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INFRASTRUCTURE ASSUMPTIONS



WILSONVILLE TOWN CENTER PLAN

Infrastructure Assumptions and Capacity Analysis

This memorandum provides the foundation for the infrastructure analysis completed for the Town Center Plan. The project team analyzed and has provided recommendations for wastewater, water and stormwater systems within Town Center based on the anticipated 40 year full buildout assumptions for residential, office, and commercial/retail development, as shown in Table 1.

Table 1. Potential Future Development by Land Use Type

	COMMERCIAL (SQ. FT.)	RETAIL (SQ. FT.)	OFFICE (SQ. FT.)	RESIDENTIAL (UNITS)
EXISTING	299,238	321,340	178,947	79
NET NEW DEVELOPMENT (20 YEAR)	130,231	31,858	297,442	881
NET NEW DEVELOPMENT (40 YEAR)	204,595	50,000	541,053	1,603
NET TOTAL	503,833	371,340	720,000	1,682
PROJECTED EMPLOYEES	1,000	740	2,880	n/a

Note: Commercial land uses includes a broad category of real estate. For this analysis, commercial land uses are typically larger types of development, such as grocery stores, restaurants, larger retail (non-main street type uses) and entertainment uses. Retail, as defined for Town Center, are typically smaller scale uses typical of a main street development pattern. Residential unit calculations assume units of approximately 750 square feet, although the expectation is that a variety of housing unit sizes (studio, one, two and three bedroom) would be constructed over time. Square footage and housing units were determined using GIS analysis, market feasibility, and proposed zoning district density allowances. Approximately 40 percent of the square footage of developable parcels was removed to accommodate for landscaping new streets, off-street parking (including loading and circulation), public spaces, stormwater retention and treatment

STORMWATER BASIS OF DESIGN

The project team made the following assumptions for evaluating the existing and future stormwater system.

1. The existing stormwater main conveyance system within the Town Center Development area has been deemed sufficient per the 2012 City of Wilsonville Stormwater Master Plan.
2. Existing stormwater main sizes within Town Center Development Area are per GIS data provided by City of Wilsonville.
3. Existing stormwater mains outside of future right-of-way will be removed. New stormwater mains will be installed in the future right-of-way. Locations of future right-of-way may be adjusted to limit the amount of utility relocations.
4. Minimum stormwater main pipe size is 12" per Section 301.8.02.b.2 of Wilsonville's 2015 Stormwater & Surface Water Design & Construction Standards.
5. All stormwater mains shall have sufficient slope to maintain a minimum flow velocity of 3 feet per second when flowing full per Section 301.8.02.k of Wilsonville's 2015 Stormwater & Surface Water Design & Construction Standards.
6. Development of adjacent parcels will implement on site water quality and flow control measures per Wilsonville's 2015 Stormwater & Surface Water Design & Construction Standards.

7. A minimum pipe slope of 1% was assumed for preliminary stormwater main sizing.
8. Table 2 can be used to size stormwater pipes in Town Center based on development acreage.

Table 2. Pipe Sizing

Pipe Sizing - Full Flow Capacity of Stormwater Pipe			
Pipe Size	Assumed Pipe Slope	*Full Flow Capacity (cfs)	**Approximate Maximum Area of Impervious Surface (acres)
8"	1%	1.57	1
10"	1%	2.85	3
12"	1%	4.63	5
14"	1%	6.99	8
16"	1%	9.97	11
18"	1%	13.65	15
20"	1%	18.08	20
24"	1%	29.41	33
30"	1%	53.32	61
36"	1%	86.70	99
42"	1%	130.79	150
48"	1%	186.73	214

* Full flow pipe capacity calculated using FlowMaster and a mannings coefficient of 0.010.

** Assuming a 25-year peak flow using TR-55 modeling of runoff from uncontrolled impervious area

SEWER BASIS OF DESIGN

The project team made the following assumptions for evaluating the existing and future sewer system:

1. Existing sewer main sizes within Town Center Development Area are per GIS data provided by City of Wilsonville.
2. Existing sewer mains outside of future right-of-way will be removed. New sewer mains will be installed in the future right-of-way. Locations of future right-of-way may be adjusted to limit the amount of utility relocations.
3. Minimum sewer main pipe size is 8" per Wilsonville's 2015 Public Work Standards.
4. Pipe size shall be determined by the design depth of flow (d) over the pipe inside diameter (D) is 0.67 per Wilsonville's 2015 Public Work Standards.
5. All sanitary sewers shall be laid on a grade that will produce a mean velocity of at least 2 feet per second when flowing full or half-full per Wilsonville's 2015 Public Work Standards.

The results of the analysis are shown in Table 3.

The Canyon Creek/Town Center sewer basin is not identified for capacity improvements in the 2014 Wilsonville Wastewater Collection System Master Plan. The master plan identifies a projected sewer flow

rate of 3.14 MGD for the future developed Urban Growth Boundary and Urban Reserve Area. Table 5-15 (from the Wastewater Collection System Master Plan) provides a summary of projected flow rates without correction for modeled peak flow attenuation and therefore is overly conservative. We assume that the system wide analysis completed in the Master Plan showed adequate capacity. Increases in peak flows resulting from buildout of the Town Center Plan is 0.69 MGD. Sewer flows through Town Center were modeled and found that the existing system is capable of accommodating the additional flows. However, an increase in surcharging is expected downstream at Memorial Drive and crossing I-5. The increase in surcharging is within acceptable limits and presents minimal risk for overflows.



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Table 3. Sewer System Capacity Analysis

	RDII (GPAD)*	Developed Area (ACRES)	GPD	MGD = gpd/1,000,000	Peaking Factor**	Peak Flow (MGD)
Existing DWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.44
Existing WWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.82
Future UGB DWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.43
Future UGB WWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.16
Future URA DWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.98
Future URA WWF - Peak Flow Estimate for Canyon Creek/Town Center per Table 5-15 of the 2014 Wastewater Collection System Master Plan	-	-	-	-	-	0.31
Dry Weather Flow Projections for Town Center Development (NET new - Comm/Retail/Office)	1,000.00	18.27	18,265.56	0.02	2.30	0.04
Wet Weather Flow Projections for Town Center Development (NET new - Comm/Retail/Office)	1,800.00	18.27	32,878.02	0.03	-	0.03
Dry Weather Flow Projections for 1,603 New Residential Units within Town Center Development***	-	-	266,098.00	0.27	2.30	0.61
Total (New plus existing):						3.83
Delta %:						21.88%

*Values for the RDII rate and the Unit Load for high density commercial areas were taken from the 2014 Wilsonville Wastewater Collection System Master Plan

**Diurnal Pattern Peaking Factor of 2.3 was taken from Table 6-1 of the 2014 Wilsonville Wastewater Collection System Master Plan

*** Residential unit loading was based on a per household wastewater usage of 166 gallons per day (gpd) taken from the 2014 Wilsonville Wastewater Collection System Master Plan.



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WATER BASIS OF DESIGN

The project team made the following assumptions for evaluating the existing and future water system.

1. Existing water main sizes within Town Center Development Area are typically 12" per GIS data provided by City of Wilsonville.
2. Existing water mains outside of future right-of-way will be removed. New water mains will be installed in the future right-of-way. Locations of future right-of-way may be adjusted to limit the amount of utility relocations.
3. Allowed water main pipe sizes are 8", 12", 18" or 24" per Wilsonville's 2015 Public Work Standards.
4. The required fire flow shall be 3000 gpm with a minimum residual pressure of 20 psi per Wilsonville's 2015 Public Work Standards.
5. Town Center Development Area is in Pressure Zone B per Figure 5 in Wilsonville's 2012 Water System Master Plan.
6. Pressure Zone B has a hydraulic grade of 400 ft, a service elevation range of 100-285 ft and a pressure range of 50 to 130 psi per Figure 5 in Wilsonville's 2012 Water System Master Plan.
7. The typical water system modeled pressures under an annual average day demand scenario for the Town Center Development Area is 80 to 110 psi per Chart 3.2 in Wilsonville's 2012 Water System Master Plan.
8. Town Center has a topographic elevation range of 175 to 200 feet, domestic water service would be anticipated to be supplied with pressures ranging from 87 to 98 pound per square inch (psi).
9. Per Figure 4 in Wilsonville's 2012 Water System Master Plan, the existing 12" water mains in the main loop of Town Center area are not identified for recommended improvements per a system evaluation based on the future demands assuming an annual growth rate of 2.9% for residential areas and an average annual growth rate of 3.25% for commercial/industrial areas through 2036.

The results of the analysis are shown in Table 4.

Based on the following assumptions, a 12" domestic water main would be sufficient to provide water service for the Town Center:

1. Fire flow requirements are the main factor in pipe sizing rather than demand based on land use.
2. The existing 12" system in Town Center has adequate capacity per Wilsonville's 2012 Water System Master Plan.
3. The projected growth Town Center growth is less than the growth assumed in Wilsonville's 2012 Water System Master Plan.
4. The existing 12" system is not identified for upgrades based on future growth in Wilsonville's 2012 Water System Master Plan.

The proposed 12" water main grid and future water demand for Town Center has not been integrated in the water main network model completed under Wilsonville's 2012 Water System Master Plan. Prior to construction, the proposed water main system in the Town Center Development should be included in the system model and flow and pressure demands should be tested at various points within the Town Center Development Area.



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Table 4. Water System Capacity Analysis

	Multi-Family Residential Max Day Demand (gpd/unit)*	Commercial Max Day Demand (gpm/acre)**	Multi-Family Residential Units	Developed Acres	Town Center Development Water Demand (GPM)
Multi-Family Residential Water Demand (based on net total full buildout number of units)	283	-	1682	-	330.56
Commercial/Industrial Water Demand (based on net total full buildout area)	-	3.30	-	36.62	120.85
Total (Full Buildout Max Day Demand):					451.41

	Commercial	Retail	Office	Total
Existing (SF)	299,238	321,340	178,947	799,525
Net New Development (40 year) (SF)	204,595	50,000	541,053	795,648
Net Total (Full Buildout) (SF)	503,833	371,340	720,000	1,595,173
Net Total (Full Buildout) (acres)	11.57	8.52	16.53	36.62

	Residential (units)
Existing	79
Net New Development (40 year)	1,603
Net Total (Full Buildout)	1,682

*Values for the multi-family residential max day demand are per Table 2.8 of the 2014 Wilsonville Wastewater Collection System Master Plan

**Values for the commercial max day demand are per Table 2.9 of the 2014 Wilsonville Wastewater Collection System Master Plan