WASTEWATER FACILITIES

The City of Newport (City) provides wastewater collection system services for more than 10,000 people and businesses spread across an area of approximately 11.2 square miles. The City owns over 62.5 miles of gravity pipelines ranging in size from approximately 3 to 36 inches in diameter, 1,400 manholes, 9 major pump stations, 16 minor pump stations, and 12 miles of sanitary force mains. A majority of the sewer system was built after 1950 and is concrete, while much of the newer pipe is polyvinyl chloride (PVC).

Detailed information on the historical, functional, and environmental factors relevant to the City's wastewater system can be found in the document entitled, "Final Sanitary Sewer Master Plan, by Brown and Caldwell, dated February 9, 2018" (hereinafter, the "Sanitary Sewer Master Plan").

Existing Wastewater System:

The primary components of the wastewater system are the Wastewater Treatment Plant (WWTP), gravity sewer mains, force mains, and pump stations. The WWTP was built by the City of Newport in 2002 at an initial cost of $42 million dollars. The plant is located in South Beach, and has the hydraulic capacity to bypass 15 million gallons of wastewater per day (untreated). The WWTP is permitted to treat up to 5 million gallons per day, and typically receives flows of 2 million gallons per day. The plant uses a biological process to treat wastes known as activated sludge. This process creates two products from wastewater. The main product is clean water, which is treated and pumped into the ocean off Nye Beach. The other product produced at the plant is Class A Biosolids. The Sanitary Sewer Master Plan evaluated the condition and future needs of the wastewater distribution system (i.e. gravity lines, force mains and pump stations). A separate facility master plan is being prepared for the WWTP.

The topography of Newport has required that pump stations be used to serve a number of areas throughout the city. Major pump stations are those that are critical to the operation of the entire collection system. Minor pump stations and individual septic tank effluent pump (STEP) systems serve targeted populations. Should minor facilities fail, the immediate population they serve would be impacted; however, the balance of the collection system would be operational. Table 1 below summarizes the design data for the City's major pump stations.

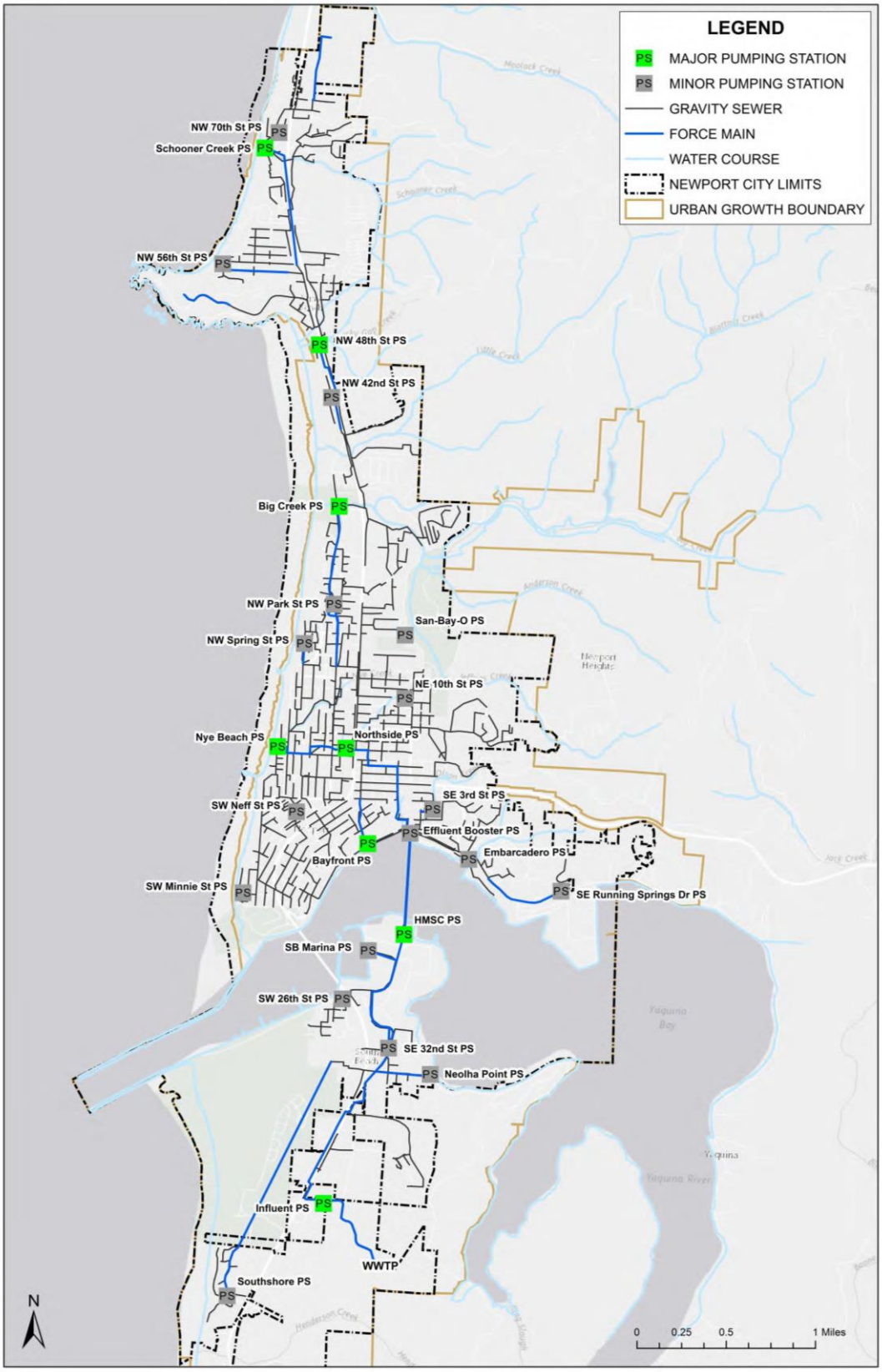
Table 1: Pump Station Summary

Pump Station	Capacity (gpm)[a]	Number of Pumps	Force Main Size (in)	Force Main Material	Force Main Length	Year Upgraded[b]
Bayfront	1,200	2	8	PVC	1,370	2001
Big Creek	2,430	3	14	HDPE	5,040	2016
HMSC	1,390	2	8		35	2001
Influent	850	2	24	HDPE	3,000	2001
	3,500	4				
Northside	3,000	3	20-24	Steel / DI / HDPE	142,000	2001
NW 48th St[c]	1,215	2	10	PVC	1,564	2018
Nye Beach	1,400	2	12	PVC / AC	2,200	-
Schooner Creek[c]	660	2	8	PVC	3,779	2018
SE Running Springs Dr	153	2	4	PVC	2,505	-

Note: gpm = gallons per minute.

a. Figures represent firm pumping capacity, and are based upon pump station operation without use of redundant pumps.
b. Year upgraded is based upon record drawings where available.
c. The NW 48th Street pump station, Schooner Creek Pump Station, and Schooner Creek force main are currently being upgraded as part of the Agate Beach Wastewater Improvement Project. Values listed represent planned improvements.

Figure 1: Existing Wastewater Distribution System



Development Assumptions:
Land use and zoning provide the basis for developing future unit wastewater flows and overall wastewater flow projections for buildout conditions. Understanding the nature and distribution of the various land use classifications is important for accurate identification of future wastewater flow rates and the phasing of required improvements. This section describes both the existing and proposed future land uses for the study area. Land use and zoning are largely governed by the local topography and by decisions made by the City, its citizens, and the Oregon Department of Land Conservation and Development (DLCD). Expansion of the Urban Growth Boundary (UGB) must be approved by the DLCD before such actions can be adopted.

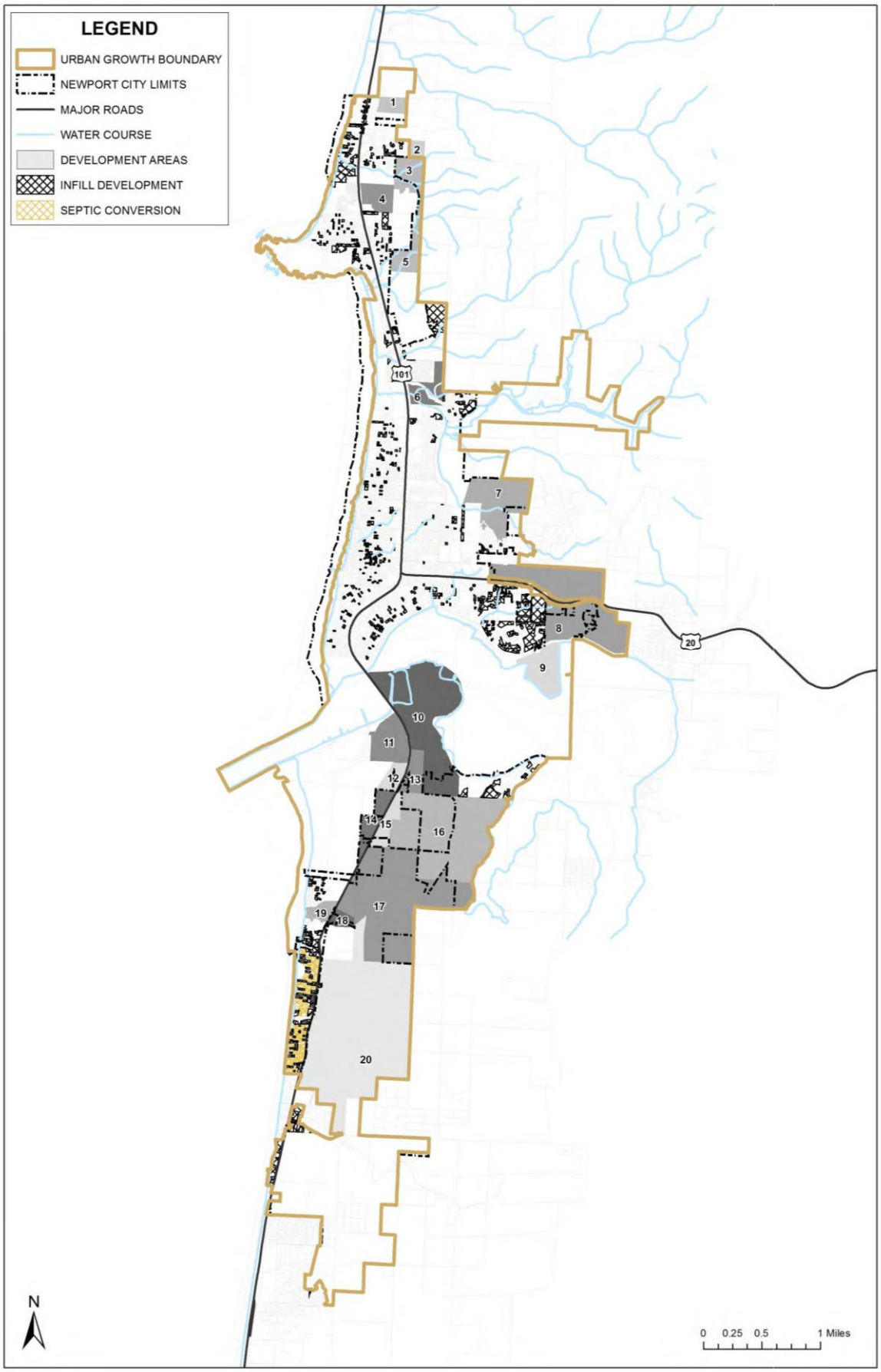
Information on current land use was obtained from GIS data provided by the City. In addition, the City maintains a buildable lands inventory (BLI). The BLI was developed in two parts. A Housing Needs and Buildable Lands Study provides land capacity estimates for low, medium and high density residential development (ECONorthwest, 2011 and 2014). An Economic Opportunities Analysis includes the same information for commercial and industrial properties, estimate land capacity in terms of dwelling unit equivalencies (ECONorthwest 2012). Buildable parcels are identified as "infill development" in Figure 2, below. The City's Community Development Department provided 20-year and buildout development conditions considering these studies. That information is listed in Table 2 below. The development identifier (ID) corresponds to the development area on Figure 2. Detailed views of the development areas are provided in Appendix B of the Sanitary Sewer Master Plan.

Table 2: Development Assumptions

Development ID	20-year Development Conditions	Buildout Development Conditions [c]
1	30-acre light industrial development [a]	
2	6-acre annexation for 48-unit assisted living facility	
3	50 Low Density Residential (LDR) units	50 LDR units
4	170 Medium Density Residential Units 120-unit assisted living facility	
5	50 LRD units	50 LDR units
6	22.5 acres High Density Residential (HDR) development [a]	12.5 acres HDR development [a]
7	38.5 acres LDR development [a]	38.5 acres LDR development [a]
8	135 acres LDR development [b]	135-acres LDR development [b]
9	9-acre log yard, 1.1 acre light industrial, 1.2 acre water dependent industrial	12-acre water dependent industrial
10	1.4 acre industrial, 3.4 acre research/classroom, 0.2 acre commercial	
11	2.3 acre commercial, OMSI 250 occupants, 60 MDR units	
12	0.2 acres commercial, 0.2 acres light industrial	
13	4.1 acres commercial development	
14	1.1 acres light industrial, 1.1 acres commercial	
15	1.0 acre commercial	
16	9.3 acres commercial, 350 LDR units, OSU (500 students)	3 acres commercial, 650 LDR units
17	1.1 acres light industrial development	2.2 acres light industrial development
18	0.5 acres commercial, 3 LDR units	
19	18 LDR units	
20	0.5 acres light industrial, 5 acres airport commercial	
Infill Development	215 residential parcels	501 residential parcels
Septic Conversion	184 LDR units	

a. Assume 80% infill to account for roads and right-of-way.
b. Assume 40% infill to account for steep sloped terrain, roads, and right-of-way
c. 20-year development conditions not are not included in buildout conditions.

Figure 2: 20-year and Buildout Conditions



Recommended Sanitary Sewer Projects:

Chapters 4 and 5 of the Sanitary Sewer Master Plan include flow projections, system modeling and hydraulic analysis to forecast anticipated demand based upon the 20-year and buildout scenarios. The results of that future condition assessment informed the development of a list of recommended capital improvements listed in the tables and figures below. Where capital projects are recommended from other facility plans, the source documents are noted.

Gravity Main Replacement

Sections of the existing gravity sewer mains along NE Avery Street and NW Nye Street lack capacity for 20-year buildout, and must be upsized to prevent excessive surcharging that could lead to basement backups and/or flooding. Individual sewer replacements are broken out into distinct sub-projects so that they can be designed bid and constructed incrementally or collectively based upon available funding, as outlined in Table 3 and graphically depicted in Figure 3.

Table 3: Recommended Gravity Main Replacements

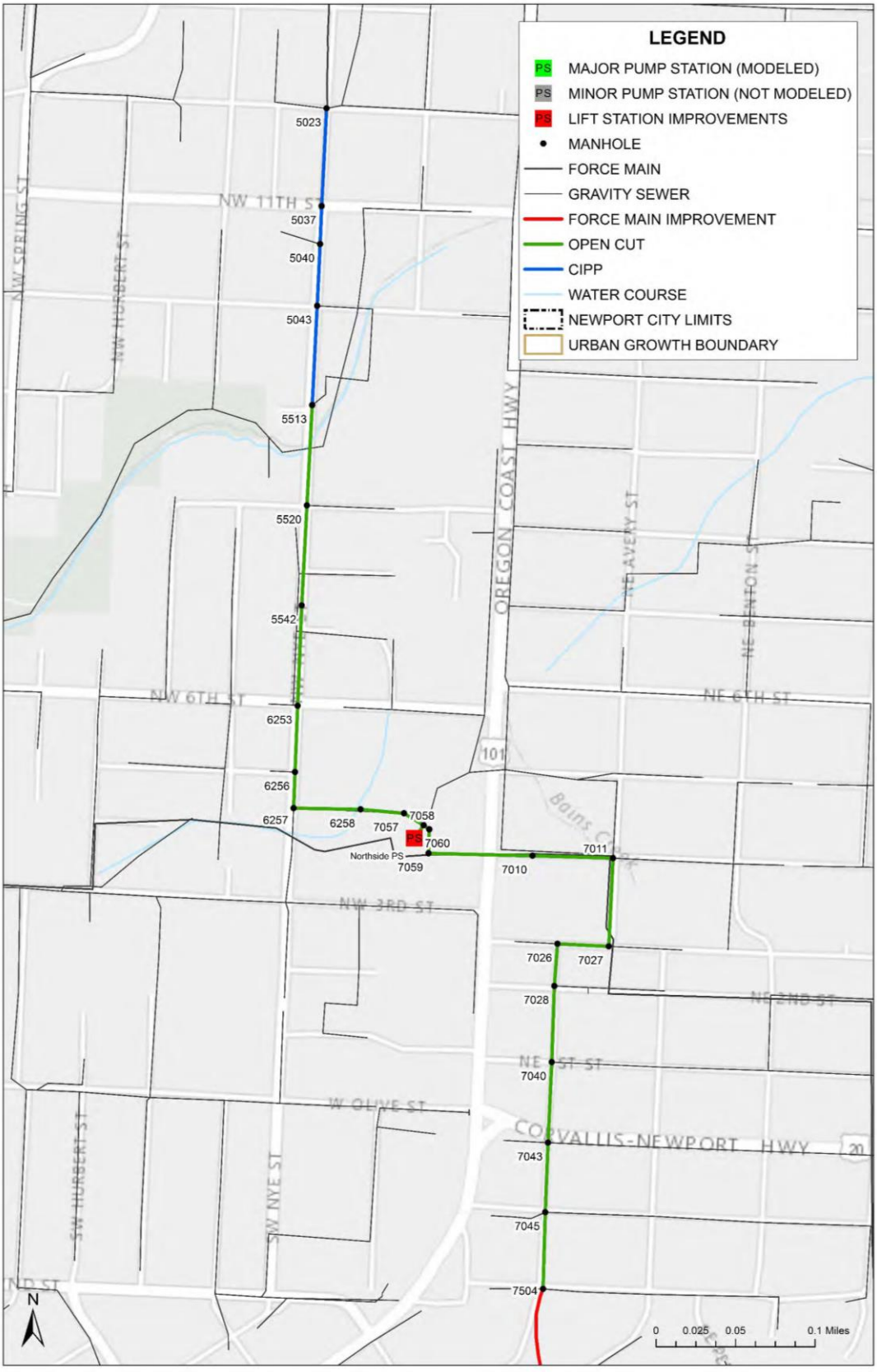
Gravity Sewer Mains (2016 dollars)						
Pipe ID	Length,(lf)	Existing Diameter (in)	Recommended Diameter (in) [a]	Solution	Estimated Cost [b]	Total Project Cost
NE Avery Street (Upsize gravity sewer from the Bayfront force main to the Northside pump station)						
7504 – 7045	258	14	18	Open cut	$137,000	$1,230,000
7045 – 7043	234	14	18	Open cut	$124,000	
7043 – 7040	264	14	18	Open cut	$140,000	
7040 – 7028	251	12	18	Open cut	$133,000	
7028 – 7026	140	12	18	Open cut	$74,000	
7026 – 7027	170	12	18	Open cut	$90,000	
7027 – 7011	293	10	18	Open cut	$155,000	
7011 – 7010	268	12	18	Open cut	$142,000	
7010 – 7059	345	12	18	Open cut	$183,000	
7059 – 7060	80	12	18	Open cut	$42,000	
7060 - 7058	23	12	18	Open cut	$12,000	
NW Nye Street (Upsize and rehabilitate gravity sewer from the Big Creek force main to the Northside pump station)						
5023 – 5037	330	15	13.5	CIPP	$109,000	$1,140,000
5037 – 5040	122	15	13.5	CIPP	$40,000	
5040 – 5043	204	15	13.5	CIPP	$67,000	
5043 – 5513	329	15	13.5	CIPP	$109,000	
5513 – 5520	340	15	18	Pipe burst	$163,000	
5520 – 5542	328	15	18	Pipe burst	$157,000	
5542 – 6253	333	15	18	Pipe burst	$159,000	
6253 – 6256	225	15	18	Pipe burst	$108,000	
6256 – 6257	109	15	18	Pipe burst	$52,000	
6257 – 6258	80	16	18	Pipe burst	$38,000	
6258 – 7057	145	16	18	Pipe burst	$69,000	
7057 – 7058	76	16	18	Pipe burst	$36,000	
7058 – Northside	53	20	21	Open cut	$31,000	

Note: CIPP = cured in place pipe.

a. Pipe diameter reduction of 10% assumed for CIPP rehabilitation

b. Estimated costs include a 30% allowance for construction contingencies and a 20% allowance for engineering design and administration. Appendix E to the Sanitary Sewer Master Plan includes unit costs tables. Assumes a depth of 10-feet per cost condition and 2-feet for gravity sewers.

Figure 3: NE Avery and NW Nye Street Gravity Sewer Replacement



Pump Station and Force Main Improvements

Four of the nine major pump stations were found to lack firm capacity for conveying the future buildout conditions peak flows: Nye Beach, Bayfront, Northside, and SE Running Springs. One pump station was identified to be at risk from unstable soil conditions.

The force main along the Bayfront will require upsizing, and replacing the force main and pump station at the same time would be beneficial from economy of scale pricing. Alternatively, the City may want to postpone installation of the new force main until later in the planning period once the buildout condition is met. Currently, the Bayfront force main is appropriately sized but nearing the upper limit of acceptable peak velocities. The HMSC force main appears to be undersized; however, flow is expected to be reduced in this area, which may mitigate concerns related to elevated force main velocities. A summary of the costs required to provide the necessary improvements is listed below.

Table 4: Recommended Pump Station and Force Main Improvements

Pump Station	Description of Improvements	Source	Estimated Cost (2016 dollars)
Nye Beach	Upgrade pump station firm capacity to 2.74 mgd	2018 Sanitary Sewer Master Plan	$2,828,000
Bayfront	Upgrade pump station firm capacity to 3.24 mgd	2018 Sanitary Sewer Master Plan	$3,224,000
Bayfront	Upgrade force main capacity to 14-inches	2018 Sanitary Sewer Master Plan	$490,000
Northside	Upgrade pump station firm capacity to 9.2 mgd	2018 Sanitary Sewer Master Plan	$2,780,000
SE Running Springs Dr	Upgrade pump station firm capacity to 9.2 mgd	2018 Sanitary Sewer Master Plan	$1,178,000
SE Running Springs Dr	Realign 4-inch force main	2018 Sanitary Sewer Master Plan	$330,000
NW 56th Street	Study pump station and upgrade	2018 Sanitary Sewer Master Plan	$1,347,000
SE 62nd Street	Construct new pump station	2006 South Beach Nbhd Plan	$1,000,000

Note: MGD = millions of gallons per day.

New Gravity Mains (i.e. Sewer Extensions)

Sewer extensions are required to provide service to those areas that do not have City sewer service. Areas without sewer service include homes on septic systems, areas within the current UGB to be developed, and miscellaneous properties inside the city boundary that are not located near existing sewers. Generally, sewer extensions are not funded by rates. Instead, most sewer extensions are funded by developers with potentially some of the costs being SDC-reimbursable. In partially developed areas of the city not currently connected to the sewer, Local Improvement Districts (LIDs) and special assessment districts may need to be formed to fund the projects. New gravity mains needed to serve new development areas include:

Table 5: Gravity Mains Needed to Serve New Development

New Gravity Sewer Mains (2016 dollars)				
Project	Length,(lf)	Recommended Diameter (in)	Source Document	Total Project Cost
NE Harney Street	1,400	8	1990 Public Facilities Plan	$740,000
NE 52nd Street	4,000	8	1990 Public Facilities Plan	$259,000
NE 70th Place	1,400	8	1990 Public Facilities Plan	$371,000
Yaquina Heights Dr	5,800	8	1990 Public Facilities Plan	$1,426,000
Benson Road	4,400	8	1990 Public Facilities Plan	$1,722,600
Harborton to SE 50th	3,400	12	2006 South Beach Neighborhood Plan	$754,800
SE 50th to SE 62nd	3,000 / 2,900	12 / 6	2006 South Beach Neighborhood Plan	$1,979,500
Wilder Phase 5	2,800	8	2006 South Beach Neighborhood Plan	$1,206,000

Septic Conversion and Airport Sewer

In the southern portion of the city, the Newport Municipal Airport and the Surfland neighborhood are currently served by septic sewer systems. The City plans on extending its sewer service out to the Surfland neighborhood and the Newport Municipal Airport. The scope and extent of the improvements are listed in the table below.

Table 6: Surfland Septic Conversion – Airport Sewer Extension

Description of Improvements	Source	Estimated Cost (2016 dollars) [a]
Gravity sewer distribution system	2018 Sanitary Sewer Master Plan	$4,620,000
Sewer force main	2018 Sanitary Sewer Master Plan	$612,000
Sewer pump station	2018 Sanitary Sewer Master Plan	$1,000,000

a. Estimated costs include a 30% allowance for contingency and a 20% allowance for engineering design and administration.

Rehabilitation and Replacement Program:

As a collection system ages, the structural and operational condition of the sewer system will decline as the number and type of defects in the piped system increase. If unattended, the severity and number of defects will increase along with an increased potential of sewer failure. Sewer failure is defined as an inability of the sewer to convey the design flow. It is manifested by hydraulic and/or structural failure modes. Hydraulic failures can result from inadequate hydraulic capacity in the sewer. Loss of hydraulic capacity can result from a reduction of pipe area because of accumulations of sediment, gravel, debris, roots, fats, oil, and grease, and structural failure. Also, a major loss of hydraulic capacity can be the result of excessive infiltration/inflow (I/I) or inappropriate planning for future growth that results in flows in excess of pipe capacity. Structural defects left unattended can lead to catastrophic failures that can have a significant negative impact on the community and the environment.

The City should implement a repair and rehabilitation (R&R) program to address its aging collection system. While the focus of many R&R programs is to restore the structural integrity of existing sewers, such activities will also help reduce the amount of infiltration that finds its way into the collection system. Elements of the collection system should be repaired or replaced based upon their structural condition with Grade 1 lines being in the best condition and Grade 5 being in the poorest condition. Factors used to determine the condition grade of the collection system are shown in the table below.

Table 7: Structural and Operational Condition Grades of Sewers

Condition Grade	Grade Description	Defect Description	Structural Condition Grade Implication	Operational Condition Grade Implication
5	Immediate Attention	Defects have led to failure	Collapsed or collapse imminent	Unacceptable infiltration or blockages; surcharging of pipe during high flow with possible overflows
4	Poor	Severe defects that will continue to degrade with likely failure in 5-10 years	Collapse likely in 5-10 years	Pipe at or near surcharge condition during high flow; overflows still possible at high flows
3	Fair	Moderate defects that will continue to deteriorate	Collapse unlikely in near future; further deterioration likely	Surcharge or overflows unlikely but increased maintenance required
2	Good	Minor and few moderate defects	Minimal near-term risk of collapse, potential for further deterioration	Routine maintenance only
1	Excellent	No defects, condition is like new	Good structural condition	Good operational condition

The City should budget approximately $1M per year in 2016 dollars to the R&R program, assuming that 2 percent of its system per year will be rehabilitated. The table below presents a more detailed break-down of the recommended R&R implementation strategy. The assumption that 2 percent will be re-habilitated is an approximate estimate based on information gathered from existing condition assessment information.

Table 8: Recommended R&R Schedule

Work Item	R&R Pipe (LF)	2016 – 2031 R&R Activities (2016 dollars)			
		2016 - 2019	2020 - 2023	2024 - 2027	2028 - 2031
Grade 5 (known)	4,990	$1,248,000	-	-	-
Grade 4 (known)	2,395	$359,000	-	-	-
Grade 5 (assumed)	22,954	$1,081,000	$2,329,000	$2,329,000	-
Grade 4 (assumed)	11,017	$311,000	$671,000	$671,000	-
Grade 1, 2 or 3 [a]	288,644	-	-	-	$3,464,000
Force Mains [b]	46,500	$930,000	$930,000	$930,000	$930,000
Total Cost		$3,929,000	$3,930,000	$3,930,000	$4,394,000
Annual Cost		$982,000	$983,000	$983,000	$1,099,000

a. Over time, pipes that are currently grade 1, 2, or 3 will escalate to being a Grade 4 pipe. It is estimated that the City will need to rehabilitate 2% of current Grade 1-3 pipes to maintain a sustainable inspection program. This is an estimated value; it is recommended that the City continues to evaluate the results of their inspection program to determine a refined R&R rate.

b. The force main R&R scope does not include the cost of replacing the Big Creek FM, NW 48th St FM, or Schooner Creek FM. These force mains were recently evaluated as part of the Agate Beach Improvement Project. In addition, the Northside, SE Running Springs Dr, and Bayfront force mains were excluded, as they are included as individual CIPs.

Years 1 through 16 should focus on the most severely deteriorated sewers, the Grade 5 sewers identified by the closed-circuit television (CCTV) inspections. The less deteriorated Grade 4 sewers should be addressed during years 5 through 16. As future inspections are conducted, additional Grade 4 and Grade 5 sewers will be identified. The LF listed in Table 6-8 for the unknown (i.e., yet to be inspected) Grade 4 and 5 sewers are estimated based on the distribution of grades for sewers inspected to date. These sewers are identified for R&R during years 1 through 16. The future inspections may find that the actual LF for each grade may vary from these projections. Also, the City should anticipate that additional R&R will be required in the future as the collection system ages. A recommended annual inspection and minor pump station repair program is outlined in the table below.

Table 9: Recommended Annual Inspection Pump Station Repair Program

Work Item	Quantity	Assumptions	Annual Estimated Cost (2016 dollars)
CCTV Inspections	47,000 LF per year	7-year inspection cycle. Assumes an average of $2.50/LF	$117,000
Pump Station Inspections	25 total	Inspect pump stations (excluding SE 3rd Street PS), with smaller stations costing $10,000 and large stations costing $20,000. Assume an average of $15,000 per station.	$15,000
Force Main Inspections	9,300 LF per year	7-year inspection cycle. Assume an average of $20/LF	$186,000
Minor Pump Station Repair and Rehabilitation Program	20 years	A schedule should be established to conduct these improvements on an annual basis. Priority pump stations include, but are not limited to Embarcadero, SW Minnie, Bayfront, and NE 10th Street.	$200,000
Total			$518,000