

# Roseburg Urban Sanitary Authority



## CAPITAL IMPROVEMENT PLAN (CIP)

### FIVE YEAR PLAN

# CAPITAL IMPROVEMENT PLAN

The following represents the recommended Capital Improvement Plan (CIP) for Roseburg Urban Sanitary Authority. The plan addresses the existing condition of the sanitary sewer system and identifies deficiencies in condition. The system is evaluated on condition and consequence of failure to establish a ranking for segments of the sewer system.

The planning period for the CIP is five (5) years for construction. The intent is to expand the list of projects every year to provide project lists for a continuous five (5) year period.

## EXISTING CONDITION

The plan evaluates only the existing condition for deficiencies in condition. The plan did not analyze the system for future capacity deficiencies as unimproved parcels within the City of Roseburg's Urban Growth Boundary are developed.

## GRAVITY SEWER REPLACEMENTS

### **1.0 Description of Existing Collection System**

The existing gravity sewer system consists of approximately 160 miles of sewer main lines, 4150 manholes and 11,000 customer connections. The gravity sewer system consists of pipes installed from 1911 to the present. RUSA began annual or semiannual pipe rehabilitation projects in 1998. The feet of pipe included in each project year was constrained by the funding available at the time.

For the purposes of the CIP the age of the existing pipe segments is assumed to be at fifty percent of the design life or greater. The generally accepted life cycle of concrete, clay and plastic pipe is 100 years.

The yearly project list limited to 1/100<sup>th</sup> of the replacement value of the system assuming an average pipe size of 8 inch and depth of 10 feet. The increased cost of major trunk line replacement has not been included; those pipe segments have been valued as 8-inch pipe segments to simplify the analysis.

For the purposes of the CIP, construction costs for replacement of the existing pipe is assumed to be located in a right-of-way and at a 10-foot depth. Rehabilitation utilizing a no dig (Cured in Place or Pipe Bursting) can be utilized in many instances at a reduced cost. Each project will be evaluated during the design as to the most cost-effective method of pipeline rehabilitation.

# CAPITAL IMPROVEMENT PLAN

## **2.0 Cost Index**

A good indicator of change over time in construction cost is the *Engineering News Record (ENR)* 20-city Construction Cost Index (CCI), which is computed from prices of construction materials and labor, and is based on a value of 100 in 1913. Cost data in this report is based on an ENR of 11281, representing the cost average for 2019. The cost provided in this CIP should be adjusted based on the ENR CCI annually to reflect any increasing costs.

## **3.0 Engineering and Contingencies**

Engineering and overhead are assumed to be 20 percent of the construction cost. Engineering services associated with typical projects include preliminary investigations and reports, site and route surveys, geotechnical explorations, preparation of drawings and specifications, construction services, surveying and staking, sampling and testing of materials. These costs can vary considerably depending on the nature and complexity of the project. Additional engineering costs could be realized if additional geotechnical investigations are required and if environmental permitting and public involvement and notification activities are required. Also, these activities could impact the engineering and construction schedule.

The construction contingency used in this CIP is 30 percent. The contingency is added after inclusion of the engineering costs. It is appropriate to allow for this degree of uncertainty due to the limited information available during the CIP planning level development of projects. Factors such as unknown geotechnical and groundwater conditions, utility relocation, and alignment changes are a few of the items that can increase project cost, for which it is wise to make allowances in preliminary estimates.

## **4.0 Sewer Construction Price Schedules**

This CIP used three pricing schedules for sewer construction. Each schedule is described as follows:

Price Condition No. 1: off-street construction. This condition includes pipe, pipe installation, excavation, import of all fill, hauling of all excavated material, manholes, trench safety, sump dewatering and traffic control. In general, this condition is for construction of sewers in future streets with no street restoration.

# CAPITAL IMPROVEMENT PLAN

- Price Condition No. 2: In-street construction, street restorations required. This condition includes pipe, pipe installation, excavation, import of all fill, hauling of all excavated material, manholes, trench safety, sump dewatering and traffic control. In general, this condition is for construction of sewers in future streets with no street restoration.
- Price Condition No. 3: In-street construction, with significant dewatering required. This condition is the same as Condition No. 2 with the inclusion of well point dewatering required to keep the trench dry for construction of the sewer. Actual dewatering costs can vary significantly with site conditions.

Tables A-1 through A-3 present unit costs for a range of pipe sizes and depths for the three construction condition schedules. Specialized construction techniques, such as pipe jacking or pipe boring work, are not included in any of the estimates. Most of the CIP projects will be to replace sewers in existing streets; therefore, the Conditions No. 2 pricing schedule is used accordingly unless other information is available for selecting one of the other pricing schedules.

<b>Table A-1. Cost Per foot of Installed Pipe</b>				
<b>Price Condition No. 1</b>				
<b>Size, inches</b>	<b>Depth of cover, feet</b>			
	<b>6</b>	<b>10</b>	<b>14</b>	<b>18</b>
8	\$202	\$324	\$470	\$643
10	\$220	\$346	\$496	\$671
12	\$242	\$371	\$526	\$704
15	\$280	\$417	\$579	\$766
18	\$327	\$470	\$638	\$831
21	\$360	\$522	\$708	\$905
24	\$417	\$596	\$798	\$1,006
27	\$462	\$633	\$827	\$1,042
30	\$496	\$674	\$872	\$1,093
36	\$573	\$766	\$981	\$1,217
42	\$666	\$879	\$1,110	\$1,355
48	\$774	\$997	\$1,235	\$1,496

# CAPITAL IMPROVEMENT PLAN

<b>Table A-2. Cost Per foot of Installed Pipe</b>				
<b>Price Condition No. 2</b>				
<b>Size, inches</b>	<b>Depth of cover, feet</b>			
	<b>6</b>	<b>10</b>	<b>14</b>	<b>18</b>
8	\$276	\$416	\$580	\$768
10	\$297	\$440	\$607	\$800
12	\$321	\$468	\$639	\$834
15	\$365	\$523	\$704	\$911
18	\$417	\$580	\$767	\$980
21	\$453	\$635	\$840	\$1,058
24	\$516	\$717	\$942	\$1,173
27	\$565	\$759	\$974	\$1,212
30	\$603	\$801	\$1,022	\$1,265
36	\$694	\$913	\$1,156	\$1,420
42	\$793	\$1,033	\$1,288	\$1,566
48	\$911	\$1,164	\$1,432	\$1,724

<b>Table A-3. Cost Per foot of Installed Pipe</b>				
<b>Price Condition No. 3</b>				
<b>Size, inches</b>	<b>Depth of cover, feet</b>			
	<b>6</b>	<b>10</b>	<b>14</b>	<b>18</b>
8	\$390	\$527	\$688	\$874
10	\$411	\$551	\$716	\$905
12	\$435	\$579	\$747	\$941
15	\$475	\$627	\$803	\$1,006
18	\$527	\$684	\$866	\$1,073
21	\$562	\$739	\$939	\$1,151
24	\$643	\$832	\$1,046	\$1,267
27	\$690	\$873	\$1,079	\$1,306
30	\$728	\$917	\$1,127	\$1,360
36	\$811	\$1,015	\$1,242	\$1,491
42	\$957	\$1,182	\$1,420	\$1,683
48	\$1,075	\$1,313	\$1,566	\$1,842

# CAPITAL IMPROVEMENT PLAN

As the collection system ages, upgrades or replacements of existing lift stations may be required to improve reliability and expand hydraulic capacity. Costs to rehabilitate or replace an existing lift station vary considerably depending on the specific needs of each station. These needs were not established as part of the CIP development unless improvements have been identified as part of normal maintenance and repair activities. Any deficiencies identified for lift stations have been included in the CIP.

## 5.0 Bypass Pumping Cost Tables

The replacement of an existing sewer will require bypass pumping in most cases. Bypass pumping costs are not included in the per foot construction cost listed above. These costs must be calculated separately and are based on the flow rates in the sewer and the amount of time that pumping is required. Guidelines for these costs are listed in table A-4. Several vendors are located in the area that can provide current quotes for individual projects.

**Table A-4. Bypass pumping Costs**

Diameter, inches	Size of pump(s), inches <sup>a</sup>	Assumed flow rate, gallons per minute <sup>b</sup>	Approximate pumping capacity, gallons per minute	Monthly rate <sup>c</sup>
8 - 12	4	200 - 600	600	\$8,271
15 - 18	6	1000 - 1,600	1,600	\$12,407
18 - 24	12	1,600 - 3,600	3,800	\$22,450
>24	Consider combinations of above sized pumps based on known flow rates in project pipes.			

<sup>a</sup>A variety of pump sizes most likely will be used for projects to accommodate actual flows. Pump sizes shown are based on ½ pipe full conditions. Full pipe and/or work during wet weather periods could require much larger pumps.

<sup>b</sup>Flow rates shown are based on ½ pipe full conditions and average pipe slope. Assumed pipe flow in 18-inch is slightly less than ½ pipe full conditions.

<sup>c</sup>Costs were provided by Rain for Rent (Portland) and based on a 28-day (monthly cycle). Actual costs will vary depending on site conditions.

# CAPITAL IMPROVEMENT PLAN

## 6.0 Pipe Replacement Cost

The gravity sewer system consists of sections of pipe that range in age from 109 years to current. Sixty-one percent (61%) of the gravity sewer system is original pipe installed prior to 1983. Thirty-nine percent (39%) of the system has been rehabilitated or is 3034 PVC pipe.

The various pipe institutes, concrete, clay, and PVC as well as that engineering community consider 100 years as the design life of buried pipe utilized in sanitary sewer systems. For the purposes of this plan, we have utilized one-hundred years as the design life and applied that to the total cost to replace the pipe within the gravity sewer system. The gravity system includes 860,556 feet of various size pipes. The cost analysis omitted the pipes less than 8" as it includes building sewers that are not part of the RUSA system.

The following spreadsheet details the pipe sizes by basin and the estimated replacement cost. The estimated total system replacement cost is \$358,447,964. The target replacement cycle is 100 years, with a projected annual replacement budget of \$3,584,480.

**Pipe Inventory - Length of Sewer by Diameter Ranges in Inches**

Basin	<8	8	10	12	15	18	21	24	30	36	42	Totals	IDM
CLOVERDALE	3,770	81,665	594	7,012	2,104	1,421				350		96,916	159,95
DEER CREEK	11,157	99,467	5,058	11,129	10,397	5,420	4,246	3,560				146,188	261,76
DOWNTOWN	21,858	52,124	4,738	4,829	3,970	3,140	4,246	4,395	1,869			101,168	191,55
FAIRGROUNDS	3,483	3,865	4,256									11,604	17,51
GOEDECK	8,547	104,338	8,940	6,436	7,201	1,699		954	2,455	13,402	5,902	159,871	372,01
HUCREST	10,962	64,992	3,730		1,488	1,227						82,399	126,42
NEWTON CREEK	9,790	168,626	22,515	7,880	5,009	9,262	2,988	7,893		2,285		236,257	438,08
VETERANS	237	15,264	4,796		1,520							21,817	35,72
WITH NO FLOW BASIN	2,297	893		1,147								4,337	4,12
<b>TOTAL:</b>	<b>72,100</b>	<b>591,233</b>	<b>54,626</b>	<b>38,432</b>	<b>31,688</b>	<b>20,748</b>	<b>7,244</b>	<b>18,223</b>	<b>4,324</b>	<b>16,037</b>	<b>5,902</b>	<b>860,556</b>	<b>1,607,88</b>

**Pipe Replacement Estimated Cost**

Cost per foot*	\$	416.00	\$	440.00	\$	468.00	\$	523.00	\$	580.00	\$	635.00	\$	717.00	\$	801.00	\$	913.00	\$	1,033.00		
<b>Total per size</b>	\$	245,952,907	\$	24,035,264	\$	17,986,176	\$	16,572,772	\$	12,034,072	\$	4,600,067	\$	13,065,748	\$	3,463,284	\$	14,641,425	\$	6,096,250	\$	358,447,964

\* Cost per foot utilizes condition 2 (in street installation at a 10 foot depth of cover). Table A-2

**Annual Replacement Program Estimate Cost \***

\* Annual program cost is base on a 100 year replacement plan

	\$	3,584,480
--	----	-----------



# CAPITAL IMPROVEMENT PLAN

## WASTEWATER COLLECTION SYSTEM

### CAPITAL IMPROVEMENT PLAN – 5 YEAR LIST

DESCRIPTION	ESTIMATE
<b>YEAR ONE</b>	
<b>HOOKER RD REHAB/REPLACEMENT</b>	\$2,300,000
2596 FEET OF 8 INCH MAINLINE 2356 FEET OF 18 INCH MAINLINE	
<b>DEER CREEK NORTH TRUNK LINE REHAB/REPLACEMENT</b>	\$1,450,000
2566 FEET OF 18 INCH MAINLINE	
<b>TOTAL</b>	\$3,750,000

DESCRIPTION	ESTIMATE
<b>YEAR TWO</b>	
<b>HOOKER RD REHAB/REPLACEMENT</b>	\$450,000
1478 FEET OF 8 INCH MAINLINE	
<b>DEER CREEK NORTH TRUNK LINE REHAB/REPLACEMENT</b>	\$2,750,000
3260 FEET OF 24 INCH MAINLINE	
<b>I&amp;I REHABILITATION</b>	\$50,000
<b>TOTAL</b>	\$3,250,000

DESCRIPTION	ESTIMATE
<b>YEAR THREE</b>	
<b>DEER CREEK NORTH TRUNK LINE REHAB/REPLACEMENT</b>	\$1,600,000
3141 FEET OF 15 INCH MAINLINE	
<b>COURT-FOWLER SYPHON LIFT STATION</b>	\$1,750,000
1165 FEET OF MAINLINE AND LIFT STATION	
<b>I&amp;I REHABILITATION</b>	\$150,000
<b>TOTAL</b>	\$3,500,000

# CAPITAL IMPROVEMENT PLAN

DESCRIPTION	ESTIMATE
<b>YEAR FOUR</b>	
<b>DEER CREEK NORTH TRUNK LINE REHAB/REPLACEMENT</b>	\$330,000
637 FEET OF 8 INCH MAINLINE 286 FEET OF 12 INCH MAINLINE	
<b>JACKSON TO PINE STREET BUNKER</b>	\$390,000
334 FEET OF 36 INCH MAINLINE	
<b>DOUGLAS TO PINE STREET BUNKER</b>	\$970,000
1044 FEET OF 30 INCH MAINLINE 350 FEET OF 24 INCH MAINLINE	
<b>DEER CREEK SOUTH TRUNK LINE REHAB/REPLACEMENT</b>	\$900,000
201 FEET OF 8 INCH MAINLINE 2072 FEET OF 12 INCH MAINLINE	
<b>I&amp;I REHABILITATION</b>	\$910,000
<b>TOTAL</b>	\$3,500,000

DESCRIPTION	ESTIMATE
<b>YEAR FIVE</b>	
<b>HARVARD ST. EAST REPLACEMENT</b>	\$2,850,000
4858 FEET OF 8 INCH MAINLINE 1301 FEET OF 10 INCH MAINLINE 2089 FEET OF 15 INCH MAINLINE	
<b>I&amp;I REHABILITATION</b>	\$650,000
<b>TOTAL</b>	\$3,500,000

# CAPITAL IMPROVEMENT PLAN

## WASTEWATER TREATMENT PLANT REPLACEMENTS AND IMPROVEMENTS

### 1.0 Description of Existing Wastewater Treatment Plant

The Roseburg Urban Sanitary Authority's (RUSA) wastewater treatment plant is located at 3485 West Goedeck Avenue.

The original plant was constructed in 1957 by the City of Roseburg. Roseburg Urban Sanitary Authority completed a major upgrade of the plant in 1987. The upgrade utilized approximately half of the infrastructure and replaced or added the remainder.

The WWTP has sections of the plant that are 63 years old and the newer sections are 33 years old making planning for major rehabilitation, replacement, or additional treatment critical. An estimated replacement price is \$150,000,000. Property acquisition has not been included in this estimate but any major project to replace the plant would most likely require additional property.

Wastewater treatment plants (WWTP) are designed with an approximate forty (40) year design life and a twenty (20) year growth design. RUSA's WWTP current summer flows average approximately 3 million gallons per day (MGD) with a design flow of 7.9 MGD. The wet weather (hydraulic design flow) is 30 MGD with winter flows averaging approximately 7 MGD. RUSA's WWTP has capacity for growth in the service area but permit restrictions may limit the treatment flow in the future. RUSA has been working to reduce the inflow and infiltration (I&I) by completing pipeline rehabilitation projects since 1997 (23 years). This work has reduced the wintertime flows (capturing existing capacity for treatment) providing for additional growth in the system.

### 2.0 Cost Index

A good indicator of change over time in construction cost is the *Engineering News Record (ENR)* 20-city Construction Cost Index (CCI), which is computed from prices of construction materials and labor, and is based on a value of 100 in 1913. Cost data in this report is based on an ENR of 11281, representing the cost average for 2019. The cost provided in this CIP should be adjusted based on the ENR CCI annually to reflect any increasing costs.

### 3.0 Engineering and Contingencies

Engineering and overhead are assumed to be 20 percent of the construction cost. Engineering services associated with typical projects include preliminary investigations

# CAPITAL IMPROVEMENT PLAN

and reports, site surveys, geotechnical explorations, preparation of drawings and specifications, construction services, surveying and staking, and sampling and testing of materials. These costs can vary considerably depending on the nature and complexity of the project. Additional engineering costs could be realized if additional geotechnical investigations are required and if environmental permitting and public involvement and notification activities are required. Also, these activities could impact the engineering and constructions schedule.

The construction contingency used in this CIP is 10 percent. The contingency is added after inclusion of the engineering costs. It is appropriate to allow for this degree of uncertainty due to the limited information available during the CIP planning level development of projects.

## **4.0 Treatment Plant Replacement Cost**

During the options evaluation to meet the new summer discharge limits an upgrade to the existing plant as well as complete replacement of the plant was explored. The estimate to replace the current treatment plant was \$150,000,000. Although this option was not selected this is a good estimate for the purposes of the capital improvement plan. The estimate does not include property acquisition but would most likely be required to build a new treatment plant.

In calculating the annual treatment plant capital improvement plan we utilized the estimated \$150,000,000 and the forty-year design life to establish a \$3,750,000 budget target.

# CAPITAL IMPROVEMENT PLAN

## WASTEWATER TREATMENT PLANT AND PUMP STATION

### CAPITAL IMPROVEMENT PLAN – 5 YEAR LIST

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>YEAR ONE</b>			
<b>SODIUM BISULFITE SYSTEM- RELOCATE</b>	\$400,000	\$120,000	\$520,000
<b>ODOR CONTROL SYSTEM -BIOTOWER</b>	\$500,000	\$150,000	\$650,000
<b>PRE-TREATMENT BLDG DOOR</b>	\$25,000	\$2,500	\$27,500
<b>PRE-TREATMENT BLDG CEILING</b>	\$50,000	\$5,000	\$55,000
<b>WINCHESTER PUMP STATION VFD'S</b>	\$40,000	\$12,000	\$52,000
<b>CLARIFIER GEAR BOX- REPLACEMENT</b>	\$10,000	\$1,000	\$11,000
<b>DIGESTER CLEANING</b>	\$65,000	\$6,500	\$71,500
<b>WWTP STORM DIVERSION</b>	\$80,000	\$24,000	\$104,000
<b>TRANSFER TO FUND 07 - CONTINGENCY</b>			\$2,259,000
<b>TOTAL</b>			\$3,750,000

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>YEAR TWO</b>			
<b>SOUTH BANK PUMP STATION-UPGRADE</b>	\$225,000	\$67,500	\$292,500
<b>BIOTOWER PUMP VFD'S</b>	\$60,000	\$18,000	\$78,000
<b>WWTP W3 SYSTEM UPGRADE</b>	\$80,000	\$24,000	\$104,000
<b>PRE-TREATMENT BLDG CEILING</b>	\$50,000	\$5,000	\$55,000
<b>LOMA VISTA PUMP STATION</b>	\$1,000,000	\$300,000	\$1,300,000
<b>NEW 50 HP PLANT BLOWER</b>	\$225,000	\$67,500	\$292,500
<b>NEW HOIST AND GANTRY WINCHESTER</b>	\$25,000	\$7,500	\$32,500
<b>NEW VFD-INFLUENT PUMP</b>	\$15,000	\$1,500	\$16,500
<b>TRANSFER TO FUND 07 - CONTINGENCY</b>			\$1,579,000
<b>TOTAL</b>			\$3,750,000

# CAPITAL IMPROVEMENT PLAN

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>YEAR THREE</b>			
<b>REPLACE PUMPS AND VFD'S-HIGHLAND</b>	\$1,300,000	\$390,000	\$1,690,000
<b>TRANSFER TO FUND 07 - CONTINGENCY</b>			\$2,060,000
<b>TOTAL</b>			\$3,750,000

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>YEAR FOUR</b>			
<b>REPLACE WWTP GENERATORS (2)</b>	\$500,000	\$50,000	\$550,000
<b>REBUILD INFLUENT SCREENS</b>	\$50,000	\$5,000	\$55,000
<b>REPLACE POLYMER MIXING SYSTEM</b>	\$350,000	\$35,000	\$385,000
<b>REPLACE WASTE GAS FLARE</b>	\$150,000	\$15,000	\$165,000
<b>REHAB PRIMARY SPLITTER BOX</b>	\$200,000	\$20,000	\$220,000
<b>TRANSFER TO FUND 07 - CONTINGENCY</b>			\$2,375,000
<b>TOTAL</b>			\$3,750,000

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>YEAR FIVE</b>			
<b>REPLACE DIGESTER MIXING SYSTEM</b>	\$1,000,000	\$300,000	\$1,300,000
<b>REPLACE BIOSOLIDS TRANSFER PUMPS</b>	\$100,000	\$10,000	\$110,000
<b>TRANSFER TO FUND 07 - CONTINGENCY</b>			\$2,340,000
<b>TOTAL</b>			\$3,750,000

# CAPITAL IMPROVEMENT PLAN

## 5.0 Treatment Plant Improvement Projects.

The list of projects included in the five (5) year CIP does not include projects that may be needed to meet future permit restrictions. We are scheduled for a NPDES permit renewal in 2022.

The list of projects also does not include improvements to work toward resiliency in the future. The following is a list of the projects that have been identified:

DESCRIPTION	ESTIMATE	ENGINEERING AND CONTINGENCY	TOTAL
<b>IMPROVEMENTS</b>			
<b>CO-GENERATION</b>	\$1,000,000	\$300,000	\$1,300,000
<b>FOG RECEIVING STATION</b>	\$1,000,000	\$300,000	\$1,300,000
<b>ADDITIONAL DIGESTER</b>	\$1,000,000	\$300,000	\$1,300,000
<b>SOLAR ARRAY WWTP, NTS, ADMIN BLDG</b>	\$1,000,000	\$300,000	\$1,300,000
<b>CLASS "A" BIOSOLIDS</b>	\$1,900,000	\$570,000	\$2,470,000
<b>TOTAL</b>			\$7,670,000