferry URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Grahams Ferry would be part of pressure zone B which is served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG). The Elligsen Reservoirs received water via gravity flow.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City, which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, including Grahams Ferry URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Grahams Ferry is assumed residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of the study area is assumed in the Master Plan to occur in 2036 for non-residential areas and in 2045 for residential areas (Grahams Ferry is included in residential development).
- Pumping – there are no pumping facilities serving pressure zone B. Based on topography, Grahams Ferry could be served by gravity from the Elligsen Reservoirs that serve the rest of pressure zone B.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of Grahams Ferry URA into the UGB.

Sanitary Sewer

The Grahams Ferry URA would likely be served by the City of Wilsonville based on proximity. Grahams Ferry is included in the study area of the Master Plan and falls within the Villebois sewer basin, which does not contain any public pump stations.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has no known hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no pumps required to serve this URA.

There are also several trunk line extensions required to serve future development areas, including the Grahams Ferry URA. The design and costs for these improvements are included in the Master Plan and are shown on the Utility Analysis Map and included in the cost tables of this report.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Additional trunk line extensions are needed to serve this URA without negative impacts to existing sanitary infrastructure within the Villebois basin.

Storm

City of Wilsonville is the likely provider for Grahams Ferry URA, as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

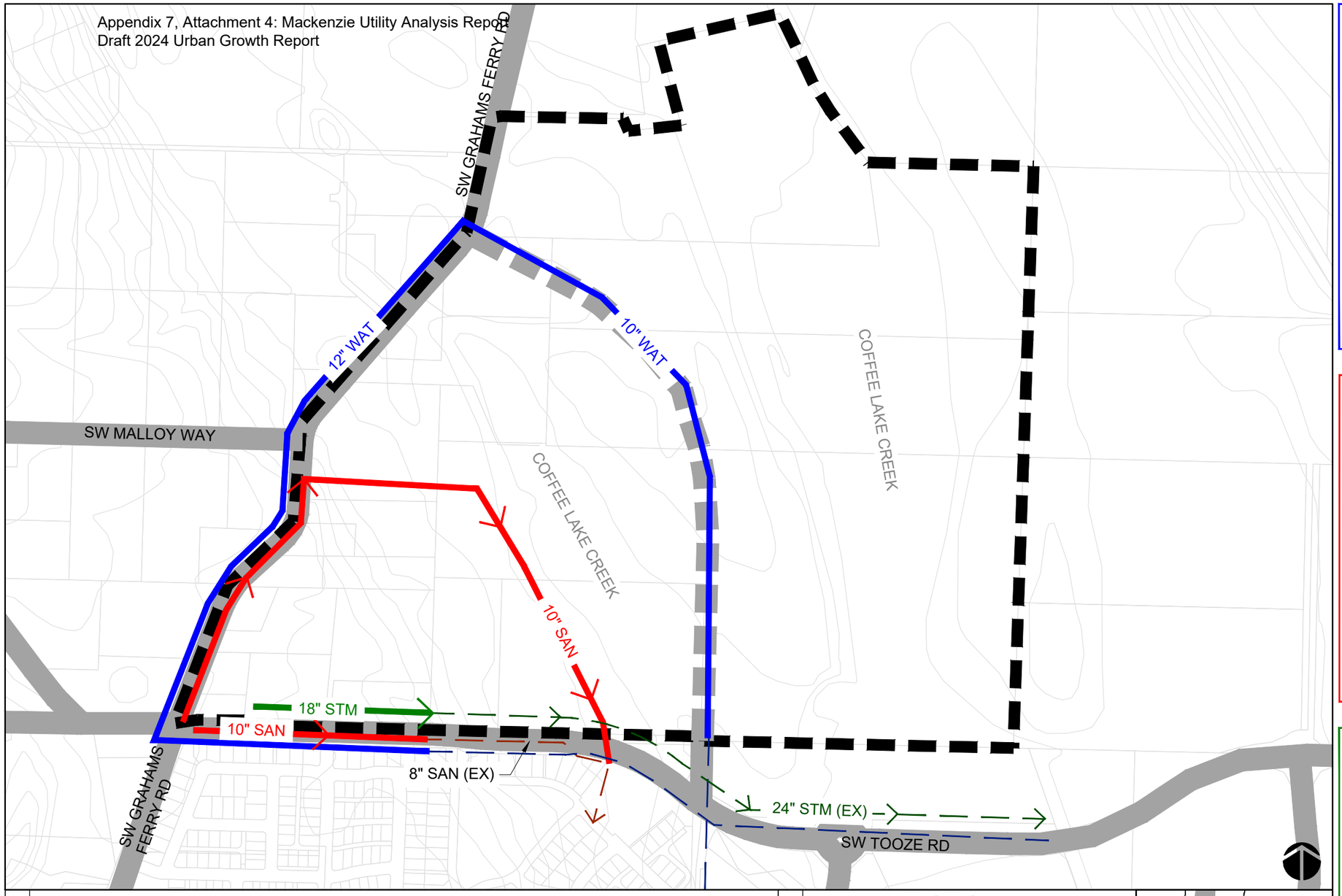
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Grahams Ferry would occur within the development area and outfall directly to Coffee Creek without connecting to an existing public stormwater system. The City's assessment of problem areas did not indicate issues in Coffee Creek downstream of the Grahams Ferry URA.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Grahams Ferry outfalls directly to Coffee Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,820	$350	$987,000
12" PIPE (LF)	4,000	$400	$1,600,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.5	$200,000	$100,000
TOTAL			$2,687,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

ZONE: VILLEBOIS

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	4,500	$275	$1,237,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$1,237,500

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: COFFEE LAKE CREEK-WILLAMETTE RIVER

PROPOSED IMPROVEMENTS

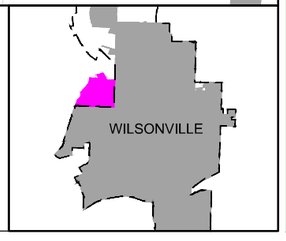
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	800	$400	$320,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	18,400	$150	$2,760,000
TOTAL			$3,080,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

GRAHAMS FERRY

MACKENZIE.

0 500 1000

GRESHAM EAST

Water

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and service area boundaries. If the City of Gresham did serve the Gresham East urban reserve, it would most likely become part of the Wheeler service level due to proximity.

The City of Gresham currently receives most of its water supply from Portland Water Bureau's Bull Run conduits. The remainder comes from groundwater through the Rockwood Water Public Utility District (RWPUD). The City of Gresham and RWPUD plan to transition away from purchasing water from PWB to local groundwater supply by the time their contract with the City of Portland expires in 2026. As a result, there are wells at various stages of planning and construction with sufficient capacity to meet projected 2026 maximum daily demand (MDD), with two planned future wells to provide capacity to meet demands through 2050.

The following assessment is based on information from City of Gresham Water System Master Plan, dated March 2022. City of Gresham master planning considers a full build-out condition for land within current service areas, with full build-out being the development to ultimate capacity according to current land use and zoning designations. While master planning does include a few expansions areas (Pleasant Valley and Springwater), Gresham East URA is not one of these.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Within the Wheeler service level under existing conditions (2020) the required storage (1.28 MG) is less than the existing effective storage (2.03 MG) resulting in a storage surplus of 0.75 MG.
- Pumping – Under existing (2020) conditions the required pump capacity (670 gpm) for the Wheeler service area is less than the total pump capacity for the Salquist and Powell & Barnes Pump Stations (1,900 gpm) resulting in a surplus of 1,230 gpm.
- Distribution – under existing maximum daily demand conditions, the distribution system maintains an adequate minimum service pressure of at least 35 psi in all service levels.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – within the Wheeler service level there is a storage deficit of approximately 0.76 MG by 2050 (not including the urbanization of Gresham East) and the addition of a 2.0 MG reservoir (North Wheeler Reservoir) is recommended to provide storage capacity for future build-out. The addition of the North Wheeler Reservoir would address storage deficiencies in the existing system as a whole, so there is no surplus available to serve the Gresham East URA, and additional storage would likely be needed.
- Pumping – the Wheeler service level is served by the Salquist and Powell & Barnes pump stations, which have a total pump capacity of 1,900 gpm and a required pump capacity of 1,020 gpm for the 2050 building. This leaves a surplus of 880 gpm that is not otherwise allocated in the master plan that has potential to serve the Gresham East URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – Without consideration of serving the Gresham East URA, there is a predicted future storage deficit for the Wheeler service level. To avoid further storage capacity deficit, additional storage would be needed for the development of the Gresham East URA.
- Pumping – pumping capacity is adequate through the 2050 buildout (does not include Gresham East URA), therefore the City has no plans to add capacity to the system in the near future. Additional pumping capacity will likely be needed to serve the Gresham East URA.
- Distribution – there are two planned mainline improvements in roadways near the Gresham East URA; a 16-inch diameter pipe in SE Orient Drive and a 12-inch diameter pipe in near the southern end of the URA boundary (shown on Utiilty Analysis Map for reference). Both of these service extensions are intended to serve the future Springwater service level and it isn't clear whether they are sized adequately to provide service outside the Springwater expansion area.

Sanitary Sewer

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and service area boundaries. The Gresham East URA would most likely be served by the Kelly Creek basin based on proximity and topography.

The following assessment is based on information from City of Gresham Wastewater Collection System Master Plan, dated June 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City of Gresham Public Works Standards (2019) specify an RDII design rate of 1,000 gpnad for new systems. The existing flow conditions for the 5-year storm event is 4,070 gpnad, indicating existing capacity deficiencies in the Upper Kelly Creek Basin Trunk.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Kelly Creek basin has capacity issues under the 2040 flow condition design storm peak flow without consideration of additional flows from Gresham East URA. There are future trunk improvements recommended to address capacity issues for both existing and future services, however it is unclear whether the improvements provide additional capacity for future expansion outside the existing UGB.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There are existing capacity issues for both the existing and future Kelly Creek basin for areas currently within the UGB. If the Gresham East URA were added to this basin without appropriate improvements, this would cause further capacity issues, negatively impacting the areas currently served within this basin, particularly as the Gresham East URA is at the upper end of the basin.

Storm

The City of Gresham is the likely provider for Gresham East URA, as it is located adjacent to the existing City of Gresham city limits and parts of the URA are already included in three of the existing stormwater basins: Kelly/Burlingame Creek, Beaver Creek, and Johnson Creek.

The following assessment is based on information from City of Gresham City-wide Stormwater Master Plan, dated June 2022. City master planning includes the build-out of areas within the study area and planning districts - Gresham East URA is not included in these areas.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

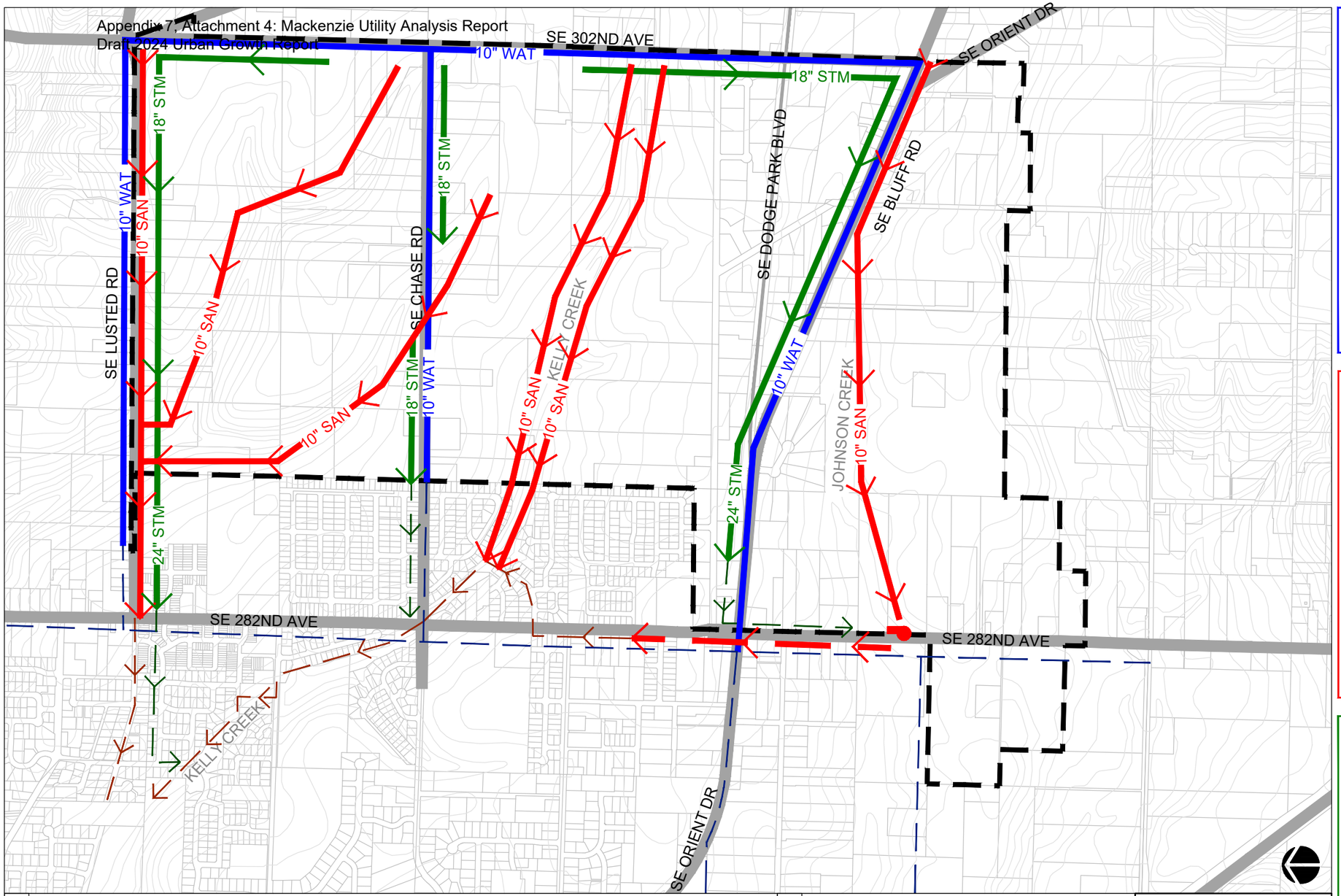
There is no predicted flooding under existing conditions in either the Kelly Creek or Johnson Creek basins for stormwater infrastructure in the area adjacent to Gresham East. The Beaver Creek basin was not modeled as it does not contain a significant amount of infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There is no predicted flooding under future conditions (not including urbanization of Gresham East) in either the Kelly Creek or Johnson Creek basins for stormwater infrastructure in the area adjacent to Gresham East. The Beaver Creek basin was not modeled as it does not contain a significant amount of infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Development/redevelopment of impervious surfaces in the City of Gresham requires on-site stormwater management (water quality and flow control). Gresham East URA contains portions of Johnson Creek, Kelly Creek and Beaver Creek tributary. Based on topography, stormwater could likely be managed and discharge to these waterways without needing connection to public infrastructure. Because flow control would be required by future development, the capacity of the waterways themselves to receive stormwater from the URA should be adequate.

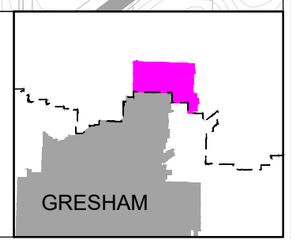


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: CITY OF GRESHAM

PRESSURE ZONE: WHEELER

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	21,130	$350	$7,395,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	3.1	$200,000	$620,000
TOTAL			$8,015,500

SANITARY

SANITARY PROVIDER: CITY OF GRESHAM

BASIN: KELLY CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	29,000	$275	$7,975,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	3.1	$1,800,000	$5,580,000
SAN FORCE (LF)	2,300	$310	$713,000
TOTAL			$14,268,000

STORM

STORM PROVIDER: CITY OF GRESHAM

WATERSHED: LOWER SANDY RIVER, JOHNSON CREEK

SUB-WATERSHED: BEAVER CREEK-SANDY RIVER, UPPER JOHNSON CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	11,100	$400	$4,440,000
24" PIPE (LF)	5,800	$425	$2,465,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	51,300	$150	$7,695,000
TOTAL			$14,600,000

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

GRESHAM EAST

MACKENZIE.

0 500 1000

HENRICI

Water

The Henrici URA would likely be served by Clackamas River Water (CRW) as it is included in the existing planning area as part of the Beavercreek pressure zone. The Beavercreek pressure zone is supplied by the Beavercreek Reservoirs which are served by the Glen Oak Pump Station.

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Henrici URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Under current conditions (2019), there is a storage capacity deficit of 0.31 MG in the Beavercreek Reservoirs.
- Pumping – Under current conditions (2019), within the Beavercreek pressure zone, there is a pumping capacity surplus of 508 gpm.
- Distribution – under current conditions there is a segment of distribution line identified with high head loss within the Henrici URA area of Beavercreek, indicating deficient pipe capacity.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage capacity surplus of 0.34 MG in the Beavercreek Reservoirs under future projections (2038).
- Pumping – there is a pumping capacity surplus of 80 gpm in the Beavercreek service area under future projections (2038).
- Distribution – under future projections (2038) there is a portion of distribution line identified with high head loss within the Henrici URA area of Beavercreek.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Pumping – future projections (2038) indicate a pumping surplus of 80 gpm, however this is less than predicted demand for the Henrici URA. Without additional pumping capacity, existing pump capacity will be exceeded.
- Storage – future projections (2038) indicate a storage surplus of 0.34 MG, however this is less than predicated demand for the Henrici URA. Without additional storage, existing storage capacity will be exceeded.

Sanitary Sewer

Henrici URA would likely be served by City of Oregon City based on proximity. Based on topography, it appears the Henrici URA would flow west toward the existing Clackamas County Water Environment Services (WES) Newell Creek Interceptor in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Clackamas County WES Master Plan identifies hydraulic deficiencies in the existing system (which includes the Newell Creek Interceptor) during the design storm event, mostly from high rainfall derived infiltration and inflow (RDI/I).

There are no pump stations currently serving or required to serve pressure zone B, which includes Henrici.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Clackamas County WES Master Plan identifies a capital improvement project to increase the size of the Newell Creek Interceptor, however it does not provide an estimate for what the increased capacity is or whether a surplus exists for future expansion. Additional capacity of the Newell Creek Interceptor could be required to serve the Henrici URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Henrici URA, as it is located within the Beaver Basin and is adjacent to the City service area boundary. The Beaver Basin does not contain any existing stormwater infrastructure and based on topography generally flows south away from City limits toward Beaver Creek, which flows west and outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the city. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues within the modeled basins (the Beaver Basin was not modeled as it does not contain any existing infrastructure). Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

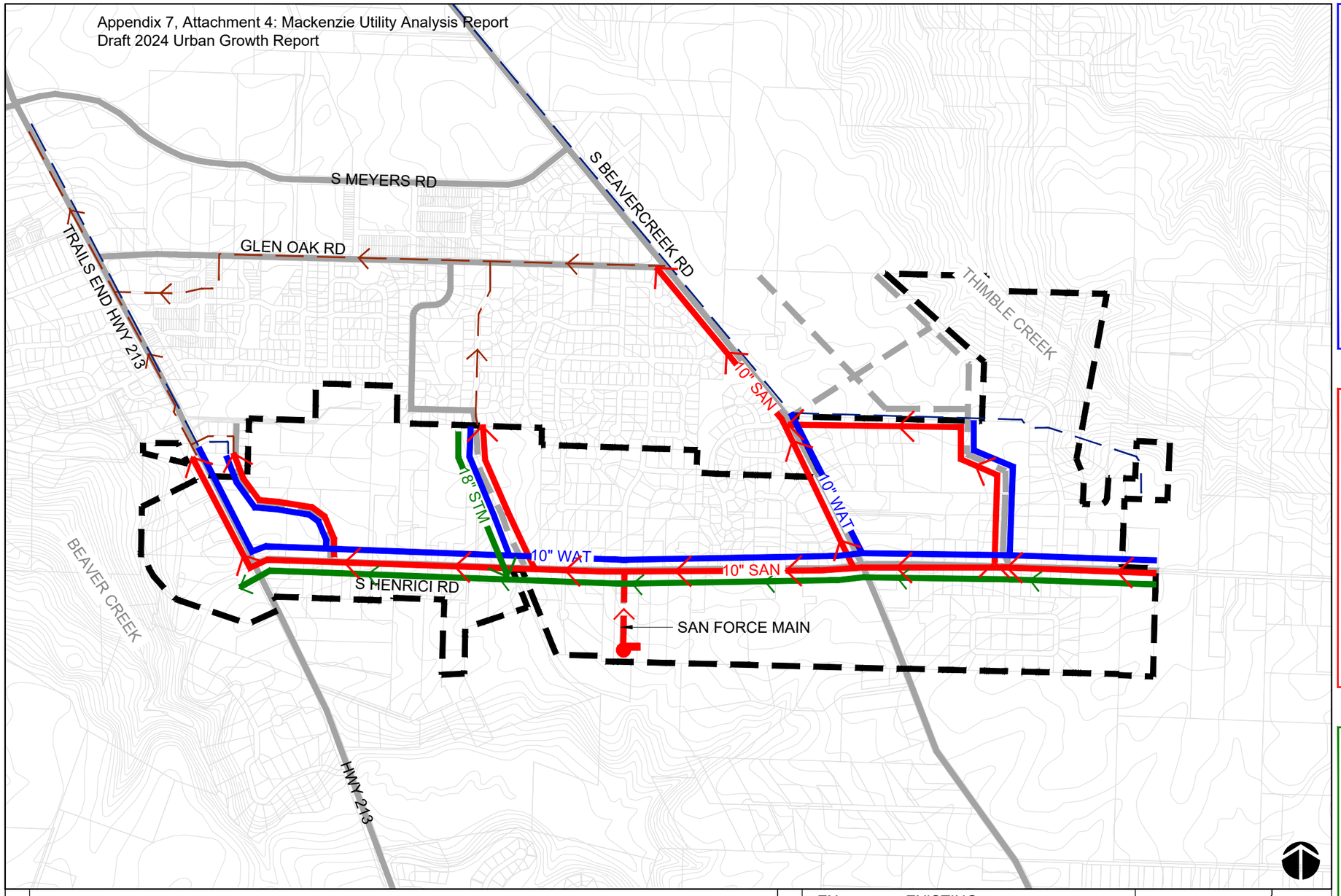
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Beaver Basin as it drains to Beaver Creek) during a 25-year storm event.

Based on topography the Henrici URA would likely outfall directly to Beaver Creek and would thus not connect to or impact existing City storm infrastructure. The addition of the Henrici URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: BEAVERCREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,790	$350	$5,176,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	1.5	$5,800,000	$8,700,000
STORAGE RESERVOIR (MG)	1.5	$200,000	$300,000
TOTAL			$14,176,500

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	18,600	$275	$5,115,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	670	$310	$207,700
TOTAL			$5,862,700

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

OUTFALL: BEAVER CREEK, ABERNETHY CREEK

PROPOSED IMPROVEMENTS

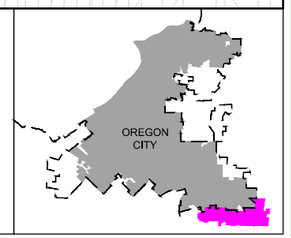
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	1,400	$400	$560,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	39,700	$150	$5,955,000
TOTAL			$6,515,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HENRI I

MACKENZIE.

0 500 1000

HOLCOMB

Water

The Holcomb URA would likely be served by Clackamas River Water (CRW) and is included in the existing planning area as part of the Holcomb and Redland pressure zones. The Holcomb pressure zone is supplied by the Hunter Heights Reservoir and Barlow Crest Reservoirs (both served by the Barlow Crest Pump Station) and the Redland pressure zone is supplied by the Redland Reservoir (served by the Redland Pump Station).

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Holcomb URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Under current conditions (2019), within the Redland service area, there is a storage capacity surplus of 0.76 MG and within the Hunter Heights service area there is a storage capacity surplus of 0.33 MG.
- Pumping – Under current conditions (2019), within the Redland service area, there is a pumping capacity surplus of 898 gpm and within the Hunter Heights service area, there is a pumping capacity deficit of 615 gpm.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage capacity surplus of 0.59 MG in the Redland service area, and a slight deficit of 0.02 MG in the Holcomb Service area under future projections (2038).
- Pumping – there is a pumping capacity surplus of 301 gpm in the Redland service area, and a deficit of 619 gpm in the Hunter Heights service area, under future projections (2038).

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – there is an overall surplus for storage capacity under future projections, which includes the development of Holcomb URA. Based on this surplus, there should be no negative impacts to nearby areas already inside the UGB as a result of developing Holcomb URA.
- Pumping – there is an overall deficit for pumping capacity under future projections, therefore additional pumping capacity will be needed to develop this URA.

Sanitary Sewer

The Holcomb URA would likely be served by the City of Oregon City and Clackamas County Water Environment Services (WES) based on proximity. Based on topography, the Holcomb URA generally flows south and intercepts the existing WES Country Village Interceptor in South Redland Road.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant which are owned and operated by WES.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Country Village Interceptor does not appear to have any predicted surcharging or flooding under existing conditions which indicates it has sufficient capacity to serve areas already inside the UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The Country Village Interceptor in Redland Road does not extend far enough to serve the Holcomb URA. The City of Oregon City Master Plan includes a capital improvement project to extend this interceptor east, far enough to serve the Holcomb URA. The area immediately west of Holcomb is currently undeveloped and identified in Oregon City Master Plan as the Park Place Concept Area – it is not clear whether the proposed Country Village Interceptor extension is sized with enough capacity to serve both the Park Place Concept Area and Holcomb URA.

There are no pump stations currently required downstream of the Holcomb URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The City of Oregon City Master Plan includes a capital improvement project to extend the Country Village Interceptor, but it is not clear whether the proposed extension is sized with enough capacity to serve both the Park Place Concept Area and Holcomb URA. Additional capacity of the Country Village Interceptor could be required to serve the Holcomb URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Holcomb URA, as it is located within the Abernathy Basin and is adjacent to the City service area boundary. The Abernathy Basin has very little existing stormwater infrastructure. Based on topography, the Holcomb URA generally flows south toward Redland Road. The south end of Holcomb URA is adjacent to Holcomb Creek, which discharges to Abernathy Creek south of Redland Road. Abernathy Creek runs west until it outfalls to the Willamette River.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

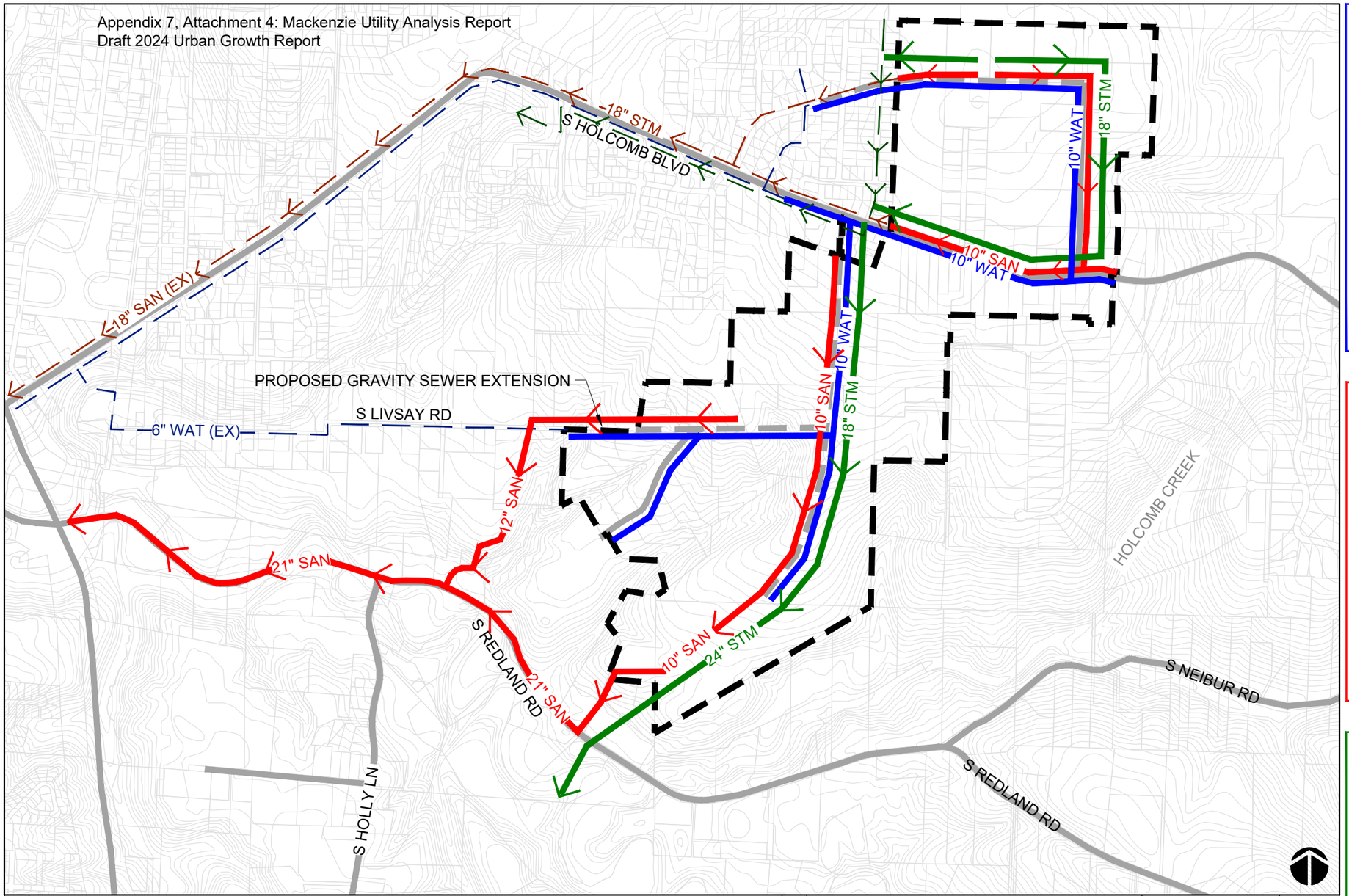
The Master Plan identifies capacity issues within the modeled basins (the Beaver Basin was not modeled as it does not contain any existing infrastructure). Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Abernathy Basin as it drains to Abernathy Creek) during a 25-year storm event.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography the Holcomb URA would likely outfall directly to Holcomb Creek (which flows to Abernathy Creek) and would thus not connect to existing City storm infrastructure. The addition of the Holcomb URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: REDLAND & HOLCOMB

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,450	$350	$5,057,500
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	1.1	$5,800,000	$6380000
STORAGE RESERVOIR (MG)	1.1	$200,000	$220,000
TOTAL			$11,657,500

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY/
CLACKAMAS RIVER WATER (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,800	$275	$2,970,000
12" PIPE (LF)	3,600	$350	$1,260,000
21" PIPE (LF)	3,800	$425	$1,615,000
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	0
TOTAL			$5,845,000

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

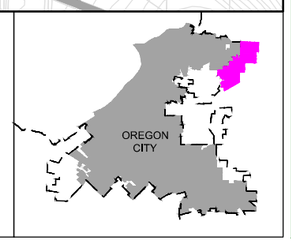
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	7,000	$400	$2,800,000
24" PIPE (LF)	4,000	$425	$1,700,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	19,750	$150	$2,962,500
TOTAL			$7,462,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HOL OM

MACKENZIE.

0 500 1000

HOLLY LANE – NEWELL CREEK CANYON

Water

The Holly Lane – Newell Creek Canyon URA would like be served by Clackamas River Water (CRW) and City of Oregon City as it falls partially within CRW Beavercreek pressure zone and partially adjacent to Oregon City Intermediate and Upper zones. The Intermediate Zone is supplied by the Barlow Crest Reservoir (served by the Hunter Avenue Pump Station) and the Mountainview Reservoir (served by the Division Street Pump Station, which is owned/operated by SFWB). The Upper Zone is served by the Henrici Reservoir (gravity fed) and Boynton Reservoir (gravity fed or manually pumped for fire flow and emergency flow only).

Both CRW (South System) and Oregon City receive water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant. Oregon City conveys treated water via a 30" transmission line and SFWB Division Street Pump Station or 42" transmission line and the City Hunter Avenue Pump Station. SFWB also provides water to Clackamas River Water (CRW) and the City of West Linn, so their demands are considered in overall analysis.

The following assessment is based on information from City of Oregon City Water Distribution System Master Plan, dated January 2012 and Clackamas River Water - Water System Master Plan, South System, dated April 2019. The CRW Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. The Holly Lane – Newell Creek Canyon URA is partially included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Clackamas River Water

- Storage – there is a storage capacity deficit of 0.31 mg in the Beavercreek service area under current conditions (2019).
- Pumping – there is a pumping capacity surplus of 508 gpm in the Beavercreek service area under current conditions (2019).

Oregon City

- Storage – the Boynton, Henrici, Mountainview (No. 1 and No. 2), and Barlow Crest Reservoirs have c combined surplus of 4.99 MG under existing conditions.
- Pumping – the Mountainview and Hunter Avenue Pump Stations have a combined surplus of 4,463 gpm of pumping capacity under existing conditions.
- Distribution – peak hour flows and maximum day demands plus fire flow can be delivered within an acceptable pressure under existing conditions.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Clackamas River Water

- Storage – there is a storage capacity surplus of 0.34 MG in the Beavercreek service area under future projections (2038).
- Pumping – there is a pumping capacity surplus of 80 gpm in the Beavercreek service area under future projections (2038).

Oregon City

Buildout conditions are within the Oregon City existing UGB only and do not include expansion into any of the URA areas.

- Storage – Boyton, Henrici, and Mountainview (No. 2) Reservoirs have a combined storage surplus of 0.38 MG, Mountainview (No. 1) Reservoir has a storage deficit of 2.41 MG, and Barlow Crest has a storage deficit of 1.75 MG under buildout conditions.
- Pumping – The Mountainview Pump Station has a pumping capacity surplus of 236 gpm, the Hunter Avenue Pump Station has a pumping capacity surplus of 248 gpm and the Barlow Crest Pump Station has a pumping capacity deficit of 874 gpm under buildout conditions.
- Distribution – Due to undersized pipes, there are areas where available fire flow was less than the required fire flow under a maximum day demand plus fire flow analysis.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Clackamas River Water

There is an overall surplus for both storage and pumping capacity under future projections, which partially includes the development of Holly Lane – Newell Creek Canyon URA. Based on this surplus, there should be no negative impacts to nearby areas already inside the UGB as a result of developing Holly Lane – Newell Creek Canyon URA.

Oregon City

Storage, pumping and distribution systems have capacity issues under future planning conditions, which does not include the development of Holly Lane – Newell Creek Canyon URA. Addition of this URA to the UGB would cause further capacity deficits if additional storage, pumping and upsizing of pipes did not occur as part of development.

Sanitary Sewer

The Holly Lane – Newell Creek Canyon URA would likely be served by City of Oregon City and Clackamas County Water Environment Services (WES) based on proximity. Based on topography, it appears the Holly Lane – Newell Creek Canyon URA would flow east and west and connect to the existing Clackamas County Water Environment Services (WES) Newell Creek Interceptor in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014 and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Both the Oregon City Master Plan and the WES Master Plan identify segments of the conveyance system that are predicted to surcharge or flood during the design storm event. The Newell Creek Interceptor south of Redland Road has predicted surcharging or flooding under existing conditions which indicates it does not have sufficient capacity to serve areas already inside the UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are existing capacity issues in the Newell Creek Interceptor which indicates it does not have the capacity to serve areas proposed for addition to the UGB.

There are no pump stations currently required downstream of the Holly Lane – Newell Creek Canyon URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The City of Oregon City Master Plan includes a capital improvement project to upsize a portion of the Newell Creek Interceptor south of Redland Road, but it is not clear how much additional capacity this will provide or whether it could serve the Holly Lane – Newell Creek Canyon URA specifically. Additional capacity of the Newell Creek Interceptor could be required to serve the Holly Lane – Newell Creek Canyon URA.

Storm

City of Oregon City is the likely provider for Holly Lane – Newell Creek Canyon URA, as it is located primarily within the Newell Basin and is adjacent to the City service area boundary.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

This URA is generally divided into two sections – area east of Highway 213 and area west of Highway 213. On both the west and east side of Highway 213 there are tributaries of Newell Creek which are generally the low points within this URA. Newell Creek runs north and flows into Abernathy Creek, which runs west until it outfalls to the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

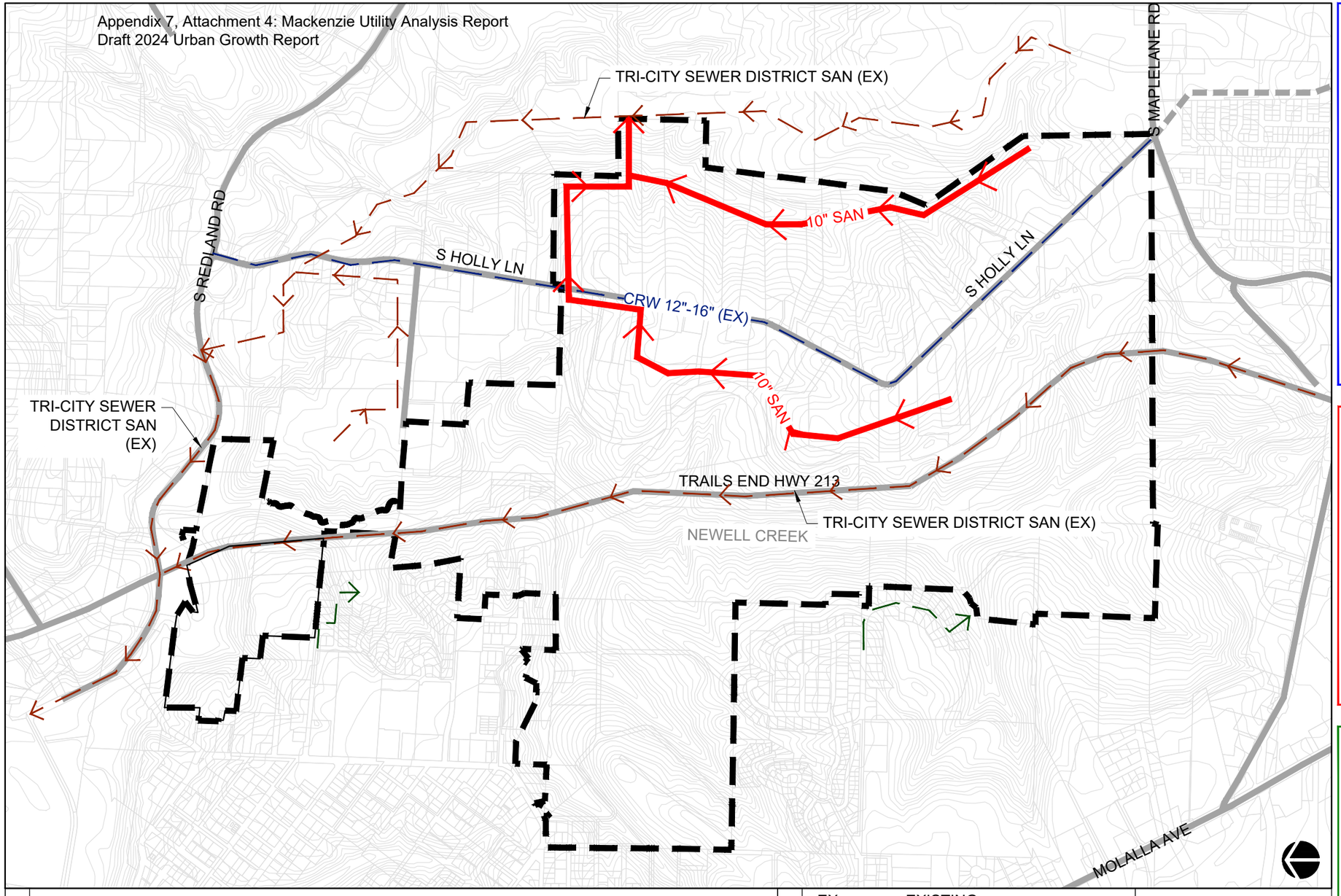
The Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Newell Basin as it drains to Abernathy Creek) during a 25-year storm event.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on this topography, this URA would likely outfall directly to Newell Creek and would thus not connect to existing City storm infrastructure. The addition of the Holly Lane – Newell Creek Canyon URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CITY OF OREGON CITY/ CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: INTERMEDIATE AND UPPER (OREGON CITY) / BEAVERCREEK (CRW)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0.4	$5,800,000	$2,320,000
STORAGE RESERVOIR (MG)	0.4	$200,000	$80,000
TOTAL			$2,400,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,500	$275	$2,887,500
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$2,887,500

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

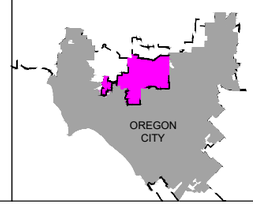
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	19,400	$150	$2,910,000
TOTAL			$2,910,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

HOLLY LANE - NEWELL REE ANYON

MACKENZIE.

0 500 1000

I-5 EAST

Water

The I-5 East URA would most likely be served by the City of Tualatin based on proximity and would be part of the B and C pressure zones. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both of these pump stations have reached the end of their usable lives and do not currently operate, and pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve. Pressure zone C is served by a 0.8 MG reservoir (C-1) which is supplied by the Norwood Pump Station.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. The City of Tualatin existing service area includes areas within City limits and areas within the UGB at the time of the Master Plan. The study area of the Master Plan includes the existing service area as well as planned expansion areas, which does not include I-5 East URA.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for service area B and a surplus of 0.51 MG for service area C under current (2020) conditions.
- Pumping – Under normal pumping conditions, the Norwood Pump Station (serving pressure zone C) has a surplus capacity of 1.33 MGD under existing conditions. The Martinazzi and Boones Ferry Pump Stations (serving pressure zone B) have reached the end of their usable lives and do not currently operate.
- Distribution – There are existing industrial deficiencies in the B service area and residential deficiencies in the C service area. Existing transmission line capacity is also deficient in both B and C levels.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which I-5 East is not included.

- Storage – there is a storage deficit of 1.0 MG for service area B and a deficit of 0.32 MG for service area C under buildout conditions.
- Pumping – Under normal pumping conditions, the Norwood Pump Station (serving pressure zone C) has a surplus capacity of 0.58 MGD under buildout conditions.
- Distribution – new customers requiring large fire flows in the B level service are required to install fire flow pumps. Further development within the C level will result in the system not being able to meet demand without pumping during fire flow or increased transmission. Additional distribution line capacity will be required to develop this URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding I-5 East URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of I-5 East would cause a greater deficit without the addition or expansion of storage facilities.
- Pumping – after full buildout, the Norwood Pump Station (serving pressure zone C) has a capacity surplus (0.58 MGD, which could potentially serve the I-5 East URA. The Martinazzi and Boones Ferry Pump Stations (serving pressure zone B) both require upgrades to be operational.
- Distribution – transmission line improvements are identified in the Master Plan capital improvement projects. These improvements would provide resiliency to the existing water system as well as additional capacity to serve future growth outside the Master Plan study area.

Sanitary Sewer

The I-5 East URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the I-5 East URA flows primarily north where it could connect to the existing City of Tualatin system by either crossing I-205 to the west (Martinazzi Basin) or the north (Nyberg Basin). If it connected to in the Nyberg Basin, it would be served by the Saum Creek Pump Station, which connects to a CWS owned 24-inch pipe that heads west toward the Lower Tualatin Interceptor.

The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF) which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019 and the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Eight of the nine existing CWS owned pump stations have surplus capacity under existing conditions and are therefore adequately serving areas within the existing UGB.

Under existing conditions (2017) there are pipe capacity issues identified in the Teton and Tualatin Reservoir Basins. These capacity issues did not result in any recommended capital improvement projects as they were not identified as they did not qualify as high priority based on the Master Plan deficiency rankings.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include infill of the existing service area as well as two planning areas (does not include I-5 East URA). If the I-5 East URA connected to the City of Tualatin system to the north (Nyberg Basin), it would be served by the Saum Creek Pump Station. The City of Tualatin Master Plan indicates that there is a proposed project that would increase the capacity of the Saum Creek Pump Station but does not specify what the increased capacity is or whether the entire capacity increase is needed for the buildout condition. If the I-5 East URA connected to the City of Tualatin system to the west (Martinazzi Basin), there is no pump station currently serving that basin.

Under buildout conditions, six of the eight basins contain pipe with deficient capacity. Both the Nyberg and Martinazzi Basins contain pipe with deficient capacity under buildout conditions, therefore it can be assumed that the existing sanitary sewer pipes do not have the capacity to serve the I-5 East URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If the I-5 East URA connected to the City of Tualatin system to the north (Nyberg Basin), it is unclear whether the proposed capacity increase to the Saum Creek Pump Station would have the capacity to serve the I-5 East URA. There are pipe deficiencies in both the Martinazzi and Nyberg basins under buildout conditions, which does not include the I-5 East URA. The addition of the I-5 East URA to either of these basins would further contribute to these deficiencies and increased pipe capacity will likely be needed to serve its development.

Storm

The I-5 East URA would most likely be served by the City of Tualatin based on proximity and topography. Based on topography the I-5 East URA generally flows toward Saum Creek which flows north/south through the URA. Saum Creek flows north until it crosses under Interstate 205 where it continues east/north until it reaches the Tualatin River.

The majority of the City of Tualatin drainage basins discharge to the Tualatin River and its tributaries, including Nyberg Creek, Hedges Creek, Cummins Creek, and Saum Creek. The City's infrastructure consists of more small dispersed systems that discharge to these receiving waters rather than large trunk lines.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. Capacity issues were identified at six locations, none of which are in the Saum Creek Basin.

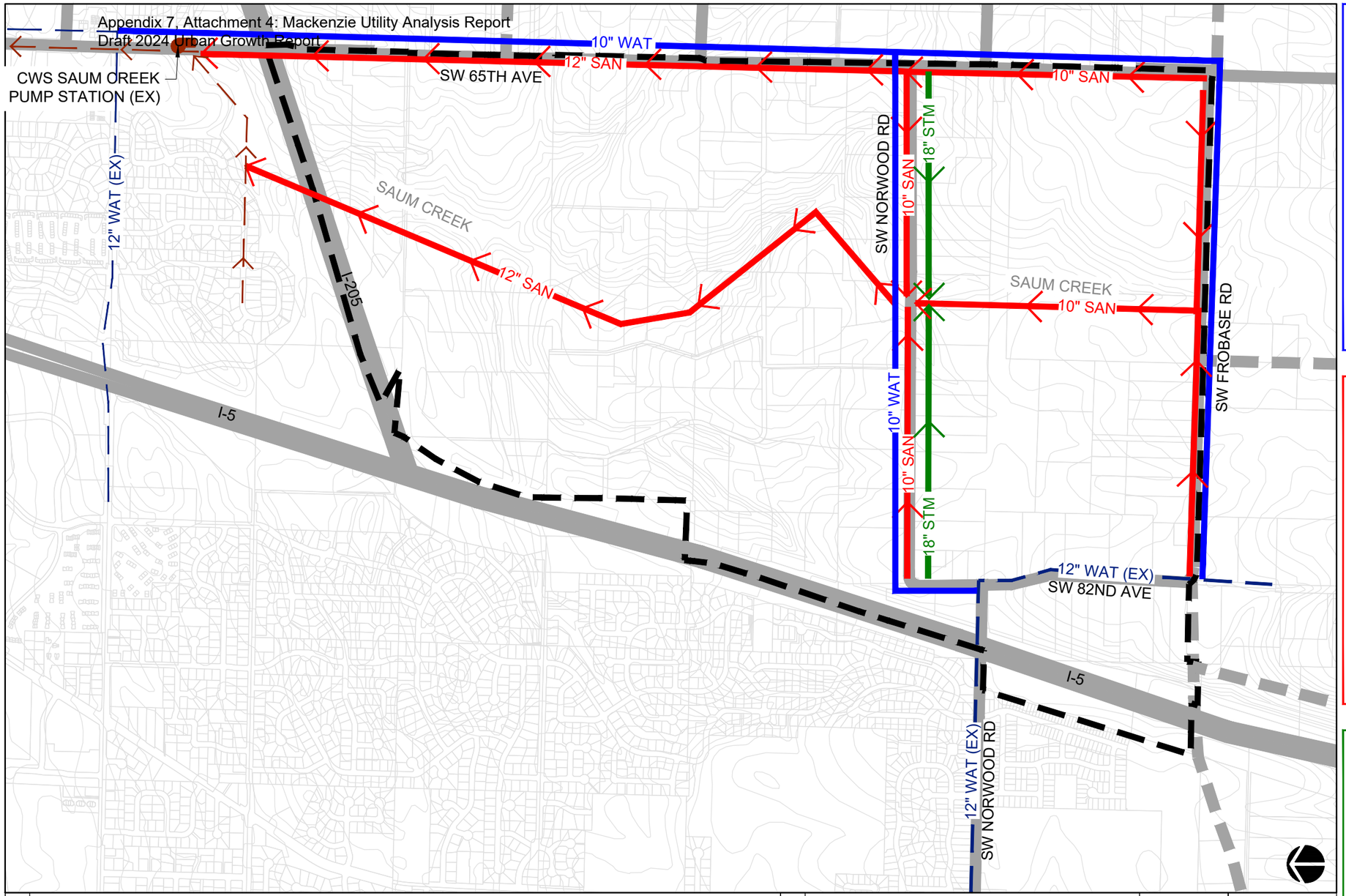
Based on topography, the I-5 East URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The I-5 East URA is within the Saum Creek Basin which does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the I-5 East URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure, therefore existing facilities would not be impacted.



WATER

WATER PROVIDER: CITY OF TUALATIN

PRESSURE ZONE: B/C

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	19,300	$350	$6,755,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.5	$5,800,000	$14,500,000
STORAGE RESERVOIR (MG)	2.5	$200,000	$500,000
TOTAL			$21,755,000

SANITARY

SANITARY PROVIDER: CITY OF TUALATIN

BASIN: NYBERG OR MARTINAZZI

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,200	$275	$3,905,000
12" PIPE (LF)	12,000	$350	$4,200,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	2.5	$1,800,000	$4,500,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$12,605,000

STORM

STORM PROVIDER: CITY OF TUALATIN

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

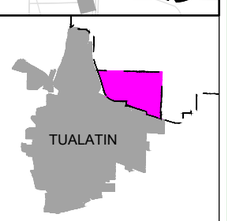
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	4,500	$400	$1,800,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	17,650	$150	$2,647,500
TOTAL			$4,447,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

I- EAST

MACKENZIE.

0 500 1000

MAPLELANE

Water

The Maplelane URA would likely be served by Clackamas River Water (CRW) as it is included in the existing CRW planning area as part of the Henrici pressure zone. The Henrici pressure zone is supplied by the Beavercreek pressure zone (served by the Henrici Reservoirs). There is currently no pump station required to serve the Henrici pressure zone.

Clackamas River Water (South System) receives water from the South Fork Water Board (SFWB), with future plans to construct a backbone connecting the south system to the north system and the CRW water treatment plant.

The following assessment is based on information from Clackamas River Water - Water System Master Plan, South System, dated April 2019. The Master Plan considers its planning area the area CRW plans to serve by the end 2038, and the service area as the area that CRW may serve beyond 2039. A majority of the Maplelane URA is included in the CRW existing service area and planning area. Future demand projections presented in the Master Plan are based on Equivalent Housing Units (EHUs) within pressure zones.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Under current conditions (2019), the Henrici Reservoirs have a storage capacity surplus of 0.29 MG indicating there is adequate storage capacity to serve areas already inside the UGB.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Under future projections (2038) there is a storage capacity surplus of 0.60 MG in the Henrici Reservoirs, thus there is additional capacity available to serve areas proposed for addition to the UGB, depending on their demand.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

There is an overall surplus for storage capacity under future projections, however it is not an adequate surplus to serve the entire Maplelane URA. Additional storage capacity will be needed to develop this URA without causing a deficit for the existing system.

Sanitary Sewer

Maplelane URA would likely be served by Oregon City based on proximity. Based on topography, it appears the Maplelane URA would flow east away from existing Oregon City and Clackamas County sanitary infrastructure. It will therefore need to be pumped west to join the existing City of Oregon City infrastructure located in Beavercreek Road, which flows to the Clackamas County Water Environment Services (WES) Newell Creek Interceptor located in Highway 213.

Wastewater from Oregon City flows to the Tri-City Sewer District (TCSD) trunks, interceptors and eventually the Tri-City Water Pollution Control Plant.

The following assessment is based on information from City of Oregon City Sanitary Sewer Master Plan, dated November 2014.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Surcharging (ranging from minor to severe) exists throughout the existing City collection system. There are also capacity deficiencies in several locations in the WES system.

Two of the twelve existing pump stations (Settler's Point and Cook Street) have existing peak flows that exceed their firm capacity.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are existing capacity issues in the Newell Creek Interceptor which indicates it does not have the capacity to serve areas proposed for addition to the UGB.

There are no pump stations currently required downstream of the Maplelane URA.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The Clackamas County WES Master Plan identifies a capital improvement project to increase the size of the Newell Creek Interceptor, however it does not provide an estimate for what the increased capacity is or whether a surplus exists for future expansion. Additional capacity of the Newell Creek Interceptor could be required to serve the Maplelane URA to reduce impacts to areas already inside the UGB.

Storm

City of Oregon City is the likely provider for Maplelane URA, as it is located within the Abernathy and Thimble Basins and is adjacent to the City service area boundary. Based on topography, the Maplelane URA generally flows east towards tributaries of the Abernathy Creek, which eventually runs west and outfalls to the Willamette River. Topography suggests that this URA would likely outfall directly to Abernathy Creek and would thus not connect to existing City storm infrastructure.

Generally, the City's topographic high point is at the center of the City and receiving waters are on all sides of the City. Because of this, much of the existing infrastructure are small, dispersed pipes and culverts rather than larger trunk lines.

The following assessment is based on information from Oregon City Stormwater Master Plan, dated July 2019. The study area for the Master Plan covers drainage areas to the following receiving water bodies: Abernathy Creek, the Clackamas River, Beaver Creek and the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues within the modeled basins. Two of the modeled basins were determined to contain the most problem areas; the John Adams Basin is described as generally undersized, and the South End Basin was described as an inefficient system with flooding during the 2-year storm event.

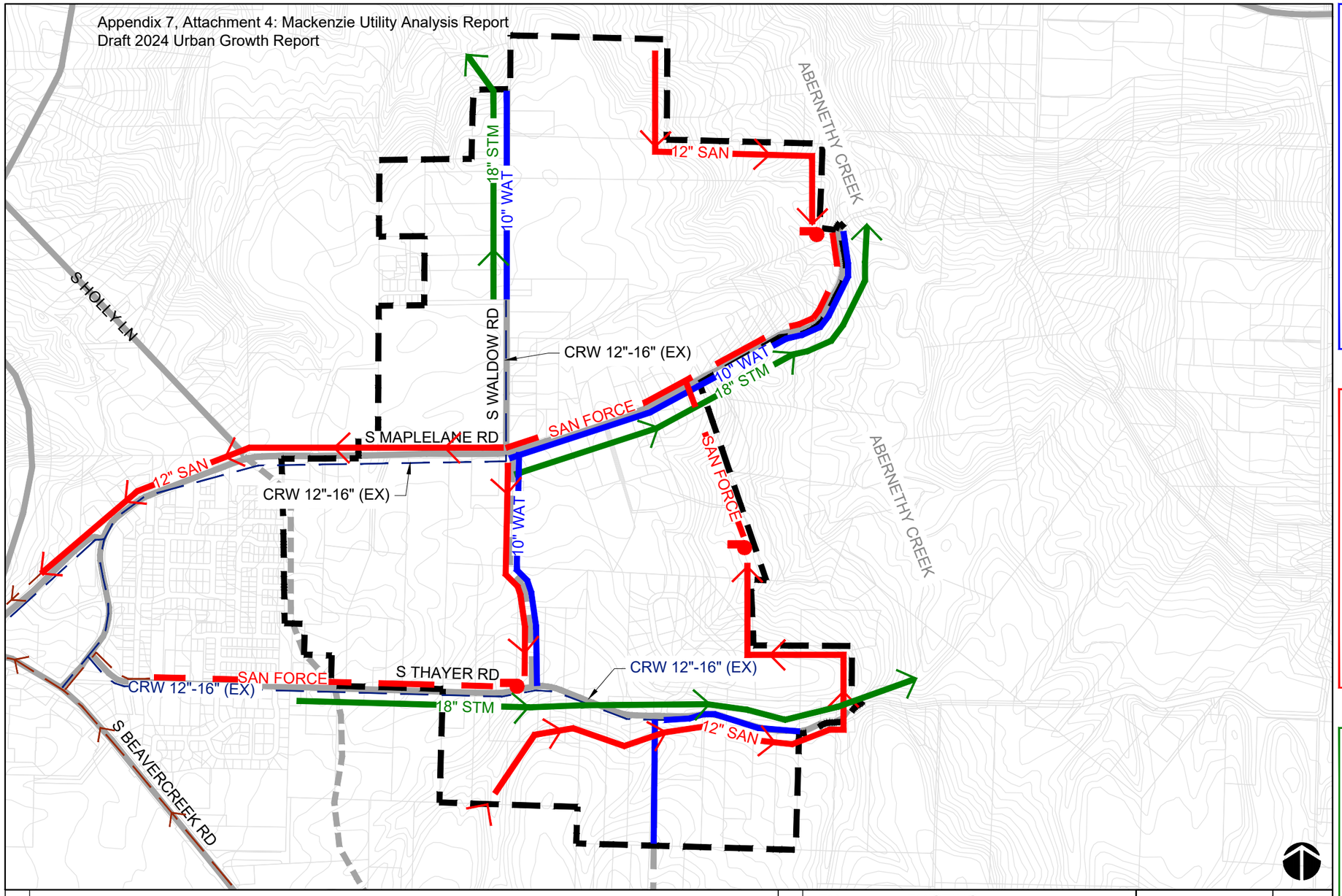
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

There are several problem areas (as defined by the Master Plan) under existing conditions for infrastructure downstream of the URA connections points. Adding stormwater from areas outside the UGB will likely contribute to these existing problems and potentially cause additional problem areas if they are not addressed.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Capital improvement projects to address capacity issues described above are presented in the Master Plan. Completion of these projects is required to provide adequate capacity to serve the study area (which includes the Thimble and Abernathy Basins as they drain to Abernathy Creek) during a 25-year storm event.

Based on topography the Maplelane URA would likely outfall directly to Abernathy Creek and would thus not connect to existing City storm infrastructure. The addition of the Maplelane URA to the UGB would thus have no impacts to existing stormwater facilities.



WATER

WATER PROVIDER: CLACKAMAS RIVER WATER (CRW)

PRESSURE ZONE: HENRICI

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	10,400	$350	$3,640,000
12" PIPE (LF)	0	$400	$0
15" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.7	$200,000	$340,000
TOTAL			$3,980,000

SANITARY

SANITARY PROVIDER: CITY OF OREGON CITY

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$275	$0
12" PIPE (LF)	15,500	$350	$5,425,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.7	$1,800,000	$3,060,000
SAN FORCE (LF)	8,500	$310	$2,635,000
TOTAL			$11,120,000

STORM

STORM PROVIDER: CITY OF OREGON CITY

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: ABERNETHY CREEK

PROPOSED IMPROVEMENTS

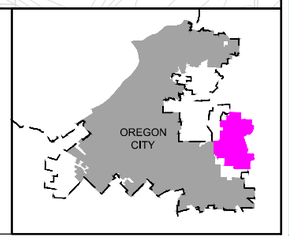
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	12,200	$400	$4,880,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	32,250	$150	$4,837,500
TOTAL			$9,717,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

MAPLELANE

MACKENZIE.

0 500 1000

NORWOOD

Water

The Norwood URA would most likely be served by the City of Tualatin based on proximity and would be part of the B pressure zone. Pressure zone B is served by two storage reservoirs, a 2.2 MG reservoir (B-1) and 2.8 MG reservoir (B-2) which were previously supplied by the Martinazzi and Boones Ferry Pump Stations. Both pump stations have reached the end of their usable lives and do not currently operate. Pressure zone B is now supplied by the Boones Ferry flow control valve/pressure reducing valve.

The City of Tualatin's sole source of water is treated water purchased from Portland Water Bureau. Water is delivered through a 36-inch supply line from the Washington County Supply Line.

The following assessment is based on information from City of Tualatin Water System Master Plan, dated March 2023. Buildout conditions in the City of Tualatin Master Plan include the existing service area and defined expansion areas, of which Norwood is not included.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – there is a storage surplus of 0.19 MG for service area B under current (2020) conditions.
- Distribution – There are existing industrial deficiencies in the B service. Existing transmission line capacity is also deficient.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – there is a storage deficit of 1.0 MG for service area B under buildout conditions. Additional areas outside the current UGB could not be served without increasing storage capacity.
- Distribution – there are existing flow deficiencies within service area B, which can be corrected by upsizing pipes. To serve areas proposed for addition to the UGB, it is likely these undersized pipes will need to be addressed.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Storage – while there is a storage surplus under existing conditions, there is a deficit under the full buildout condition. Assuming adding Norwood URA to the UGB would occur after full buildout of the areas already within the UGB, incorporation of Norwood would cause a greater deficit without the addition or expansion of storage facilities.
- Distribution – without addressing undersized pipes, the number and severity of the existing flow deficiencies could increase if URA land were added to the UGB.

Sanitary Sewer

The Norwood URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the Norwood URA flows primarily north where it would cross I-205 and join the existing City of Tualatin sewer system in the Nyberg Basin. Norwood URA would likely be served by the Borland Pump Station, which connects to a CWS owned 24-inch pipe that heads west toward the Lower Tualatin Interceptor.

The City of Tualatin's sewage is treated at the Durham Advanced Wastewater Treatment Facility (AWWTF) which is owned and operated by Clean Water Services. Clean Water Services is also responsible for gravity sewers over 24-inches in size, pump stations and force mains.

The following assessment is based on information from City of Tualatin Sewer Master Plan, dated August 2019 and the Clean Water Services East Basin 2019 Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- The Borland Pump Station has a surplus of 155 gpm under existing conditions.
- There are no modeled pipe deficiencies (based on HGL criteria outlined in the Master Plan) in the Nyberg basin under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions in the City of Tualatin Master Plan include infill of the existing service area as well as two planning areas (does not include I-5 East URA).

- The Borland Pump Station has surplus capacity under existing conditions, however it is not clear in either the City of Tualatin or Clean Water Services Master Plans whether it has capacity under buildout conditions.
- The Nyberg basin contains deficient pipe (based on HGL criteria outlined in the Master Plan) under buildout conditions.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- It is unclear whether the Borland Pump Station has the capacity to serve additional area.
- There are pipe deficiencies in the Nyberg basin under buildout conditions. The addition of the Norwood URA would further contribute to these deficiencies.

Storm

The Norwood URA would most likely be served by the City of Tualatin based on proximity. Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

The majority of the City of Tualatin drainage basins discharge to the Tualatin River and its tributaries, including Nyberg Creek, Hedges Creek, Cummins Creek, and Saum Creek. The City's infrastructure consists of more small dispersed systems that discharge to these receiving waters rather than large trunk lines.

The following assessment is based on information from the City of Tualatin Stormwater Master plan, dated April 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. Capacity issues were identified at six locations, none of which are in the Saum Creek Basin.

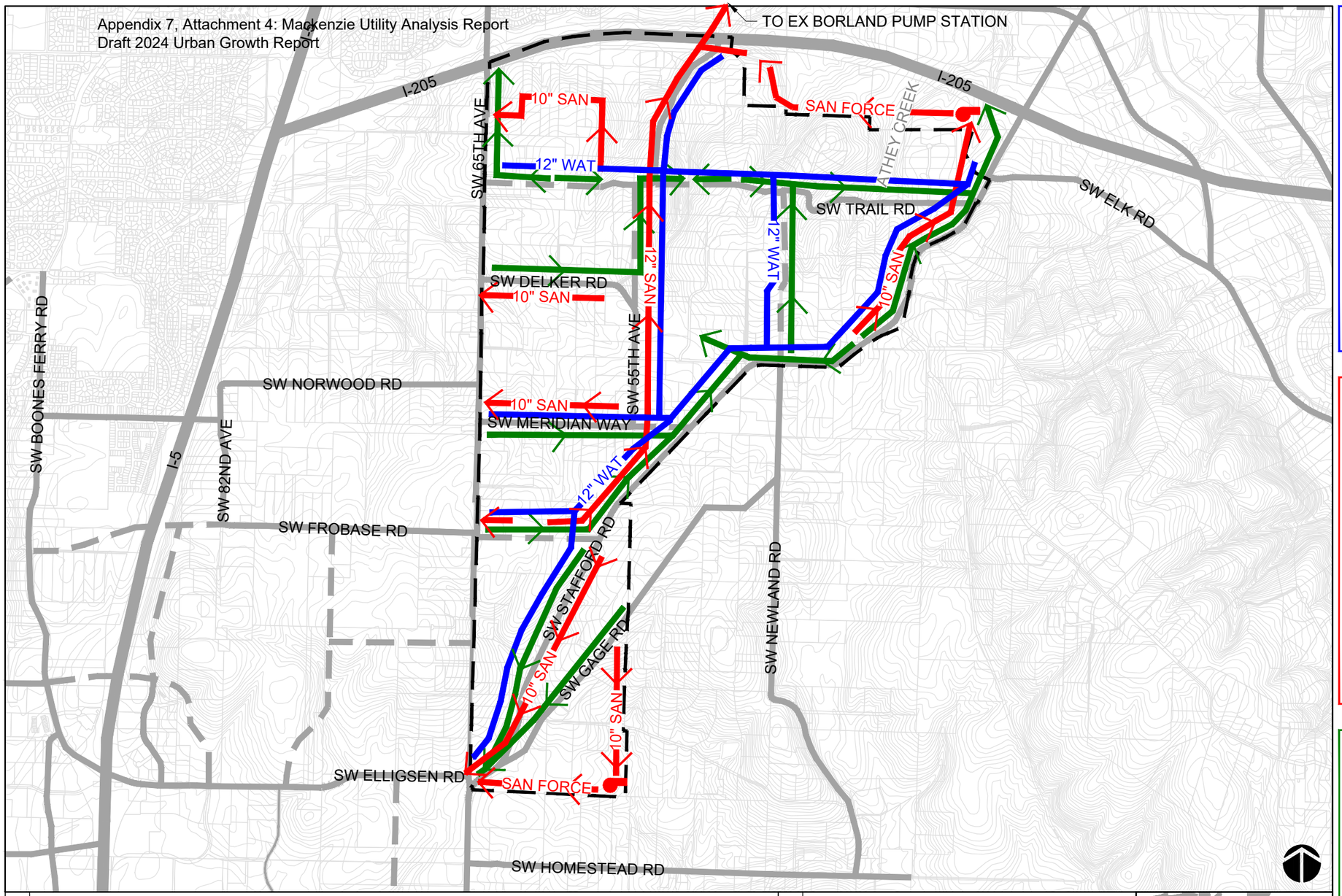
Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for existing conditions are problematic when considering serving areas outside the existing service area and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Norwood URA is within the Saum Creek Basin which does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Norwood URA would discharge directly to Saum Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Tualatin infrastructure.



WATER				
WATER PROVIDER: CITY OF TUALATIN				
PRESSURE ZONE: SERVICE AREA B (NEAREST)				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	38,600	$350	$13,510,000
	12" PIPE (LF)	0	$400	$0
	15" PIPE (LF)	0	$500	$0
	PUMP STATION (MGD)	0	$5,800,000	$0
	STORAGE RESERVOIR (MG)	5.4	$200,000	$1,080,000
	TOTAL			$14,590,000

SANITARY				
SANITARY PROVIDER: CITY OF TUALATIN				
BASIN: NYBERG				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	10" PIPE (LF)	19,800	$275	$5,445,000
	12" PIPE (LF)	10,800	$350	$3,780,000
	15" PIPE (LF)	0	$375	$0
	PUMP STATION (MGD)	0.8	$1,800,000	$1,440,000
	SAN FORCE (LF)	7,300	$310	$2,263,000
	TOTAL			$12,928,000

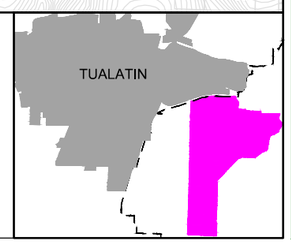
STORM				
STORM PROVIDER: CLEAN WATER SERVICES (CWS)				
WATERSHED: FANNO CREEK-TUALATIN RIVER				
SUB-WATERSHED: SAUM CREEK-TUALATIN RIVER				
PROPOSED IMPROVEMENTS				
	ITEM	UNITS	UNIT COST	TOTAL COST
	18" PIPE (LF)	17,700	$400	$7,080,000
	24" PIPE (LF)	15,000	$425	$6,375,000
	30" PIPE (LF)	10,000	$500	$5,000,000
	WATER QUALITY/ DETENTION (SF)	123,900	$150	$18,585,000
	TOTAL			$37,040,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP
NORWOOD

MACKENZIE.

0 1000 2000

ROSA

Water

Rosa would most likely be served by the City of Hillsboro based on proximity. Rosa is located south of the existing City System service area and west of the future South Hillsboro service area and is included in the Master Plan as a future growth area (FGA). The Master Plan includes the evaluation of distribution system and storage system under both existing and projected future water demand, which includes future growth areas (FGA).

The City of Hillsboro owns and operates two municipal drinking water systems, City System (primary) and Upper System (secondary), served by wholesale water purchased from Joint Water Commission (JWC). The City also provides wholesale water to City of Cornelius, City of Gaston and LA Water Cooperative. The City of Hillsboro and Tualatin Valley Water District are developing the Willamette Water Suply System (WWSS), a new water supply system from the Willamette River, to address rapid growth in City of Hillsboro City System and City of Cornelius. The expected completion for this project is June 2026. There is also a planned upgrade for the existing JWC Water Treatment Plant.

The following assessment is based on information from City of Hillsboro Water Master Plan, dated June 2019.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – The WWSS has sufficient capacity to meet demands within the existing service area.
- Storage – additional storage of 6.4 MG is needed for areas within the existing UGB to provide the desired level of service during a regional supply outage.
- Distribution – with the exception of some locations with dead-end pipe segments smaller than 6-inches in diameter, the required fire flow is available City-wide. The system transmission capacity is also generally good.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – without the WWSS, capacity is insufficient to meet projected buildout demands within the current UGB. The WWSS can likely serve a portion of the additional demands for areas outside the current UGB, however available capacity is dependent on the type of development that occurs.
- Storage – an additional 17.8 MG of storage is needed for expansion beyond the current UGB, i.e. to serve the Rosa URA.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – the WWSS is required to provide additional supply for expansion outside the UGB. With full buildout of the WWSS, a total supply (including JWC supply) of 77.95 MGD would be available. The peak daily demand of the existing service area is 45.1 MGD, leaving 32.85 MGD for future expansion outside the UGB. This is sufficient supply to serve the Rosa URA.

- Storage – Areas outside the existing UGB cannot be served without additional storage capacity.

Sanitary Sewer

Rosa URA would likely be served by the City of Hillsboro and Clean Water Services who work together to manage the sanitary sewer system near the Rosa URA. The primary point of connection for this URA would likely be a City of Hillsboro sanitary main located in SE River Road, which connects to a Clean Water Services pump station near the intersection of SE River Road and SE David Road.

The Master Plan for the Clean Water Services (West Basin, which includes City of Hillsboro) is currently in development. The following assessment is based on information from communication with Clean Water Services Capital Planning Division Manager.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

CWS is currently developing the West Basin Master Plan (WBMP) which is anticipated to be completed in early 2025. The WBMP will identify sanitary projects at both the Water Resource Recovery Facilities (WRRFs) and in the conveyance system necessary to accommodate redevelopment of underdeveloped areas within the UGB and green-field development of large areas recently brought into the UGB that are undergoing community planning and/or development.

Much of the conveyance infrastructure required for growing demands within the UGB is anticipated to be constructed privately during the development process and coordinated by CWS and local jurisdictions. The CWS WBMP will identify trunk line projects and pump stations necessary to accommodate growth of these areas; these projects will be incorporated into the CWS long-range capital improvement plan (CIP) at strategic times necessary to meet expected capacity demands. The CWS CIP will be updated and adjusted annually to reflect the latest growth patterns and anticipated timing.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The CWS WBMP will acknowledge the potential for growth in the Rosa URA. Full development of areas inside the UGB does not happen prior to the addition of URAs into the UGB; the CWS WBMP will assume there is overlap in the continued development of the UGB while simultaneous development begins in URAs added to the UGB.

Clean Water Services has indicated that it is likely the development of Rosa URA would require a new pump station that would pump directly to the Rock Creek WRRF.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

The CWS WBMP will address the infrastructure needs in unincorporated areas as well as the partner cities to accommodate planned growth. CWS regularly calibrates, updates, and maintains a hydraulic model that predicts sewer flows under development conditions. The hydraulic model is a key component in the identification of both the magnitude and timing of capital projects to meet growth demands.

Because CWS plans to pump the Rosa URA directly to the Rock Creek WRRF via a new pump station, there won't be negative impacts to the existing sanitary sewer facilities.

Storm

The Rosa URA would be served by the City of Hillsboro and Clean Water Services. Rosa is included in the planning area of the City of Hillsboro Master Plan as part of the Tualatin River Basin. The Tualatin River basin drains directly to the Tualatin River or indirectly through smaller creeks including Gordon Creek and Butternut Creek.

The following assessment is based on information from the City of Hillsboro Stormwater Master Plan, dated 2021. The study area included in the Master Plan is the incorporated City, portions of the UGB where the City has adopted plans for development, and portions of the UGB where the City plans to begin planning in the next several years (including the Rosa URA).

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

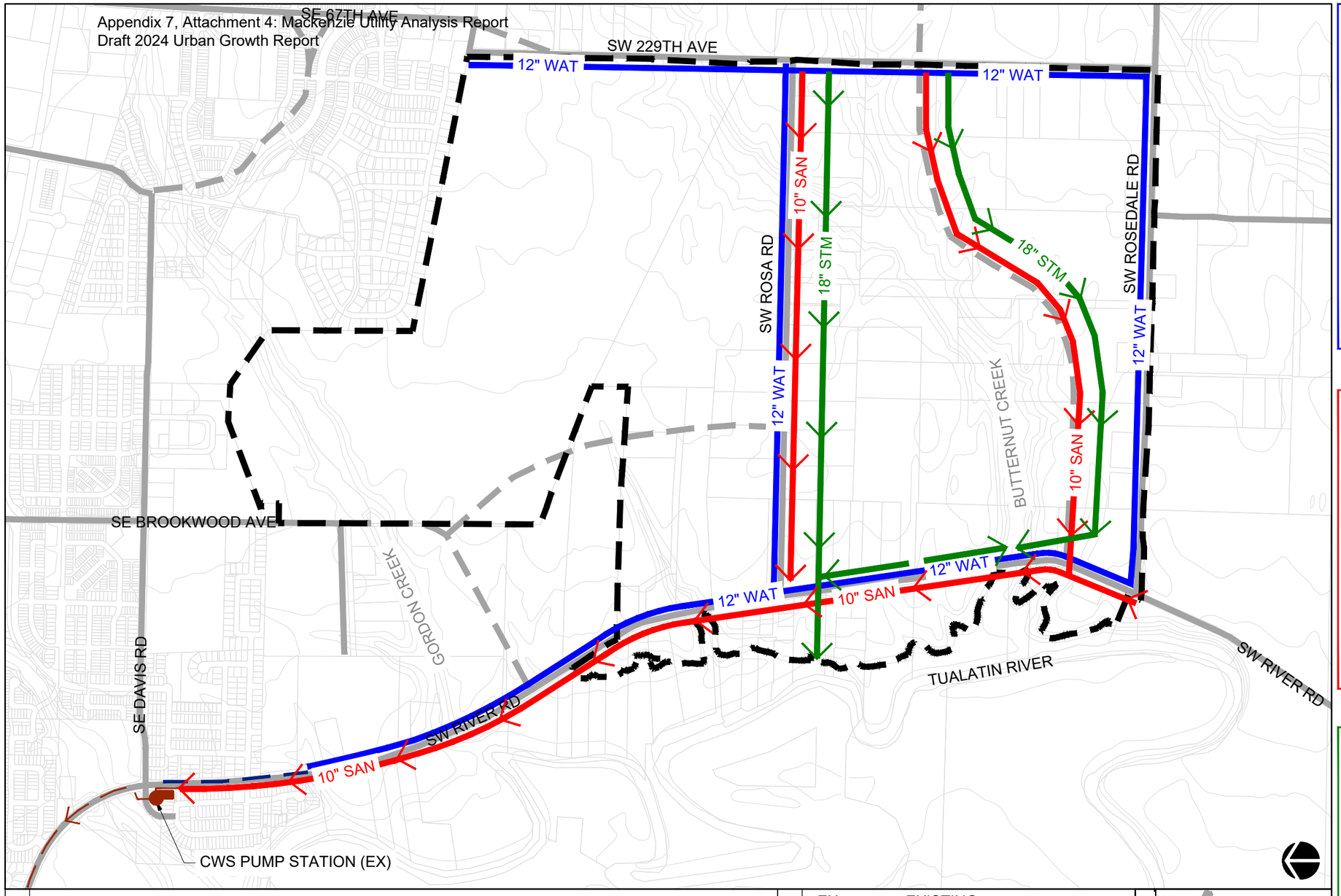
The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Gordon Creek or Butternut Creek and would not impact the capacity of existing stormwater infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The Master Plan discusses currently undeveloped areas as expected to be provided with adequately sized conveyance and stormwater treatment by private development as it occurs. These appropriately sized stormwater facilities would presumably discharge directly to Gordon Creek or Butternut Creek and would not impact the capacity of existing stormwater infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

City of Hillsboro and Clean Water Services standards require on-site detention for expansion areas identified in the City of Hillsboro Stormwater Master Plan, which includes the Rosa URA. Based on topography, the Rosa URA would discharge directly to Butternut Creek or Gordon Creek via private outfalls from development areas and public outfalls from roadways and would thus not connect to any of the existing City of Hillsboro infrastructure. CWS expects that stormwater will be treated and detained on development sites so that there are no negative impacts to Butternut Creek.



WATER

WATER PROVIDER: HILLSBORO WATER DISTRICT

PRESSURE ZONE: MAIN (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	23,600	$400	$9,440,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	1.4	$200,000	$280,000
TOTAL			$9,720,000

SANITARY

SANITARY PROVIDER: CLEAN WATER SERVICES

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	18,800	$275	$5,170,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.4	$1,800,000	$2,520,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$7,690,000

STORM

STORM PROVIDER: CITY OF HILLSBORO

WATERSHED: ROCK CREEK-TUALATIN RIVER

SUB-WATERSHED: DAVIS CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

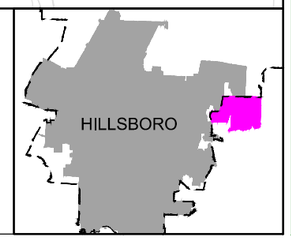
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	7,500	$400	$3,000,000
24" PIPE (LF)	5,200	$425	$2,210,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	62,500	$150	$9,375,000
TOTAL			$14,585,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ROSA

MACKENZIE.

0 500 1000

ROSEMONT

Water

The Rosemont URA would likely be served by the City of West Linn based on proximity and would be part of the Rosemont pressure zone. The Rosemont pressure zone is served by the Rosemont Reservoir which is filled by the Horton Pump Station and View Drive Pump Station.

The primary water source for City of West Linn is from the South Fork Water Board (SFWB) water treatment plant located in Oregon City, with an emergency supply from City of Lake Oswego Water Treatment Plant.

The following assessment is based on information from City of West Linn Water System Master Plan, dated November 2008. The buildout scenario in the City of West Linn Master Plan is defined as saturation development of all land within the existing UGB that the City has determined to be economically and physically developable.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – Under normal (non-emergency) conditions, there is a supply deficit of 3.8 MG in the Rosemont pressure zone.
- Storage – under normal (non-emergency) conditions there is not currently a storage deficit in the Rosemont pressure zone.
- Distribution – Master Plan modeling analysis revealed deficiencies during fire flow events under existing conditions in all six pressure zones.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – under normal (non-emergency) conditions there is a deficit of 3.4 MG for the saturation development (build-out) scenario in the Rosemont pressure zone.
- Storage – under normal (non-emergency) conditions there is no storage deficit for the saturation development scenario in the Rosemont pressure zone.
- Pumping – The Master Plan identifies a deficiency in pumping capacity to the Rosemont pressure zone under buildout conditions.
- Distribution – Master Plan modeling analysis revealed deficiencies during fire flow events under saturation development conditions in all six pressure zones.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply/Storage – the Master Plan proposes the construction of a new reservoir and booster pump station to supply the Rosemont pressure zone and address its current deficiency. The reservoir, Bland Reservoir No. 2, would have a capacity of 0.3 MG and be located adjacent to the existing Bland Reservoir near Crestview Drive. The booster station would have a pumping capacity of 1,800 gpm. According to City of West Linn Public Works website, this project applied for a conditional use permit in 2012 and was appealed. Based on aerial imagery it does not appear the project was constructed. It is unclear from the Master Plan whether these improvements would provide surplus capacity that could be used to serve Rosemont URA.
- Pumping – The Master Plan recommends the construction of a third pump station to serve the Rosemont pressure zone.
- Distribution – approximately 79,000 feet of piping improvements were identified in the Master Plan as needing to be completed to address deficiencies in existing and saturation development scenarios. Ten of the projects are within the Rosemont pressure zone.

Sanitary Sewer

Rosemont URA would likely need to be served by the City of West Linn for sanitary sewer based on proximity and topography. The site generally flows west/southwest away from existing City sanitary infrastructure and toward currently undeveloped land. Assuming the land south of the URA were not developed prior to the development of Rosemont, a pump would be required to connect sanitary sewer from this URA to existing City infrastructure. This connection would likely occur within Basin 9E.

At the downstream end of the City of West Linn sanitary system as Clackamas County Water Environment Services (WES) owned pumps and force mains. Sanitary ultimately gets pumped to the Tri-City Water Resource Recovery Facility (WRRF) located on the east side of the Willamette River. The Rosemont site would be part of the WES Willamette Basin which flows to the Willamette Pump Station, then the West Linn Interceptor.

The following assessment is based on information from City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, and the Sanitary Sewer System Master Plan for Water Environment Services, dated January 2019. The study area of the Master Plan is the existing service area, which coincides with both the City limits and UGB.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The City Master Plan has identified potential system capacity deficiencies for modeled pipes both the existing and buildout scenarios. There are no deficiencies identified in the City system downstream of the Rosemont URA connection point under existing conditions.

The existing WES system has the capacity to convey both the dry weather flow and groundwater infiltration associated with winter conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

The buildout scenario in the West Linn Master Plan assumes all properties within the study area will be developed and connected to the sanitary sewer collection system, including decommissioning of private septic systems and connecting them to the City's collection system.

The City Master Plan has identified potential system capacity deficiencies for modeled pipes both the existing and buildout scenarios. There are three deficiencies identified in the City system downstream of the Rosemont URA connection point under buildout conditions. They occur downstream in the sanitary system near the Willamette River.

The WES Master Plan identifies hydraulic deficiencies for future dry weather flow, groundwater infiltration and rainfall derived infiltration and inflow.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Whether the development of the Rosemont URA would cause capacity issues to the existing City sanitary sewer system or WES facilities is dependent on the timing of its development and other development in and around the City.

The WES Master Plan identifies an expansion of the existing Treatment Plant within the 2020-2040 timeframe, taking it from its existing 78.3 MGD capacity to 104 MGD capacity.

Storm

The Rosemont URA would most likely be served by the City of West Linn, as it is adjacent to their existing City Limits and falls mostly within the Fritchie Creek watershed. Tributaries of Fritchie Creek originate in the Rosemont URA and flow southwest toward the Willamette River. Based on topography, the Rosemont URA could discharge directly to the Fritchie Creek tributaries and thus not connect to any existing City of West Linn stormwater infrastructure.

The following assessment is based on information from the City of West Linn Storm Drainage Master Plan, dated September 2019.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

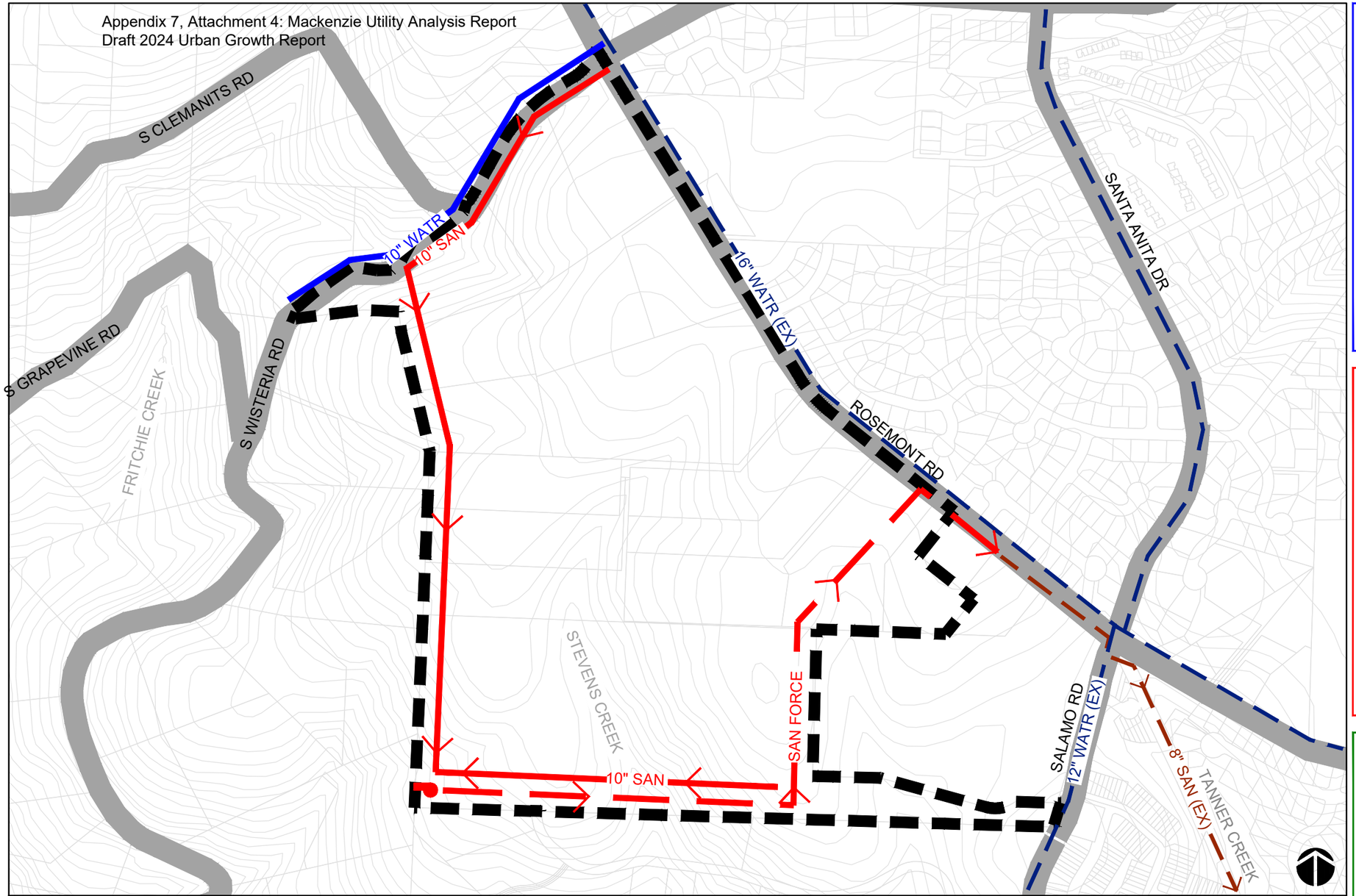
The Master Plan identifies capacity issues related to modeled future flows through the existing system and does not specifically address the capacity of the existing system related to existing flows. However, hydraulic modeling summarized in the Master Plan indicates that within modeled areas, full development would result in minimal or no increase to future flows, therefore it can be assumed that identified capacity issues are related to existing flows and not future flows. There are four high priority capital improvement projects recommended in the Master Plan to address capacity related issues, all of which occur at the downstream end of the stormwater system near the Willamette River.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

The same capacity issues identified in the Master Plan for the existing service area are problematic when considering serving additional areas and should be corrected based on proposed capital improvement projects prior to serving additional area. Capacity issues do not exist in every basin so necessary improvements are dependent on the location of the proposed development area. The Rosemont URA is within the Fritchie Creek Basin which has limited existing stormwater infrastructure and does not have any identified capacity related issues.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Existing stormwater facilities with identified capacity issues will experience further issues if not addressed prior to adding URA land to the UGB. Based on topography, the Rosemont URA could discharge directly to the Fritchie Creek tributaries and thus not connect to any existing City of West Linn stormwater infrastructure.



WATER

WATER PROVIDER: CITY OF WEST LINN

PRESSURE ZONE: ROSEMONT

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,900	$350	$665,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0.5	$5,800,000	$2,900,000
STORAGE RESERVOIR (MG)	0.5	$200,000	$100,000
TOTAL			$3,665,000

SANITARY

SANITARY PROVIDER: CITY OF WEST LINN/CLACKMAS COUNTY WATER ENVIRONMENT SERVICES (WES)

BASIN: 9E

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	5,200	$275	$1,430,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.5	$1,800,000	$900,000
SAN FORCE (LF)	3600	$310	$1,116,000
TOTAL			$3,446,000

STORM

STORM PROVIDER: CITY OF WEST LINN

WATERSHED: TUALATIN RIVER

SUB-WATERSHED: FRITCHIE CREEK-TUALATIN RIVER

PROPOSED IMPROVEMENTS

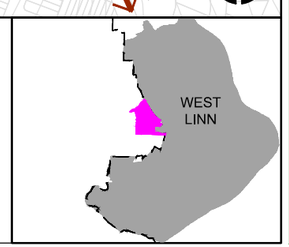
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	10,200	$150	$1,530,000
TOTAL			$1,530,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

ROSEMONT

MACKENZIE.

0 250 500

SHERWOOD NORTH

Water

Sherwood North URA would most likely be served by the City of Sherwood based on proximity as it is falls along the northern limits of the City of Sherwood proposed 2034 water service area. The Sherwood North URA would most likely become part of the 380 pressure zone, which is served by the Sunset Reservoir. There are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Sherwood North).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial, and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Sherwood North URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area, thus the existing water supply is not sufficient for the development of Sherwood North URA.
- Storage – the buildout condition causes a deficit of 0.61 MG within the 380 pressure zone.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution – very few deficiencies exist for either existing or projected future (buildout) MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full buildout demand with some remaining capacity that could potentially serve the Sherwood North URA, depending on timing of its development and other future development within and around the City.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood North URA.

Sanitary Sewer

Sherwood North URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood North URA would be part of the City of Sherwood Cedar Creek and Rock Creek basins based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. The Master Plan Study Area includes the current City limits and two expansion areas, which does not include the Sherwood South URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood North URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood North URA, as it is located within the Chicken Creek and Rock Creek basins and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.
The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

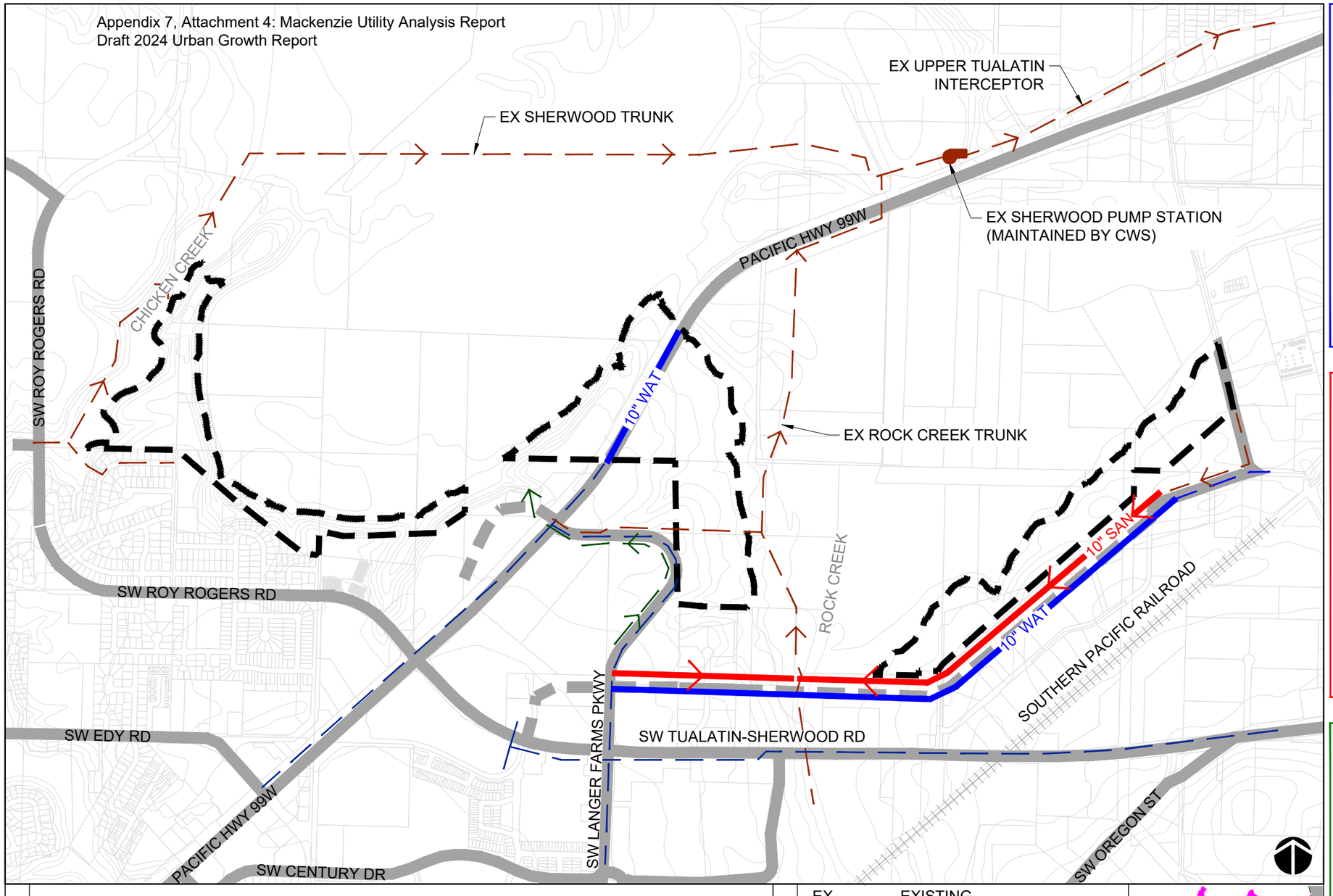
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood North URA, stormwater from developed areas could likely outfall directly to Chicken Creek, Rock Creek and their tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood North.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood North URA, stormwater from developed areas could likely outfall directly to Chicken Creek, Rock Creek and their tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood North.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	7,200	$350	$2,520,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.3	$200,000	$60,000
TOTAL			$2,580,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK/ROCK CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	5,600	$275	$1,540,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$2,080,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: TUALATIN RIVER

SUB-WATERSHED: ROCK CREEK, CHICKEN CREEK

PROPOSED IMPROVEMENTS

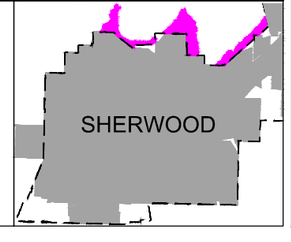
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	0	$400	$0
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	4,700	$150	$705,000
TOTAL			$705,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION (EX)
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

SHERWOOD NORTH

MACKENZIE.

0 500 1000

SHERWOOD SOUTH

Water

Sherwood South URA would most likely be served by the City of Sherwood based on proximity as it is falls along the southern limits of the City of Sherwood proposed 2034 water service area (south of the proposed Brookman Annexation). The Sherwood South URA would most likely become part of the 380 and 400 pressure zone. The 400 pressure zone is served by the Sunset Reservoir and there are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Sherwood South.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Sherwood South URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area.
- Storage – the buildout condition causes a deficit of 0.61 MG within the 380 pressure zone.
- Pumping – There are no pump stations needed in the 380 pressure zone. The firm capacity of the Sunset Pump Station (serving pressure zone 400) allows for future buildout with zero surplus or deficit. Any area outside the planning area added to the the 400 pressure zone will therefore need to increase the capacity of the Sunset Pump Station.
- Distribution – very few deficiencies exist for either existing or projected future MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Sherwood South URA, depending on timing of its development and other future development within and around the City.
- Storage – adding Sherwood South URA to the UGB would cause a storage deficit in the 380 and 400 pressure zones.
- Pumping – The Sunset Pump Station, which serves the 400 pressure zone, has the capacity for the full buildout condition, however this does not include the Sherwood South URA. There is zero surplus after full build-out, so the development of Sherwood South would cause a deficit in pumping capacity.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood South URA.

Sanitary Sewer

Sherwood South URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood South URA would be part of the City of Sherwood Cedar Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. Future expansion areas identified in the Master Plan do not include the Sherwood South URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under build-out conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood South URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood South URA, as it is located within the Cedar Creek basin and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

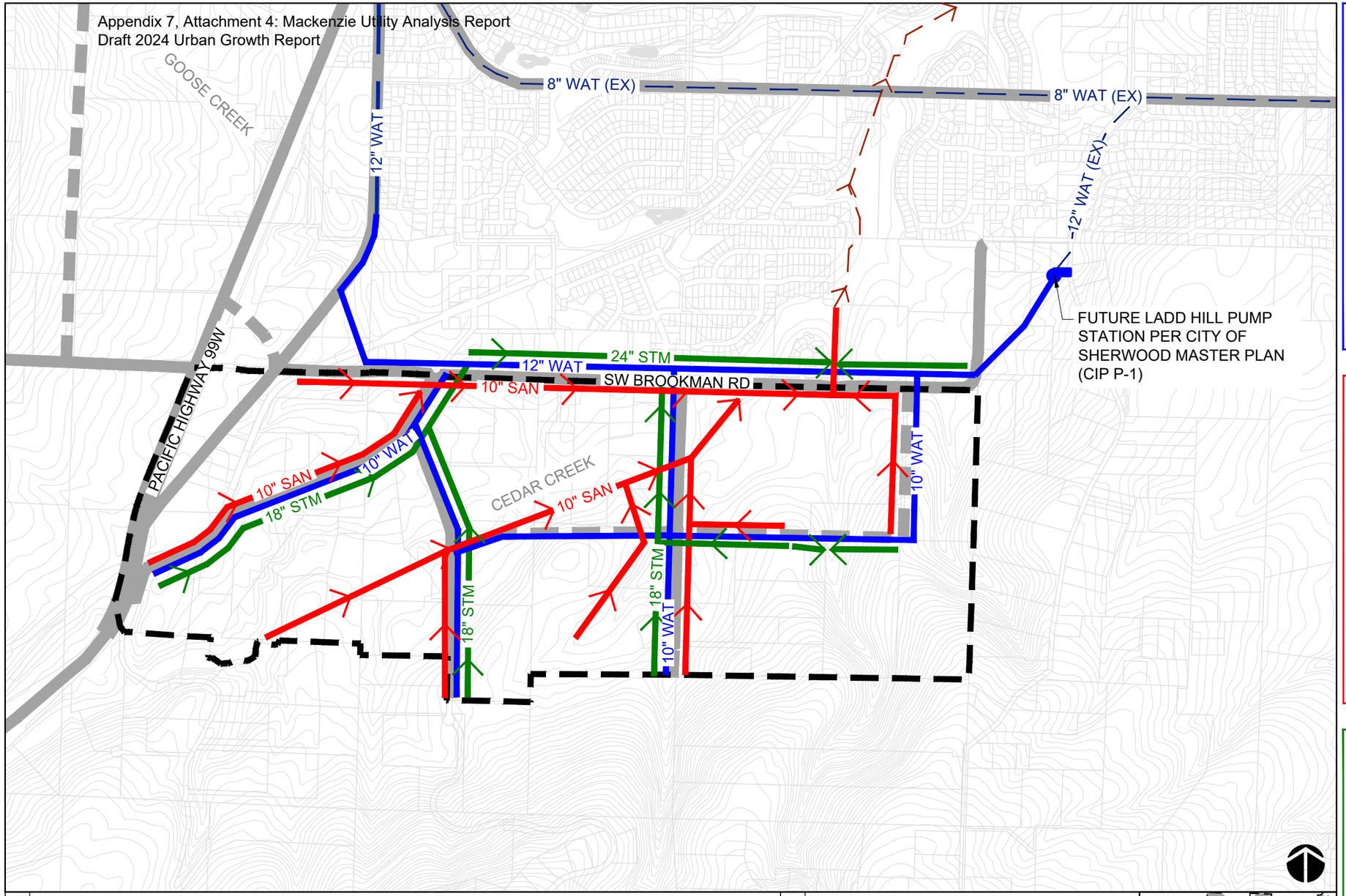
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood South URA, stormwater from developed areas could likely outfall directly to Cedar Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood South.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood South URA, stormwater from developed areas could likely outfall directly to Cedar Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood South.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380/400

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	14,100	$350	$4,935,000
12" PIPE (LF)	8,300	$400	$3,320,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.3	$5,800,000	$13,340,000
STORAGE RESERVOIR (MG)	1.0	$200,000	$200,000
TOTAL			$21,795,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	21,000	$275	$5,775,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0	$1,800,000	$0
SAN FORCE (LF)	0	$310	$0
TOTAL			$5,775,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: CHICKEN CREEK-TUALATIN RIVER

SUB-WATERSHED: CEDAR CREEK

PROPOSED IMPROVEMENTS

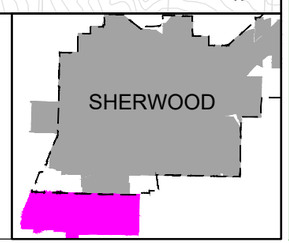
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	10,000	$400	$4,000,000
24" PIPE (LF)	5,200	$425	$2,210,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	43,750	$150	$6,562,500
TOTAL			$12,772,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- SANITARY LINE
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP
SHERWOOD SOUTH

MACKENZIE.

0 500 1000

SHERWOOD WEST

Water

Sherwood West URA would most likely be served by the City of Sherwood as it is included in the City of Sherwood Master Plan proposed 2034 water service area. The Sherwood West URA would be part of the existing pressure zones 380 (supplied by the Sunset Reservoir) and 455 and proposed pressure zones 475 and 630. There are no pumps serving the 380 pressure zone and the 455 pressure zone is served by the Wyndham Ridge Pump Station. The Sunset Reservoir supplies water for the existing 380 pressure zone and future 475 pressure zone. The Kruger Reservoir supplies water for the existing 455 pressure zone and future 630 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for buildout for areas within the City of Sherwood 2034 water service area which includes Sherwood West. Because Sherwood West is included in the buildout scenario, the additional 4 MGD (or some portion of) is needed for its development.
- Storage – Per the Master Plan, which includes Sherwood West URA, both the Kruger and Sunset Reservoirs have adequate capacity to meet storage criteria through the 2034 buildout.
- Pumping – There are no pump stations needed in the 380 pressure zone. Firm capacity of the Wyndham Ridge Pump Station for the buildout scenario (which includes Sherwood West) exceeds the required capacity. A future pump station (Edy Road Pump Station) is required to serve the future 475 pressure zone and is included in the Master Plan.
- Distribution – very few deficiencies exist for either existing or projected future MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Sherwood North URA, depending on timing of its development and other future development within and around the City.
- Storage – adding Sherwood West URA to the UGB would cause a storage deficit in both the Sunset and Kruger Reservoir during the full build-out condition.
- Pumping – There are no pump stations needed in the 380 pressure zone. Firm capacity of the Wyndham Ridge Pump Station for the buildout scenario (which includes Sherwood West) exceeds the required capacity. A future pump station (Edy Road Pump Station) is required to serve the future 475 pressure zone and is included in the Master Plan.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Sherwood West URA.

Sanitary Sewer

Sherwood West URA would likely be served by the City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Sherwood South URA would be part of the City of Sherwood Cedar Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Under buildout conditions (which includes the Sherwood West URA) the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Sherwood West URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Sherwood West URA, as it is located within the Cedar Creek and Chicken Creek basins and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

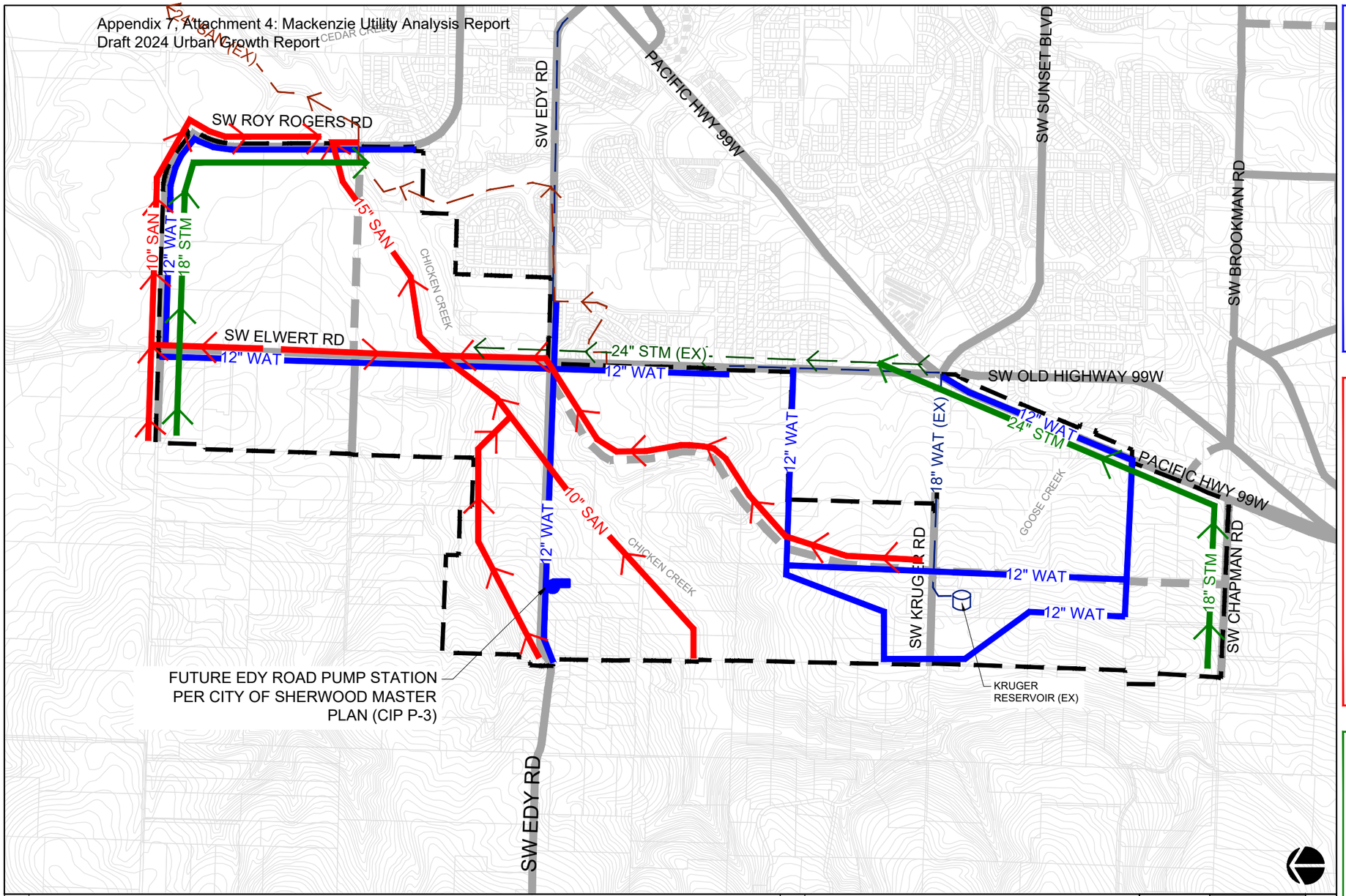
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Sherwood West URA, stormwater from developed areas could likely outfall directly to Chicken Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood West.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Sherwood West URA, stormwater from developed areas could likely outfall directly to Chicken Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Sherwood West.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380/455 (EXISTING), 475/630 (FUTURE)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	36,550	$400	$14,620,000
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	2.3	$5,800,000	$13,340,000
STORAGE RESERVOIR (MG)	3.9	$200,000	$780,000
TOTAL			$28,740,000

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: CEDAR CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,800	$275	$770,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	3,700	$375	$1,387,500
PUMP STATION (MGD)	3.9	$1,800,000	$7,020,000
SAN FORCE (LF)	0	$310	$0
TOTAL			$9,177,500

STORM

STORM PROVIDER: CITY OF SHERWOOD

BASIN: CHICKEN CREEK-TUALATIN RIVER

OUTFALL: CHICKEN CREEK, GOOSE CREEK

PROPOSED IMPROVEMENTS

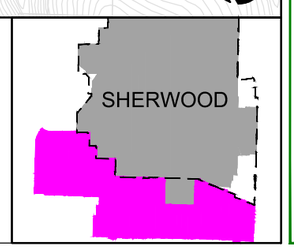
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	8,100	$400	$3,240,000
24" PIPE (LF)	4,000	$425	$1,700,000
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	90,950	$150	$13,642,500
TOTAL			$18,582,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- WATER PUMP STATION
- WATER RESERVOIR (EX)
- SANITARY LINE
- SANITARY LINE (EX)
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

SHERWOOD WEST

MACKENZIE.

0 750 1500

STAFFORD

Water

The Stafford URA would likely be served by both City of West Linn and City of Lake Oswego based on proximity. Stafford is adjacent to the City of West Linn Horton, Rosemont, and Willamette pressure zones, and is adjacent to the City of Lake Oswego service area including small portions of the URA which fall adjacent to the Rivergrove Water District and Skylands Water Cooperative.

The City of Lake Oswego's water source is the Clackamas River. In 2017 construction of five new major water facilities was completed in partnership with the City of Tigard to increase capacity of drinking water from the Clackamas River to Lake Oswego and Tigard. The construction included a new river intake pump station in Gladstone, a water treatment plan in West Linn, a 3.5 MG reservoir in Lake Oswego and a pump station in Tigard as well as more than 10 miles of large diameter backbone piping. The new Lake Oswego-Tigard Water Partnership water service area includes a portion of the Stafford URA in its plans for buildout.

The primary water source for City of West Linn is from the South Fork Water Board (SFWB) water treatment plant located in Oregon City, with an emergency supply from City of Lake Oswego Water Treatment Plant. Stafford URA would likely be part of the City of West Linn Horton, Rosemont, and Willamette pressure zones based on proximity. The City of West Linn does not include the Stafford URA in their master planning study areas.

The following assessment is based on information from City of West Linn Water System Master Plan, dated November 2008 and City of Lake Oswego Water Management and Conservation Plan, dated January 2010 and information from the Lake Oswego-Tigard Water Partnership.

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

Lake Oswego

Based on the City of Lake Oswego Master Plan, during the peak season, City of Lake Oswego supply intake, treatment plant and transmission mains must all operate at maximum installed capacity but can meet existing peak demands (note this is before the improvements as described above were completed).

West Linn

- Supply – Under normal (non-emergency) conditions, current demand is 8.6 MG and capacity is 9.5 MG, resulting in a surplus of 0.9 MG.

- Storage – Under normal (non-emergency) conditions storage capacity is adequate.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

Lake Oswego

Based on the City of Lake Oswego Master Plan, during the peak season, City of Lake Oswego supply intake, treatment plant and transmission mains must all operate at maximum installed capacity to meet existing peak demands. The Master Plan has not been updated since the construction of the facilities outlined above, which were to provide additional capacity. It is not clear whether those improvements provided any surplus capacity that could be used for the development of Stafford URA.

West Linn

- Supply – Under normal (non-emergency) conditions there is a supply deficit of 1 MGD for the saturation development scenario.
- Storage – There is a 0.8 MG storage deficit in the Willamette pressure zone, a 0.7 MG storage deficit in the Horton pressure zone, and a 0.8 MG storage deficit in the Rosemont pressure zone under saturation development conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Lake Oswego

It is not clear whether the improvements to the existing City of Lake Oswego water infrastructure provided any surplus capacity that could be used for the development of Stafford URA. The ability of the Lake Oswego-Tigard Water Partnership to serve Stafford without negative impacts to the existing system is also dependent on timing on development.

West Linn

Under saturation development conditions in the City of West Linn, there are both supply and storage deficits. If the Stafford URA were developed, additional sources of supply and storage would be required to not create further deficits for the existing system.

Sanitary Sewer

Based on proximity and topography, Stafford URA would likely be served by the City of West Linn and/or City of Lake Oswego for sanitary sewer.

The portion of the Stafford URA that slopes toward Lake Oswego basins has been included in the Master Plan future flow (the Master Plan calculates this as approximately 22% of the total URA area). Based on topography, connection points to the City of Lake Oswego infrastructure would be in SW Childs Road (in the Canal basin) and SW Stafford Road (in the South Shore basin).

The remaining area of the Stafford URA generally flows south/southwest toward Interstate 205 where it would likely connect to the City of West Linn existing infrastructure at the Johnson Pump Station located near SW Johnson Road and Interstate 205.

The following assessment is based on information from City of West Linn Sanitary Sewer Master Plan Update, dated September 2019, the City of Lake Oswego Wastewater Master Plan, dated March 2013, and the 2019 Amendment to the City of Lake Oswego Wastewater Master Plan, dated February 2020.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

Lake Oswego

Several deficiencies are identified for the 25-year storm event under existing conditions. These deficiencies are all downstream of the likely point of connection and generally occur in large diameter trunk lines. The Master Plan recommends improvement projects to address these deficiencies.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under existing conditions.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Lake Oswego

Several deficiencies are identified for the 25-year storm event under buildout conditions. A cluster of deficiencies occur in the Canal Trunk and L5 Trunk directly downstream of the likely point of connection at SW Childs Road. Very few deficiencies are identified in the system downstream of the SW Stafford Road point of connection. Without correction, these deficiencies will experience further negative impacts if flows from the Stafford URA are added.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under buildout conditions. Without correction, these deficiencies will experience further negative impacts if flows from the Stafford URA are added.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Lake Oswego

Because deficiencies already exist in the sanitary infrastructure downstream of the Stafford URA assumed point of connection, additional flow from this URA will cause further negative impacts if pipe sizes aren't increased.

West Linn

The gravity sewer line downstream of the Johnson Pump Station (likely connection point for Stafford URA) has two identified deficiencies, i.e. system capacity issues that may cause backwatering in the collection system, under both existing and buildout conditions. Additional flow from this URA will cause further negative impacts if pipe sizes aren't increased.

Storm

Stafford URA would likely be served by the City of West Linn and City of Lake Oswego for stormwater based on proximity and topography. A majority of the Stafford URA flows south/southwest toward the Tualatin River and would likely not need to connect to any existing City infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

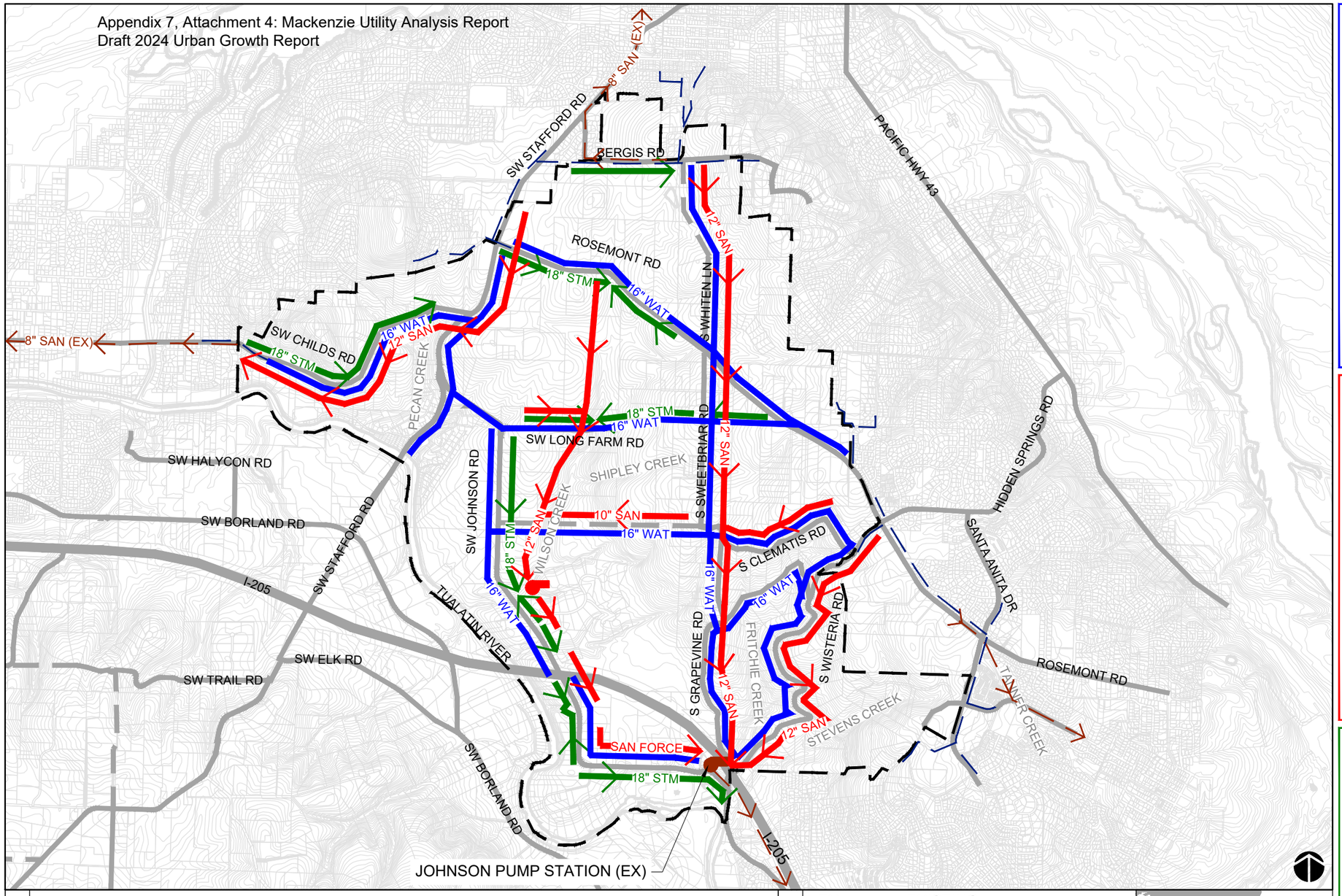
Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because the Stafford URA is outside both City of West Linn and City of Lake Oswego City limits, existing stormwater infrastructure does not appear to exist in this area. Based on topography, a majority of the Stafford URA flows south/southwest toward the Tualatin River and new stormwater infrastructure within the URA would likely outfall directly to the river and not need to connect to any existing City infrastructure.

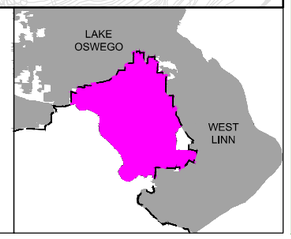


LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



WATER

WATER PROVIDER: WEST LINN / LAKE OSWEGO

PRESSURE ZONE: HORTON/ROSEMONT/WILLAMETTE (WEST LINN) , N/A (LAKE OSWEGO)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	0	$350	$0
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	71,000	$500	$35,500,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	6.2	$200,000	$1,240,000
TOTAL			$36,740,000

SANITARY

SANITARY PROVIDER: WEST LINN / LAKE OSWEGO

BASIN: 2B (WEST)/3A/3D (WEST LINN), MARYLHURST (LAKE OSWEGO)

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	4,700	$275	$1,292,500
12" PIPE (LF)	38,800	$350	$13,580,000
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	1.0	$1,800,000	$1,800,000
SAN FORCE (LF)	6,000	$310	$1,860,000
TOTAL			$18,532,500

STORM

STORM PROVIDER: WATER ENVIRONMENT SERVICES

BASIN: TUALATIN RIVER, OSWEGO LAKE

OUTFALL: PECAN CREEK, WILSON CREEK, FRITCHIE CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	27,200	$400	$10,880,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	153,850	$150	$23,077,500
TOTAL			$33,957,500

METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

STAFFORD

MACKENZIE.

0 1250 2500

TONQUIN

Water

Tonquin URA would most likely be served by the City of Sherwood based on proximity as it is falls along the eastern limits of the City of Sherwood 2034 proposed water service area. Based on proximity, the Tonquin URA would most likely become part of the 380 pressure zone, which is served by the Sunset Reservoir. There are no pumps serving the 380 pressure zone.

Most of City water is supplied by the Willamette River Water Treatment Plan (WRWTP), located in the City of Wilsonville, with the remainder coming from four groundwater wells within City limits (back-up supply).

The following assessment is based on information from City of Sherwood Water System Master Plan, dated May 2015. The study area of the Master Plan includes the current City limits as well as three expansion areas (which does not include Tonquin URA).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Supply – supply from WRWTP is sufficient to meet maximum daily demand and existing City groundwater wells provide an effective emergency supply.
- Storage – adequate to meet existing service area demands.
- Pumping – adequate to meet existing service area demands.
- Distribution Piping – sufficient for providing adequate fire flow capacity to commercial, industrial and residential customers.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

The Master Plan defines buildout as when all vacant, developable land within the planning area has been developed to the maximum zoning density with some allowance for in-fill of existing developed properties. Improvements recommended in capital improvement projects are sized for the buildout scenario. The buildout scenario does not include the development of Tonquin URA.

- Supply – An additional 1 MGD is required for the 20 year and 4 MGD is needed for build-out for areas within the City of Sherwood 2034 water service area, thus the existing water supply is not sufficient for the development of Tonquin URA.
- Storage – the buildout condition causes a deficit of 0.61 MG at the Sunset Reservoir, therefore there is not available capacity to serve areas outside the UGB.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution – very few deficiencies exist for either existing or projected future (buildout) MDD conditions. No additional deficiencies were identified under peak hour demand conditions.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

- Supply – Capital improvement projects identified for the existing WRWTP would increase capacity from the current 5 MGD to 15 MGD, however this capacity would be shared with City of Wilsonville. To address long-term supply needs, City of Sherwood plans to pursue a purchase of an additional 5 MGD from WRWTP and to expand the WRWTP facilities which would secure them an additional 10 MGD. These projects would provide the additional capacity needed to meet the full build-out demand with some remaining capacity that could potentially serve the Tonquin URA, depending on timing of its development and other future development within and around the City.
- Storage – Depending on when the Tonquin URA was developed in relation to other development projects within the 380 pressure zone, storage in the Sunset Reservoir may be insufficient.
- Pumping – There are no pump stations needed in the 380 pressure zone.
- Distribution - Large diameter mains will be needed to provide sufficient fire flow capacity for areas outside the current City water service area. There are capital improvement projects planned to serve potential growth outside the UGB, but they do not address Tonquin URA.

Sanitary Sewer

Tonquin URA would likely be served by City of Sherwood and Clean Water Services (CWS), as they have an Intergovernmental Agreement to serve the Sherwood area. The City of Sherwood is responsible for gravity piping up to 24-inch diameter, and CWS is responsible for gravity piping 24-inch diameter and greater, wastewater treatment, and the public sewage pump station. Tonquin URA would be part of the City of Sherwood Rock Creek basin based on proximity.

The following assessment is based on information from City of Sherwood Sanitary Sewer Master Plan dated September 2016, and Clean Water Services East Basin Master Plan Project, dated June 2021. The Master Plan Study Area includes the current City limits and two expansion areas, which does not include the Tonquin URA.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

- Distribution – There are zero significant hydraulic deficiencies in the existing system.
- Pumping – The existing Sherwood Pump Station and 18-inch force main (CWS owned) have adequate capacity to serve the existing peak flow rate of 4.7 MGD (pump station capacity is 6.6 MGD and force main capacity is 9.1 MGD).

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

Buildout conditions are defined in the Master Plan as full development with sanitary sewer service of all vacant parcels within the UGB. Under buildout conditions the following deficiencies exist:

- Capacity of Sherwood Trunk and Rock Creek Trunk (CWS owned)
- Capacity of the Sherwood Pump Station (CWS owned) - peak build-out flow rate is 7.3 MGD, capacity is 6.6 MGD

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Because deficiencies already exist for both the distribution system and the existing pump station under buildout conditions for areas within the UGB, there is not a capacity to serve URA land without negative impacts to areas already inside the UGB. Incorporating Tonquin URA into the UGB would require upgrades to both the distribution system and pump capacity.

The City of Sherwood and CWS both have capital improvement projects planned to address capacity issues as described above. It is not clear from either Master Plan whether these improvements include any excess capacity for additional future expansion (beyond the Brookman Concept Area and Tonquin Employment Area).

Storm

City of Sherwood is the likely provider for Tonquin URA, as it is located within the Rock Creek basin and adjacent to the City service area boundary. CWS does not appear based on GIS mapping to have any storm infrastructure near this URA.

The following assessment is based on information from City of Sherwood Stormwater Master Plan, dated September 2016.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

The existing conveyance system contains a number of locations that were determined to be at moderate or high risk of flooding. Regional water quality and quantity facilities are adequately sized per the standards used at the time of their design.

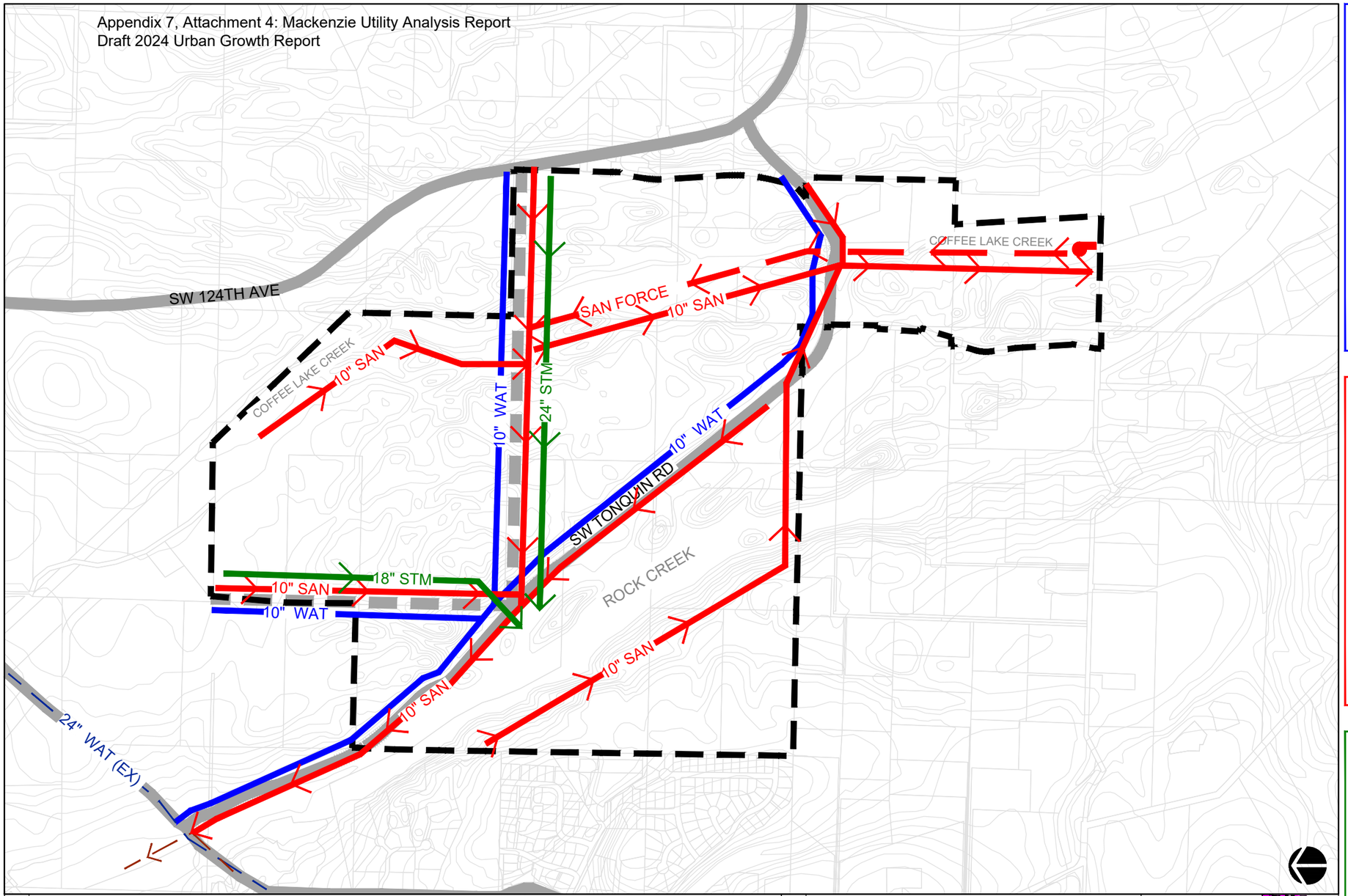
Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

If the proposed area is near a conveyance system that has been identified as having a flooding risk, pipes may need to be upsized to serve additional areas.

The Master Plan does not indicate whether regional water quality and quantity facilities have capacity to serve additional area. Based on topography within the Tonquin URA, stormwater from developed areas could likely outfall directly to Rock Creek and its tributaries. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Tonquin.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Based on topography within the Tonquin URA, stormwater from developed areas could likely outfall directly to Rock Creek. Per CWS and City of Sherwood stormwater standards for new development, water quality and quantity would be provided on private property before outfalling to these water bodies, thus the existing storm facilities would not be impacted by the development of Tonquin.



WATER

WATER PROVIDER: CITY OF SHERWOOD

PRESSURE ZONE: 380

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	15,110	$350	$5,288,500
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	0	$500	$0
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.8	$200,000	$160,000
TOTAL			$5,448,500

SANITARY

SANITARY PROVIDER: CITY OF SHERWOOD

BASIN: ROCK CREEK

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	27,800	$275	$7,645,000
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.3	$1,800,000	$540,000
SAN FORCE (LF)	5,000	$310	$1,550,000
TOTAL			$9,735,000

STORM

STORM PROVIDER: CITY OF SHERWOOD

WATERSHED: FANNO CREEK-TUALATIN RIVER

SUB-WATERSHED: ROCK CREEK

PROPOSED IMPROVEMENTS

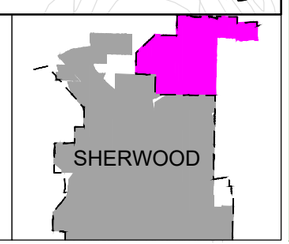
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,900	$400	$1,160,000
24" PIPE (LF)	3,900	$425	$1,657,500
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	28,200	$150	$4,230,000
TOTAL			$7,047,500

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- STORM LINE

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

TONQUIN

MACKENZIE.

0 500 1000

WILSONVILLE SOUTHWEST

Water

Wilsonville Southwest URA would likely be served by the City of Wilsonville as it is included in their Master Plan study area. According to the Master Plan, Wilsonville Southwest would be part of pressure zone B which is served by the Elligsen Reservoirs (two reservoirs with a total capacity of 5 MG). The Elligsen Reservoirs received water via gravity flow.

The City of Wilsonville's primary supply comes from the Willamette River. There is a single water treatment plant (Willamette River Water Treatment Plant) that serves the City which is in shared ownership with Tualatin Valley Water District.

The following assessment is based on information from the City of Wilsonville Water System Master Plan, dated September 2012. The Master Plan study area includes the area currently within the UGB plus areas of Clackamas and Washington County Urban Reserve Areas expected to be incorporated into City of Wilsonville, which includes Wilsonville Southwest URA. Buildout within the study area is projected to occur by 2036 for non-residential areas and 2045 for residential areas (Wilsonville Southwest is assumed non-residential in the Master Plan).

Assessment of the capacity of existing water facilities to serve areas already inside the UGB.

- Storage – Per the City Master Plan, there are no known storage issues in the existing system, which consists of four storage reservoirs providing a total of 7.6 MG of effective (usable) storage.
- Pumping – There are two pumping facilities in the distribution system, the Charbonneau Booster Station, and the B-to-C Booster Station. Both facilities have a firm capacity greater than what is anticipated to be needed in the 20-year planning period (as of 2012 report).
- Distribution – peak hour demands can be met with negligible pressure changes from annual average day demand.

Assessment of the capacity of existing water facilities to serve areas proposed for addition to the UGB.

- Storage – estimated required storage by the year 2030 is 17.64 MG, creating a storage deficit of 8.97 MG. Buildout of non-residential areas (including Elligsen Road North) is not projected to occur until 2036, so additional storage will be needed for its development.
- Pumping – there are no pumping facilities serving pressure zone B. Based on topography, Wilsonville Southwest could be served by gravity from the Elligsen Reservoirs that serve the rest of pressure zone B.
- Distribution – Future system infrastructure as shown in the City of Wilsonville master plan is adequately sized for required fire flow and operating pressures.

Assessment of the impacts to existing water facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

To provide adequate storage capacity to the study area an additional 8.97 MG of storage capacity will be needed. The City has eight backup wells with a total storage capacity of 6.92 MG, which reduces the 2030 projected storage need to 2.05 MG. The City of Wilsonville is currently in the design phase (construction planned for 2023-2024) for a 3.0 MG storage reservoir located in pressure zone B, with a second reservoir to follow in the future (timeline undefined). The addition of this reservoir will allow for adequate storage capacity to serve current service area as well as the addition of this URA into the UGB.

Sanitary Sewer

The Wilsonville Southwest URA would likely be served by the City of Wilsonville based on proximity.

Wastewater from the City of Wilsonville is conveyed in a City-owned and operated collection system to the Wilsonville Wastewater Treatment Plant (WWTP).

The following assessment is based on information from the City of Wilsonville Wastewater Collection Master Plan, dated November 2014. Grahams Ferry is included in the study area of the Master Plan and falls within the Wood School sewer basin, which is served by the Corral Creek, Rivergreen and Moreys Landing Pump Stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas already inside the UGB.

The existing system has zero hydraulic deficiencies for all existing pipe and pump stations.

Assessment of the capacity of existing sanitary sewer facilities to serve areas proposed for addition to the UGB.

There are no capacity of other existing issues with any of the three pumps that may serve this URA, however they are all reaching the end of their useful service and the City has identified capital improvement projects to rehabilitate them within the next 20 years. Based on topography, a new pump station will be required to connect sanitary lines for Wilsonville Southwest URA to the existing public sewer system. This pump station is identified in the City of Wilsonville Wastewater Master Plan and is shown on the Utility Analysis Map.

Assessment of the impacts to existing sanitary sewer facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

Besides non-capacity related improvements to the Corral Creek and Rivergreen Pump Stations as discussed above, there are no downstream capacity issues identified by the Master Plan.

Storm

Wilsonville Southwest URA would likely be served by the City of Wilsonville as it is located primarily within the Boeckman Creek Basin and is adjacent to the City service area boundary.

The following assessment is based on information from City of Wilsonville Stormwater Master Plan, dated March 2012.

Assessment of the capacity of existing stormwater facilities to serve areas already inside the UGB.

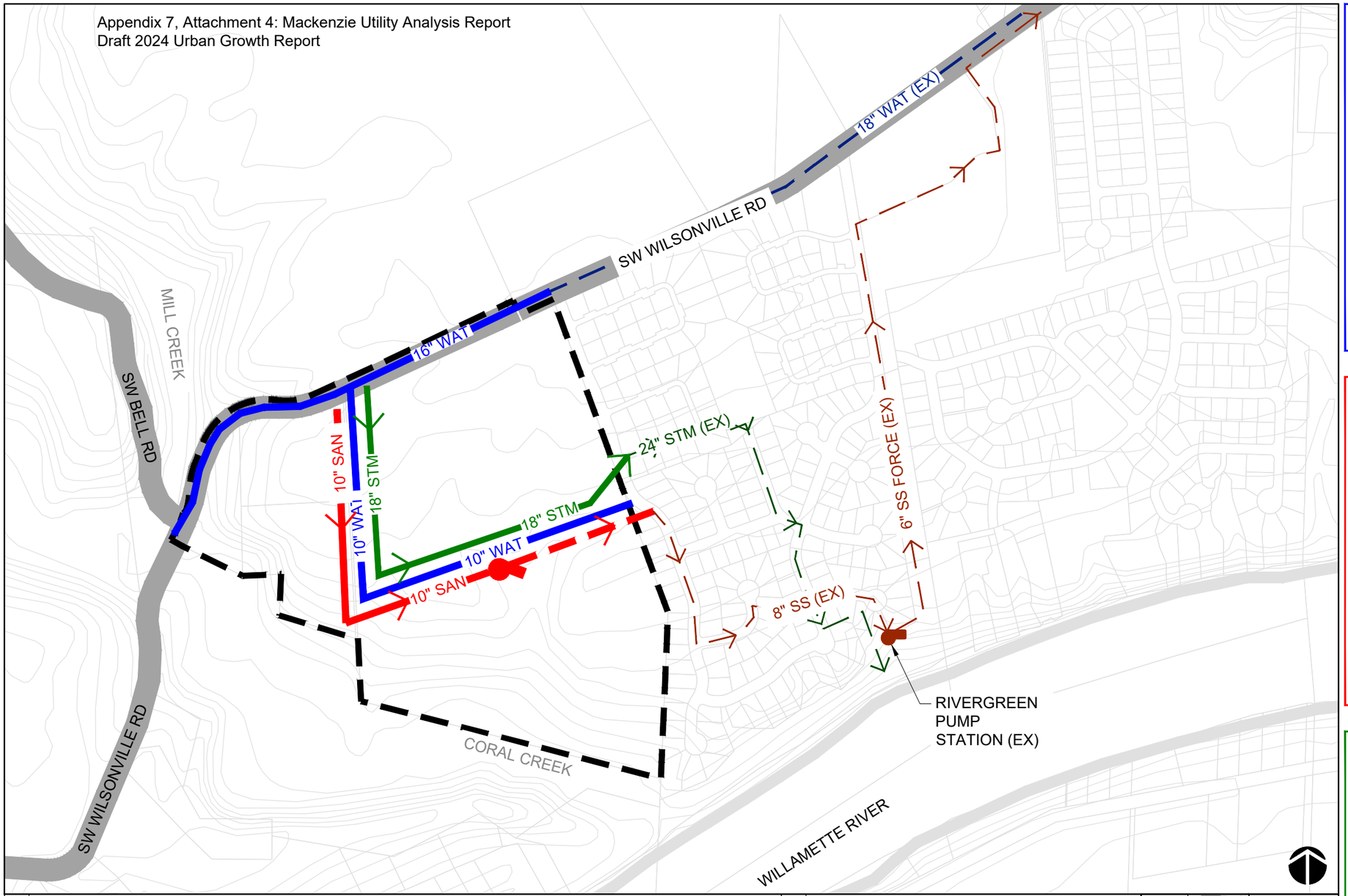
The Master Plan has identified "problem areas" (areas with flooding and evidence of significant erosion) based on observation during a 25-year storm event in 2009. The problem areas are isolated and there are no serious flooding issues under the existing condition.

Assessment of the capacity of existing stormwater facilities to serve areas proposed for addition to the UGB.

City of Wilsonville requires that stormwater management (water quality and flow control) be provided for all new impervious surfaces. Based on topography it seems likely that stormwater management for the development of Wilsonville Southwest would occur within the development area and outfall directly to Corral Creek, which drains directly to the Willamette River without connecting to an existing public stormwater system. The Master Plan does not indicate any problem areas in the short portion of Corral Creek between the Wilsonville Southwest URA and the Willamette River.

Assessment of the impacts to existing stormwater facilities that serve nearby areas already inside the UGB as a result of adding URA land to the UGB.

If Wilsonville Southwest outfalls directly to Corral Creek via private outfalls from development areas and public outfalls from roadways, there would be no impacts to existing storm facilities.



WATER

WATER PROVIDER: CITY OF WILSONVILLE

PRESSURE ZONE: B

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	2,300	$350	$805,000
12" PIPE (LF)	0	$400	$0
16" PIPE (LF)	2,200	$500	$1,100,000
PUMP STATION (MGD)	0	$5,800,000	$0
STORAGE RESERVOIR (MG)	0.1	$200,000	$20,000
TOTAL			$1,925,000

SANITARY

SANITARY PROVIDER: CITY OF WILSONVILLE

BASIN: WOOD SCHOOL

PROPOSED IMPROVEMENTS

ITEM	UNITS	UNIT COST	TOTAL COST
10" PIPE (LF)	1,650	$275	$453,750
12" PIPE (LF)	0	$350	$0
15" PIPE (LF)	0	$375	$0
PUMP STATION (MGD)	0.1	$1,800,000	$180,000
SAN FORCE (LF)	690	$310	$213,900
TOTAL			$847,650

STORM

STORM PROVIDER: CITY OF WILSONVILLE

WATERSHED: ABERNETHY CREEK-WILLAMETTE RIVER

SUB-WATERSHED: CORRAL CREEK

PROPOSED IMPROVEMENTS

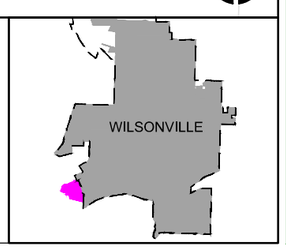
ITEM	UNITS	UNIT COST	TOTAL COST
18" PIPE (LF)	2,300	$400	$920,000
24" PIPE (LF)	0	$425	$0
30" PIPE (LF)	0	$500	$0
WATER QUALITY/ DETENTION (SF)	5,800	$150	$870,000
TOTAL			$1,790,000

LEGEND

- RESERVE BOUNDARY
- WATER LINE
- WATER LINE (EX)
- SANITARY LINE
- SANITARY FORCE MAIN
- SANITARY LINE (EX)
- SANITARY PUMP STATION
- SANITARY PUMP STATION (EX)
- STORM LINE
- STORM LINE (EX)

ABBREVIATIONS

EX	EXISTING
LF	LINEAR FEET
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
SF	SQUARE FEET



METRO RESERVES GOAL 14 - UTILITY ANALYSIS MAP

WILSONVILLE SOUTHWEST

MACKENZIE.

0 500 1000