
CAPITAL IMPROVEMENT PROGRAM

This chapter presents the capital improvement plan (CIP) for the Wastewater Collection System Master Plan. The CIP includes a summary of recommended projects, preliminary cost estimates, and an implementation plan.

9.1 BASIS OF COST ESTIMATES

Cost estimates were prepared for general planning purposes and to guide project evaluation and implementation. The cost estimates presented in this document were developed from bid tabulations, cost curves, and unit costs obtained from previous studies and were based on a 20-City Average Engineering News Record Construction Cost Index (ENR CCI) of 10,037 (July 2015). Final project costs will depend on actual labor and material costs, competitive market conditions, final project scope, implementation schedule, and other variable factors, such as detailed utility and topography surveys.

Cost estimates were prepared in accordance with the guidelines of the AACE International (the Association for the Advancement of Cost Engineering, 18R-97) for a Class 5 estimate. Of the five total estimates included in the AACE Cost Estimate Classification System, Class 5 estimates are most appropriate for planning projects before more definitive information (such as detailed designs) is available. For this reason, Class 5 estimates have wide accuracy ranges that vary from -20 to -50 percent on the low side to +30 to +100 percent on the high side. Class 5 estimates fluctuate based on the project's technological complexity, the availability and accuracy of appropriate reference information, and the inclusion of an appropriate contingency determination.

Typically, Class 5 estimates are prepared for any number of strategic business planning purposes, including, but not limited to, project screening, evaluating resource needs and budgeting, and long-range capital planning similar to what is being performed in this Master Plan.

9.1.1 Pipeline Unit Construction Costs

Unit construction costs were developed to prepare order of magnitude cost estimates for gravity sewer and force main pipelines.

9.1.1.1 Gravity Sewers

Gravity sewer pipeline improvements range in size from 8 inches to 66 inches in diameter. The unit costs provided for these pipelines were based on typical field conditions for construction in stable soil at a depth from 10 feet to 15 feet. Table 9.1 shows the unit costs for the construction of gravity sewer pipelines and appurtenances (i.e., manholes).

Table 9.1 Gravity Sewer Unit Construction Costs Wastewater Collection System Master Plan City of Modesto, California			
Pipe Diameter (inches)	Unit Construction Cost (\$/linear foot)⁽¹⁾	Pipe Diameter (inches)	Unit Construction Cost (\$/linear foot)⁽¹⁾
8	\$109	24	298
10	137	27	335
12	163	30	373
15	205	36	447
18	223	42	521
21	260	48	552

Note:
 (1) Costs are provided as present value based on an ENR CCI number of 10,037, which corresponds with the 20-City Average Index in July 2015. Costs are not escalated to future years.

Table 9.2 shows the unit costs for pipeline rehabilitation. Rehabilitation costs include direct construction-related activities and are attained from Modesto’s Wastewater Collection System Condition Assessment Report.

9.1.1.2 Force Mains

New force mains will be required for three of the proposed lift stations: Chapman Road, Kansas Avenue, and Whitmore/Carpenter. Estimated unit costs for the construction of force mains are shown in Table 9.3.

9.1.2 Lift Stations

Lift station costs were developed on the basis of pumping capacity. Lift station improvements will increase the firm pumping capacity, which is the capacity with the largest pump out of service. The lift station construction cost curve shown in Figure 9.1 was derived from past costs for projects of similar size in California.

9.1.3 Project Costs

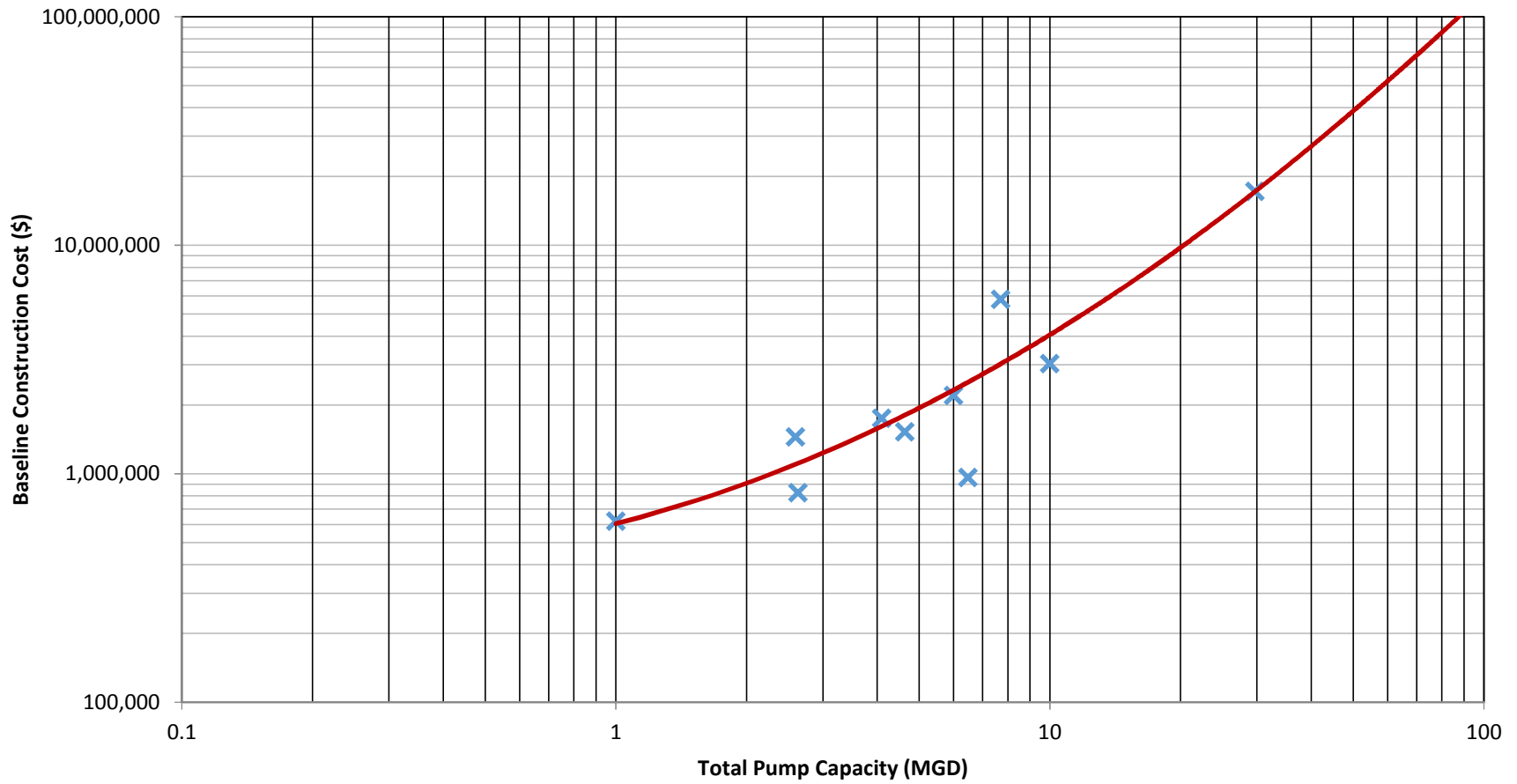
Construction costs were estimated by adjusting the total direct cost by 25 percent and estimating contingency to account for unexpected construction conditions, the need for unforeseen mechanical items, variations in final quantities, and other project considerations.

Table 9.2 Gravity Sewer Rehabilitation Construction Costs Wastewater Collection System Master Plan City of Modesto, California		
Pipe Diameter (inches)	CIPP Construction Cost (\$/linear foot)⁽¹⁾	Slipline Construction Cost (\$/linear foot)⁽¹⁾
16	\$115	\$85
18	129	95
21	151	111
24	172	127
27	194	143
30	215	159
33	237	175
36	258	190
39	280	206
42	301	222
45	323	238
48	344	254
51	366	270
54	387	285
60	430	317
66	473	349

Note:
(1) Costs are provided as present value based on an ENR CCI number of 11,155.07, which corresponds with San Francisco Bay Area Index in July 2015. Costs are not escalated to future years.

Table 9.3 Force Main Unit Construction Costs Wastewater Collection System Master Plan City of Modesto, California	
Pipe Diameter (inches)	Unit Construction Cost (\$/linear foot)⁽¹⁾
4	\$144
6	147
8	150
10	156

Note:
(1) Costs are provided as present value based on an ENR CCI number of 10,037, which corresponds with the 20-City Average Index in July 2015. Costs are not escalated to future years.



LIFT STATION COST VS. CAPACITY CURVE

FIGURE 9.1

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WASTEWATER COLLECTION SYSTEM MASTER PLAN



The total project cost was estimated as the total construction cost plus an allowance of 30 percent for engineering, legal, and administration costs. Table 9.4 summarizes the overall approach for developing capital cost estimates.

Table 9.4 Capital Cost Estimating Approach Wastewater Collection System Master Plan City of Modesto, California	
Item	Cost Formula
	Total Direct Cost = A
Estimating Contingency	B = 25 percent of A
	Total Construction Cost = A + B
Engineering, legal, and administrative costs for implementing the project (E.L.A.)	E.L.A. = 30 percent of Total Construction Cost
	Total Project Capital Cost = Total Construction Cost + E.L.A.

9.2 RECOMMENDED PROJECTS

Table 9.5 summarizes the recommended projects for the CIP. Detailed descriptions of each project were described in Chapters 6 and 8.

The City's 2005 sewer bond has already funded some of the projects listed in the CIP. Currently, these projects are either in progress or are planned to start in the near future. To keep track of the overall collection system improvements the City has planned, previously funded projects are listed in the CIP without costs to avoid double counting.

9.3 PROJECT IMPLEMENTATION PLAN

The project implementation plan identifies the project phasing, project category, and projected cash flow requirements for implementing the CIP.

9.3.1 Project Phasing Assumptions

The CIP projects were prioritized based on their level of urgency. As such, improvements needed to mitigate existing deficiencies were assigned the highest priority, and expansion of the system to accommodate growth was given the lowest. This system expansion will begin when prompted by the City's growth. The recommended phasing for each project is shown in Table 9.6.

Table 9.5 CSMP CIP Wastewater Collection System Master Plan City of Modesto, California									
Project Number	Project	Description/Street	Purpose	Improvement Category	Ex. Size/ Diam. (in)⁽⁶⁾	New Size/ Diam. (in)⁽⁶⁾	Replace/ New	Length (ft)	Total Project Cost⁽¹⁾
Existing System Improvements									
Area 1									
West Trunk									
LS 19 - Hahn	Hahn Lift Station	Honey Creek Road and Nightingale Drive	This improvement will increase firm capacity from 0.65 mgd to 1.3 mgd to meet existing and future PWWFs.	Capacity	0.6 mgd	2.6 mgd	Replace	-	\$1,791,000
A-3	Gravity Pipeline ⁽²⁾	Roseburg/Haney Avenue	Inspections along this reach indicate that roots have penetrated the RCP. This Pipeline is recommended for urgent repair. The method of rehabilitation will involve cured-in-place pipe (CIPP) lining.	Rehabilitation	18	-	CIPP	3,000	\$619,000
C-1	Gravity Pipeline ⁽²⁾	Woodland Avenue	Pipeline aggregate along this reach is missing and protruding. The method of rehabilitation will involves slip-lining.	Rehabilitation	54/60	-	Slip-lining	24,900	\$16,016,000
Rumble Trunk									
LS 30 - Rumble	Rumble Lift Station	Rumble Road near Bay Lane	This improvement will increase firm capacity from 1.37 mgd to 2.33 mgd to meet existing and future PWWFs.	Capacity	1.4 mgd	3.5 mgd	Replace	-	\$2,280,000
Area 2									
Emerald Trunk									
B-2	Gravity Pipeline ⁽²⁾	Mercy Avenue	Inspections along this reach have observed visible reinforcement with some areas of projecting rebar. The method of rehabilitation will involve CIPP lining and slip-lining.	Rehabilitation	18/27/54	-	CIPP/ Slip-lining	7,500	\$2,176,000
D-2	Gravity Pipeline ⁽²⁾	Briggsmore Ave/Tully Rd	The pipeline coating has deteriorated and is susceptible to corrosion.	Rehabilitation	30	-	CIPP	110	\$39,000
Area 3									
Sutter Trunk									
A-2	Gravity Pipeline ⁽²⁾	Pipelines entering Sutter Plant	Pipeline reinforcements within the Sutter reach are corroded, and segments of the wall are missing. PoleCam data on the South Trunk identified pipelines with moderate to severe conditions. The South Trunk Siphon was included in this project for budgeting purposes.	Rehabilitation	24/30	-	CIPP	2,200	\$726,000
S-4a	Gravity Pipeline	Highway 99	This improvement will increase reliability by constructing a parallel 16-inch diameter trunk under Highway 99.	Reliability	-	16	New	400	\$373,000
C-2/S-4b	Gravity Pipeline	Highway 99	This improvement will rehabilitate the existing 16-inch diameter trunk.	Rehabilitation	16	-	Rehab	400	\$113,000
River Trunk									
RT-1	Gravity Pipeline ⁽³⁾	Tuolumne Avenue	This improvement will provide gravity conveyance of the River Trunk flows from the discharge of the River Trunk force mains to the Sutter Plant.	Capacity	-	48	New	2,300	\$3,211,000
RT-2	Gravity Pipeline ⁽³⁾	Colorado Avenue	This improvement will provide gravity conveyance of the River Trunk flows from the discharge of the River Trunk force mains to the Sutter Plant.	Capacity	-	54	New	4,000	\$8,648,000
RT-3	Gravity Pipeline ⁽³⁾	Colorado Avenue	This improvement will provide gravity conveyance of the River Trunk flows from the discharge of the River Trunk force mains to the Sutter Plant.	Capacity	-	60 / 72/84	New	3,300	\$7,442,000
RT-4	Gravity Pipeline ⁽³⁾	Tuolumne Boulevard	This improvement will provide peak wet weather diversion for the existing Sutter Trunk.	Capacity	-	21	New	1,300	\$1,137,000
RT-5	Force Main ⁽³⁾	Tuolumne Boulevard	This improvement will add force mains that allow the system to maintain flushing velocities through a wide range of flows; these force mains will convey flows from the River Trunk Pump Station.	Capacity	-	30 & 42	New	2,600	\$5,818,000
RT-6	Gravity Pipeline ⁽³⁾	Beard Brook North Gravity Alignment	This improvement will extend the Dry Creek crossing that conveys flows to the River Trunk Pump Station.	Capacity	-	48	New	3,900	\$16,967,000
RT-7	Gravity Pipeline ⁽³⁾	B Street	This improvement will reroute flows to the River Trunk Pump Station.	Capacity	-	36 & 48	New	1,500	\$2,071,000
RT-8	Force Main/ Gravity Pipeline ⁽³⁾	Open Space	This improvement will convey flows from the new Shackelford PS to the new River Trunk in Colorado.	Capacity	-	14 & 18	New	3,200	\$1,944,000
RT-9	Gravity Pipeline ⁽³⁾	Sutter Avenue	This improvement will rehabilitate the Sutter Ave Trunk based on the results of the condition assessment.	Rehabilitation	-	24	New	1,300	\$533,000

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RT-10	Gravity Pipeline ⁽³⁾	Open Space	This improvement will rehabilitate a segment of the River Trunk based on the results of the condition assessment.	Rehabilitation	-	48/60/66	New	15,000	\$14,069,000
RT-11	River Bank Armament ⁽³⁾	Tuolumne River Bank	This improvement will provide armoring for the riverbank to prevent future erosion and exposure of the CSL and River Trunk.	Reliability	-	-	New	-	\$4,668,000
RT-12	CSL Diversion Structures ⁽³⁾	North or Sutter Plant	This improvement will provide a contingency to divert flows between the CSL and River Trunk.	Reliability	-	-	New	-	\$560,000
PS - Shackelford	Shackelford Pump Station ⁽³⁾	East of Crows Landing	This improvement will eliminate the siphon below the Tuolumne River.	Capacity	-	4.2 mgd	New	-	\$2,989,000
PS - River Trunk	River Trunk Pump Station ⁽³⁾	Morton Boulevard	This improvement will eliminate the River Trunk inverted siphon and the associated issues.	Capacity	-	54.5 mgd	New	-	\$33,483,000
Area 4									
Downtown Trunks									
DT-1	Gravity Pipeline	J Street	The trunk in J Street exceeds the maximum d/D criteria under PWWF, causing the existing 12-inch pipeline to surcharge; replacing the pipe will increase capacity.	Capacity	12	15	Replace	2,400	\$800,000
DT-2	Gravity Pipeline	Kimble Street and Floto Street	The existing 10-inch diameter pipelines exceed the maximum d/D criteria under PWWF at approximately 90 percent capacity; replacing these pipes will increase capacity.	Capacity	10	12	Replace	1,000	\$265,000
C-3	Gravity Pipeline ⁽²⁾	9 th Street	Inspections along this reach have exposed missing aggregate, visible reinforcement and deterioration of the concrete walls. The method of rehabilitation will involve CIPP lining.	Rehabilitation	27	-	CIPP	3,300	\$1,037,000
D-1	Gravity Pipeline ⁽²⁾	12 th St./Morton Blvd	Aggregate and missing segments of the interior wall were observed below the flow line, which indicates the corrosion is due to chemicals within the wastewater. The method of rehabilitation will involve CIPP lining.	Rehabilitation	21/24/27	-	CIPP	1,800	\$553,000
Area 5									
Santa Rosa Trunk									
SR-4	Gravity Pipeline	Coffee Road	The existing 10-inch diameter pipelines in Coffee Road exceed the maximum d/D criteria and surcharge under PWWF; replacing these pipes will increase capacity.	Capacity	10	15	Replace	1,600	\$533,000
SR-6	Gravity Pipeline	Kimble Street and Floto Street	This improvement will rehabilitate the segment of the pipe that is over 50 years old and is deteriorated to the point that its structural integrity is compromised.	Rehabilitation	18	-	Rehab	1,000	\$358,000
Rose and Celeste Trunk									
A-1	Gravity/Force Main ⁽²⁾	Scenic Dr/Oregon Dr	The project includes rehabilitating gravity pipelines and the 14-inch diameter force main extending from Thousand Oaks Lift Station. Pipeline conditions range from severe to moderate. Urgent repairs are recommended where a void and corroded reinforcements have been observed. The method of rehabilitation will involve CIPP lining.	Rehabilitation	16/18/24/30	--	CIPP	8,800	\$2,631,000
LS 29 - Rose & Celeste	Rose & Celeste Lift Station	Rose Avenue and Celeste Drive	This improvement will increase the firm capacity from 0.86 mgd to 1.3 mgd to meet existing and future PWWFs.	Capacity	0.9 mgd	2.6 mgd	Replace	-	\$1,791,000
Area 6									
Empire Trunk									
EM-1	Gravity Pipeline ⁽⁴⁾	Yosemite Road	The existing pipelines in McClure Road exceed the maximum d/D criteria under PWWF; replacing these pipes will increase capacity.	Capacity	10	15	Replace	200	In Progress
EM-2	Gravity Pipeline ⁽⁴⁾	Garner Road	This improvement will add a relief pipeline to alleviate surcharging within the Empire Trunk along Yosemite Boulevard and McClure Road.	Capacity	-	18	New	3,300	In Progress
EM-3	Gravity Pipeline	Hoover Avenue	The existing pipelines exceed the maximum d/D under PWWF at approximately 95 percent capacity; replacing these pipes will increase capacity.	Capacity	10	12	Replace	1,800	\$476,000
EM-4	Gravity Pipeline	Benson Avenue	The 15-inch diameter trunk in Benson Avenue exceeds the d/D criteria under PWWF at approximately 93 percent capacity; replacing the trunk will increase capacity.	Capacity	15	18	Replace	1,400	\$507,000
LS 03 - Benson	Benson Lift Station	Benson Avenue	This improvement will increase the firm capacity from 0.22 mgd to 1.3 mgd to meet existing and future PWWFs.	Capacity	0.2 mgd	2.6 mgd	Replace	-	\$1,791,000

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Sonoma/Lakewood Trunk									
LS 31 - Scenic	Scenic Lift Station ⁽⁴⁾	Scenic Drive	This improvement will increase the firm capacity from 2.3 mgd to 18.4 mgd to meet existing and future PWWFs.	Capacity	13.0 mgd	25.6 mgd	Replace	-	In Progress
Area 8									
Ceres Trunk									
CT-1	Gravity Pipeline ⁽⁴⁾	Parallel to Tuolumne River	This project rehabilitates the oldest and most deteriorated segment of the Ceres Trunk.	Rehabilitation	18/21/24	-	Replace	2,900	In Progress
C-2a	Gravity Pipeline ⁽⁴⁾	Highway 99 crossing	This improvement will increase reliability by constructing a parallel 24-inch diameter trunk under Highway 99.	Reliability	-	24	New	300	In Progress
C-2b	Gravity Pipeline ⁽⁴⁾	Highway 99 crossing	This improvement will rehabilitate the existing 24-inch diameter trunk.	Rehabilitation	24	24	New	300	In Progress
Area 9									
River Trunk Tributary									
B-1	Gravity Pipeline ⁽²⁾	Spokane St/Cascade Ave	Inspections along this reach have observed missing aggregate and visible reinforcement. The method of rehabilitation will involve CIPP lining.	Rehabilitation	30	-	Rehab	5,600	\$1,963,000
City-Wide									
SDR	Storm Drain	Various Locations	This improvement will remove storm drain connections from the sewer collection system.	Storm Drain Removal	-	-	-	-	\$17,040,000
R&R	Rehabilitation & Replacement	Various Locations	These improvements will help carry out the Small and Large Diameter Rehabilitation and Replacement Program.	Rehabilitation	-	-	-	-	\$17,720,000
Existing Improvements Cost Estimate									\$175,138,000
Future System Improvements									
Area 1									
West Trunk									
W-1	Gravity Pipeline	Carpenter Road to Sutter Plant	Build-out PWWF causes the lower reach of the West Trunk to exceed the maximum depth criteria at approximately 90 percent capacity; this improvement will increase capacity.	Capacity	-	48	New	5,200	\$4,664,000
W-3	Gravity Pipeline	Undeveloped Area	These improvements are recommended to service future growth within the Beckwith-Dakota and College West CPDs.	New Growth	-	15	New	4,000	\$1,333,000
W-4	Force Main	North Avenue	These improvements are recommended to service future growth within the Beckwith-Dakota and CPD.	New Growth	-	6	New	8,300	\$1,983,000
W-6	Gravity Pipeline	Kansas Avenue	This improvement is recommended to service future growth within the Highway 132 CPD.	New Growth	-	15	New	4,300	\$1,433,000
W-7	Gravity Pipeline	Carpenter Road and Paradise Road	This improvement is recommended to service infill as the sewer service area extends to include county islands.	New Growth	-	10	New	2,900	\$645,000
LS 63	Kansas Lift Station	Kansas Avenue and Altamont Court	This improvement will add a lift station due to the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	2.0 mgd	New	-	\$1,477,000
LS 64	Dakota Lift Station	Dakota Road and Beckwith Court	This improvement will add a lift station because of the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	1.0 mgd	New	-	\$983,000
LS 39	Woodland Lift Station ⁽⁵⁾	Woodland Avenue and Poust Road	This improvement will increase the firm capacity from its current capacity of 20.9 mgd to 25.9 mgd to meet future PWWFs.	Capacity	27.4 mgd	32.4 mgd	Expand	-	\$1,293,000
Rumble Trunk									
R-1	Gravity Pipeline	Claremont Avenue and Maud Kump Terrace	This reach of the Rumble Trunk experiences flow depths in excess of the maximum d/D at approximately 90 percent capacity during PWWFs; replacing the trunk will increase capacity.	Capacity	21	24	Replace	5,100	\$2,470,000
R-2	Gravity Pipeline	McHenry Avenue	This sewer trunk extension will provide service to future development in the Pelandale/McHenry CPD.	New Growth	-	10	New	900	\$200,000

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Dale Trunk									
D-1	Gravity Pipeline	Undeveloped Area	These improvements are recommended to service future growth within the Kiernan-Carver and Kiernan-Carver North CPDs.	New Growth	-	15	New	1,200	\$400,000
D-2	Force Main	Undeveloped Area	These improvements are recommended to service future growth within the Kiernan-Carver and Kiernan-Carver North CPDs.	New Growth	-	6	New	2,600	\$621,000
D-3	Gravity Pipeline	Chapman Road	These improvements are recommended to service future growth within the Kiernan-Carver and Kiernan-Carver North CPDs.	New Growth	-	12	New	1,700	\$450,000
D-4	Gravity Pipeline	Chapman Road	These improvements are recommended to service future growth within the Kiernan-Carver and Kiernan-Carver North CPDs.	New Growth	-	10	New	2,200	\$489,000
D-5	Gravity Pipeline	Undeveloped Area	These improvements are recommended to service future growth within the Kiernan-Carver and Kiernan-Carver North CPDs.	New Growth	-	8	New	1,500	\$267,000
LS # 60	Chapman Lift Station	Chapman Road	This improvement will add a lift station due to the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	1.6 mgd	New	-	\$1,276,000
North Trunk Extension									
N-1	Gravity Pipeline	Bangs Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	27	New	2,800	\$1,524,000
N-2	Gravity Pipeline	Bangs Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	24	New	6,100	\$2,954,000
N-3	Gravity Pipeline	Bangs Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	21	New	1,600	\$676,000
N-4	Gravity Pipeline	Bangs Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	18	New	3,100	\$1,123,000
N-5	Gravity Pipeline	Bangs Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	15	New	2,400	\$800,000
N-6	Gravity Pipeline	Tully Road and Pelandale Avenue	Future development within the northern portion of the City will require the completion of a trunk sewers to serve customers.	New Growth	-	10	New	800	\$179,000
N-7	Gravity Pipeline	American Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	15	New	3,100	\$1,034,000
N-8	Gravity Pipeline	Kiernan Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	10	New	5,600	\$1,246,000
N-9	Gravity Pipeline	Kiernan Avenue	Future development within the northern portion of the City will require the construction of several trunk sewers to serve customers.	New Growth	-	8	New	6,300	\$1,116,000
LS 59	Pelandale Lift Station	Pelandale Avenue	This improvement will add a lift station because of the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	0.3 mgd	New	-	\$645,000
LS 65	Kiernan Lift Station	Kiernan Avenue and Carver Road	This improvement will add a lift station because of the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	0.5 mgd	New	-	\$738,000
Area 3									
Sutter Trunk									
S-1	Gravity Pipeline	Jefferson Street	The trunk in Jefferson Avenue exceeds the d/D criteria at approximately 89 percent capacity. Since the upstream and downstream pipelines have steeper slopes, they were not identified as capacity deficient.	Capacity	16	18	Replace	760	\$275,000
Area 6									
Sonoma Trunk Extension									
SO-1	Gravity Pipeline	Undeveloped Area	This group of improvements is recommended to service future growth within the Roselle-Claribel CPD.	New Growth	-	24	New	3,300	\$1,597,000
SO-2	Gravity Pipeline	Undeveloped Area	This group of improvements is recommended to service future growth within the Roselle-Claribel CPD.	New Growth	-	18	New	2,600	\$943,000
SO-3	Gravity Pipeline	Undeveloped Area	This group of improvements is recommended to service future growth within the Roselle-Claribel CPD.	New Growth	-	15	New	2,800	\$933,000

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SO-4	Gravity Pipeline	Undeveloped Area	This group of improvements is recommended to service future growth within the Roselle-Claribel CPD.	New Growth	-	8	New	3,100	\$549,000
LS 61	Wood Sorrel Lift Station	North of Wood Sorrel Drive and Sylvan Avenue	This improvement will add a lift station due to the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	0.1 mgd	New	-	\$582,000
Lakewood Trunk Extension									
L-1	Gravity Pipeline	Litt Road	This group of improvements will service residential and business-commercial-residential growth to the east within the Roselle-Claribel CPD.	New Growth	-	18	New	900	\$327,000
L-2	Gravity Pipeline	Litt Road	This group of improvements will service residential and business-commercial-residential growth to the east within the Roselle-Claribel CPD.	New Growth	-	15	New	1,700	\$567,000
L-3	Gravity Pipeline	Litt Road	This group of improvements will service residential and business-commercial-residential growth to the east within the Roselle-Claribel CPD.	New Growth	-	12	New	800	\$211,000
L-4	Gravity Pipeline	Plainview Road	This group of improvements will service residential and business-commercial-residential growth to the east within the Roselle-Claribel CPD.	New Growth	-	10	New	3,000	\$668,000
L-5	Gravity Pipeline	Claus Road	This group of improvements will service business, commercial, and residential growth within the Village One CPD.	New Growth	-	8	New	300	\$54,000
L-6	Gravity Pipeline	Merle Ave	This group of improvements will service business, commercial, and residential growth within the Village One CPD.	New Growth	-	10	New	400	\$89,000
LS 67	Litt Lift Station	Litt Road	This improvement will add a lift station due to the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	1.3 mgd	New	-	\$1,118,000
Area 10									
Ustick Trunk									
U-1	Gravity Pipeline	Ustick Road	At build-out of Area 10, the PWWF from new growth will cause the Ustick Trunk to surcharge; replacing this trunk will increase capacity.	Capacity	12	15	Replace	2,100	\$700,000
U-2	Gravity Pipeline	Whitmore Avenue	This group of improvements will service commercial and residential growth within the Fairview CPD.	New Growth	-	10	New	1,000	\$223,000
U-3	Force Main	Whitmore Avenue	This group of improvements will service commercial and residential growth within the Fairview CPD.	New Growth	-	4	New	400	\$99,000
U-4	Gravity Pipeline	Whitmore Avenue	This group of improvements will service commercial and residential growth within the Fairview CPD.	New Growth	-	10	New	3,400	\$757,000
LS 62	Whitmore/Carpenter Lift Station	Whitmore Avenue	This improvement will add a lift station due to the area's flat topography and the extensive length and minimum slope of the proposed pipelines.	New Growth	-	0.8 mgd	New	-	\$887,000
Future Improvements Cost Estimate									\$42,598,000
Total Capital Improvement Cost Estimate									\$217,736,000
Notes:									
(1) Costs are provided in millions of dollars as present value based on an ENR CCI number of 10,037, which corresponds with the 20-City Average Index in July 2015. Costs are not escalated to future years. Total project costs include a 25 percent estimating contingency and a 30 percent allowance for engineering, legal, and administrative costs.									
(2) Costs are provided in millions of dollars as present value based on an ENR CCI number of 11,155, which corresponds with San Francisco Bay Area Index in July 2015. Costs are not escalated to future years. Total project costs include a 25 percent estimating contingency and a 30 percent allowance for engineering, legal, and administrative costs.									
(3) Cost estimates are from the River Trunk Realignment, Beard Brook Siphon, and Cannery Segregation Line Improvement Project PDR.									
(4) The project's cost is not included in the CIP because the improvement is currently in progress.									
(5) The cost for the Woodlake Lift Station is based on the 2007 Master Plan and was escalated to reflect the most probable current cost.									
(6) Lift station capacities refer to the total capacity unless otherwise noted.									

**Table 9.6 CSMP CIP Phasing
Wastewater Collection System Master Plan
City of Modesto, California**

Project Number	Project	Total Project Cost (\$) ⁽¹⁾	Capital Improvement Program Cost per Phase ⁽¹⁾							
			Phase 1				Phase 2	Phase 3	Phase 4	
			2016	2017	2018	2019	2020	2021-2025	2026-2030	2031-2035
Existing System Improvements										
Area 1										
West Trunk										
LS 19 - Hahn	Hahn Lift Station	\$1,791,000	\$1,791,000							
A-3	Gravity Pipeline	\$619,000		\$619,000						
C-1	Gravity Pipeline	\$16,016,000				\$6,809,000	\$9,207,000			
Rumble Trunk										
LS 30 - Rumble	Rumble Lift Station	\$2,280,000					\$2,280,000			
Area 2										
Emerald Trunk Tributary										
B-2	Gravity Pipeline	\$2,176,000			\$2,176,000					
D-2	Gravity Pipeline	\$39,000					\$39,000			
Area 3										
Sutter Trunk										
A-2	Gravity Pipeline	\$726,000		\$726,000						
S-4a	Gravity Pipeline	\$373,000	\$186,500	\$186,500						
C-2/S-4b	Gravity Pipeline	\$113,000	\$56,500	\$56,500						
River Trunk										
RT-1	Gravity Pipeline ⁽³⁾	\$3,211,000						\$3,211,000		
RT-2	Gravity Pipeline ⁽³⁾	\$8,648,000						\$8,648,000		
RT-3	Gravity Pipeline ⁽³⁾	\$7,442,000						\$7,442,000		
RT-4	Gravity Pipeline ⁽³⁾	\$1,137,000						\$1,137,000		
RT-5	Force Main ⁽³⁾	\$5,818,000						\$5,818,000		
RT-6	Gravity Pipeline ⁽³⁾	\$16,967,000				\$16,967,000				
RT-7	Gravity Pipeline ⁽³⁾	\$2,071,000					\$2,071,000			
RT-8	Force Main/Gravity Pipeline ⁽³⁾	\$1,944,000						\$1,944,000		
RT-9	Gravity Pipeline ⁽³⁾	\$533,000	\$533,000							
RT-10	Gravity Pipeline ⁽³⁾	\$14,069,000		\$14,069,000						
RT-11	River Bank Armament ⁽³⁾	\$4,668,000		\$4,668,000						
RT-12	CSL Diversion Structures ⁽³⁾	\$560,000			\$560,000					
LS - Shackelford	Shackelford Lift Station ⁽³⁾	\$2,989,000						\$2,989,000		
LS - River Trunk	River Trunk Lift Station ⁽³⁾	\$33,483,000		\$33,483,000						
Area 4										
Downtown Trunks										
DT-1	Gravity Pipeline	\$800,000		\$800,000						
DT-2	Gravity Pipeline	\$265,000						\$265,000		
C-3	Gravity Pipeline	\$1,037,000					\$1,037,000			
D-1	Gravity Pipeline	\$553,000						\$553,000		

**Table 9.6 CSMP CIP Phasing
Wastewater Collection System Master Plan
City of Modesto, California**

Project Number	Project	Total Project Cost (\$) ⁽¹⁾	Capital Improvement Program Cost per Phase ⁽¹⁾							
			Phase 1					Phase 2	Phase 3	Phase 4
			2016	2017	2018	2019	2020	2021-2025	2026-2030	2031-2035
Area 5										
Santa Rosa Trunk										
SR-4	Gravity Pipeline	\$533,000	\$533,000							
SR-6	Gravity Pipeline	\$358,000					\$358,000			
Rose and Celeste Trunk										
A-1	Gravity Pipeline	\$2,631,000		\$2,631,000						
LS 29 - Rose & Celeste	Rose & Celeste Lift Station	\$1,791,000					\$1,791,000			
Area 6										
Empire Trunk										
EM-1	Gravity Pipeline ⁽⁴⁾	In Progress								
EM-2	Gravity Pipeline ⁽⁴⁾	In Progress								
EM-3	Gravity Pipeline	\$476,000					\$476,000			
EM-4	Gravity Pipeline	\$507,000					\$507,000			
LS 03 - Benson	Benson Lift Station	\$1,791,000					\$1,791,000			
Sonoma/Lakewood Trunk										
LS 31 - Scenic	Scenic Lift Station ⁽⁴⁾	In Progress								
Area 8										
Ceres Trunk										
CT-1	Gravity Pipeline ⁽⁴⁾	In Progress								
C-2a	Gravity Pipeline ⁽⁴⁾	In Progress								
C-2b	Gravity Pipeline ⁽⁴⁾	In Progress								
Area 9										
B-1	Gravity Pipeline	\$1,963,000			\$1,963,000					
City-wide										
SDR	Storm Drain	\$17,040,000	\$1,020,000	\$1,020,000			\$5,000,000	\$5,000,000	\$5,000,000	
R&R	Rehabilitation & Replacement	\$17,720,000						\$8,860,000	\$8,860,000	
Existing Improvements Cost Estimate		\$175,138,000	\$4,120,000	\$58,259,000	\$4,699,000	\$16,967,000	\$9,917,000	\$53,456,000	\$13,860,000	\$13,860,000
Future System Improvements										
Area 1										
West Trunk										
W-1	Gravity Pipeline	\$4,664,000								\$4,664,000
W-3	Gravity Pipeline	\$1,333,000								\$1,333,000
W-4	Force Main	\$1,983,000								\$1,983,000
W-6	Gravity Pipeline	\$1,433,000								\$1,433,000
W-7	Gravity Pipeline	\$645,000							\$645,000	
LS 63	Kansas Lift Station	\$1,477,000								\$1,477,000
LS 64	Dakota Lift Station	\$983,000								\$983,000
LS 39	Woodland Lift Station ⁽⁵⁾	\$1,293,000							\$1,293,000	

**Table 9.6 CSMP CIP Phasing
Wastewater Collection System Master Plan
City of Modesto, California**

Project Number	Project	Total Project Cost (\$) ⁽¹⁾	Capital Improvement Program Cost per Phase ⁽¹⁾							
			Phase 1					Phase 2	Phase 3	Phase 4
			2016	2017	2018	2019	2020	2021-2025	2026-2030	2031-2035
Rumble Trunk										
R-1	Gravity Pipeline	\$2,470,000						\$2,470,000		
R-2	Gravity Pipeline	\$200,000						\$200,000		
Dale Trunk										
D-1	Gravity Pipeline	\$400,000							\$400,000	
D-2	Force Main	\$621,000							\$621,000	
D-3	Gravity Pipeline	\$450,000							\$450,000	
D-4	Gravity Pipeline	\$489,000							\$489,000	
D-5	Gravity Pipeline	\$267,000							\$267,000	
LS 60	Chapman Lift Station	\$1,276,000							\$1,276,000	
North Trunk Extension										
N-1	Gravity Pipeline	\$1,524,000						\$1,524,000		
N-2	Gravity Pipeline	\$2,954,000						\$2,954,000		
N-3	Gravity Pipeline	\$676,000							\$676,000	
N-4	Gravity Pipeline	\$1,123,000							\$1,123,000	
N-5	Gravity Pipeline	\$800,000							\$800,000	
N-6	Gravity Pipeline	\$179,000						\$179,000		
N-7	Gravity Pipeline	\$1,034,000								\$1,034,000
N-8	Gravity Pipeline	\$1,246,000								\$1,246,000
N-9	Gravity Pipeline	\$1,116,000								\$1,116,000
LS 59	Pelandale Lift Station	\$645,000						\$645,000		
LS 65	Kiernan Lift Station	\$738,000								\$738,000
Area 3										
Sutter Trunk										
S-1	Gravity Pipeline	\$275,000								\$275,000
Area 6										
Sonoma Trunk Extension										
SO-1	Gravity Pipeline	\$1,597,000						\$1,597,000		
SO-2	Gravity Pipeline	\$943,000						\$943,000		
SO-3	Gravity Pipeline	\$933,000						\$933,000		
SO-4	Gravity Pipeline	\$549,000						\$549,000		
LS 61	Wood Sorrel Lift Station	\$582,000						\$582,000		
Lakewood Trunk Extension										
L-1	Gravity Pipeline	\$327,000							\$327,000	
L-2	Gravity Pipeline	\$567,000							\$567,000	
L-3	Gravity Pipeline	\$211,000							\$211,000	
L-4	Gravity Pipeline	\$668,000							\$668,000	
L-5	Gravity Pipeline	\$54,000						\$54,000		
L-6	Gravity Pipeline	\$89,000								\$89,000

**Table 9.6 CSMP CIP Phasing
Wastewater Collection System Master Plan
City of Modesto, California**

Project Number	Project	Total Project Cost (\$) ⁽¹⁾	Capital Improvement Program Cost per Phase ⁽¹⁾								
			Phase 1					Phase 2	Phase 3	Phase 4	
			2016	2017	2018	2019	2020	2021-2025	2026-2030	2031-2035	
LS 67	Litt Lift Station	\$1,118,000							\$1,118,000		
Area 10											
Ustick Trunk											
U-1	Gravity Pipeline	\$700,000								\$700,000	
U-2	Gravity Pipeline	\$223,000								\$223,000	
U-3	Force Main	\$99,000								\$99,000	
U-4	Gravity Pipeline	\$757,000								\$757,000	
LS 62	Whitmore/Carpenter Lift Station	\$887,000								\$887,000	
Future Improvements Cost Estimate		\$42,598,000	\$0	\$0	\$0	\$0	\$0	\$0	\$12,630,000	\$10,931,000	\$19,037,000
Total Capital Improvement Cost Estimate		\$217,736,000	\$4,120,000	\$58,259,000	\$4,699,000	\$16,967,000	\$9,917,000	\$66,086,000	\$24,791,000	\$32,897,000	

Notes:
(1) Costs are provided in millions of dollars as present value based on an ENR CCI number of 10,037, which corresponds with the 20-City Average Index in July 2015. Costs are not escalated to future years. Total project costs include a 25 percent estimating contingency and a 30 percent allowance for engineering, legal, and administrative costs.
(2) Costs are provided in millions of dollars as present value based on an ENR CCI number of 11,155, which corresponds with San Francisco Bay Area Index in July 2015. Costs are not escalated to future years. Total project costs include a 25 percent estimating contingency and a 30 percent allowance for engineering, legal, and administrative costs.
(3) Cost estimates are from the River Trunk Realignment, Beard Brook Siphon, and Cannery Segregation Line Improvement Project PDR.
(4) The project's cost is not included in the CIP because the improvement is currently in progress.
(5) The cost for the Woodlake Lift Station is based on the 2007 Master Plan and was escalated to reflect the most probable current cost.

9.3.2 Project Category Classification

Projects are grouped into the following categories:

- **Capacity Improvements:** These include either replacing existing trunk sewers or adding new trunk sewers or pump stations to convey current peak wet weather flows (PWWFs). As growth continues and more users contribute to the system, increased flow will potentially create additional hydraulic capacity deficiencies during wet weather conditions. For this reason, the hydraulic model was used to identify peak wet weather flow deficiencies at build-out of the service area. The projects that address peak wet weather flow deficiencies at build-out are considered capacity related and are not strictly an expansion of the system to connect future users.
- **New Growth Improvements:** These include adding new pump stations and extending existing trunk sewers to serve new customers.
- **Rehabilitation and Replacement (R&R) Improvements:** These include improvements to existing trunk sewers or pump stations to extend their useful lives, repair structural deficiencies, and/or improve performance to provide adequate peak hydraulic capacity throughout the planning period.
- **Reliability Improvements:** These include constructing parallel sewers where existing sewers cross below major obstacles.
- **Storm Drain Cross Connection Removal:** Currently, the City has 60 known storm drain cross connections that discharge storm water runoff to the sanitary sewer system. Based on discussions with the City, it was assumed for the hydraulic model that the cross connections will be removed. Therefore, the capacity evaluation and proposed improvements were developed under the assumption that storm water connections will be removed in the future.

Costs per project category are summarized in Table 9.7. Figure 9.2 is a graphical distribution of the costs per category.

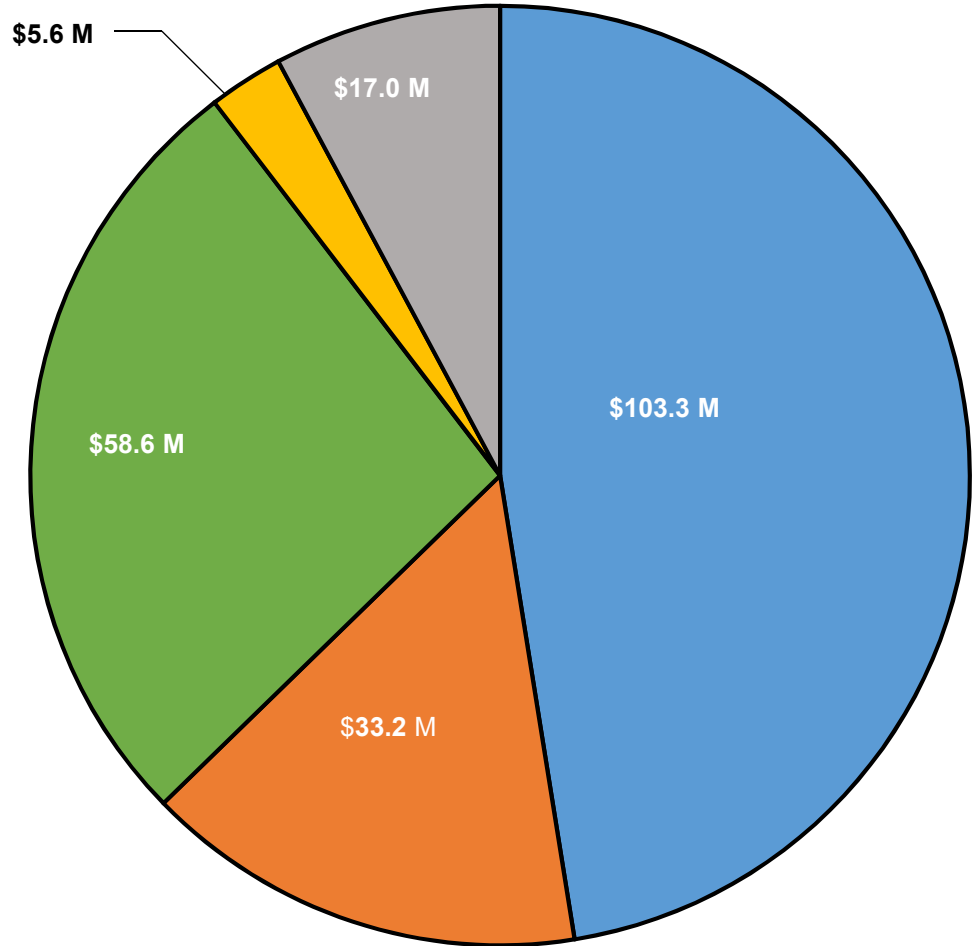
9.3.3 Cash Flow Projection

The projected cash flow presented in this document is based on the recommended CIP and the implementation schedule. Because it contains only projections, the cash flow analysis is provided merely as a preliminary tool to assess impacts on the City's resources over time. Currently, others are developing a more detailed financial plan to fund the CIP. The projected cash flow is presented in Figure 9.3.

Table 9.7 Capital Cost Summary by Project Category Wastewater Collection System Master Plan City of Modesto, California					
Improvement Type	Project Phasing⁽¹⁾				Total⁽¹⁾
	Phase 1 2015-20	Phase 2 2021-25	Phase 3 2026-30	Phase 4 2031-35	
Capacity Improvements	\$55.6	\$40.8	\$1.3	\$5.6	\$103.3
New Growth Improvements	-	\$10.2	\$9.6	\$13.4	\$33.2
R&R Improvements	\$30.7	\$10.2	\$8.9	\$8.9	\$58.6
Reliability Improvements	\$5.6	-	-	-	\$5.6
Storm Drain Removal	\$2.0	\$5.0	\$5.0	\$5.0	\$17.0
Total	\$94.0	\$66.1	\$24.8	\$32.9	\$217.7

Notes:
(1) Costs are provided in millions of dollars as present value based on an ENR CCI number of 10,037, which corresponds with the 20-City Average Index in July 2015. Costs are not escalated to future years. Total project costs include a 25 percent estimating contingency and a 30 percent allowance for engineering, legal, and administrative costs.

Total CSMP CIP Cost = \$ 217.7M

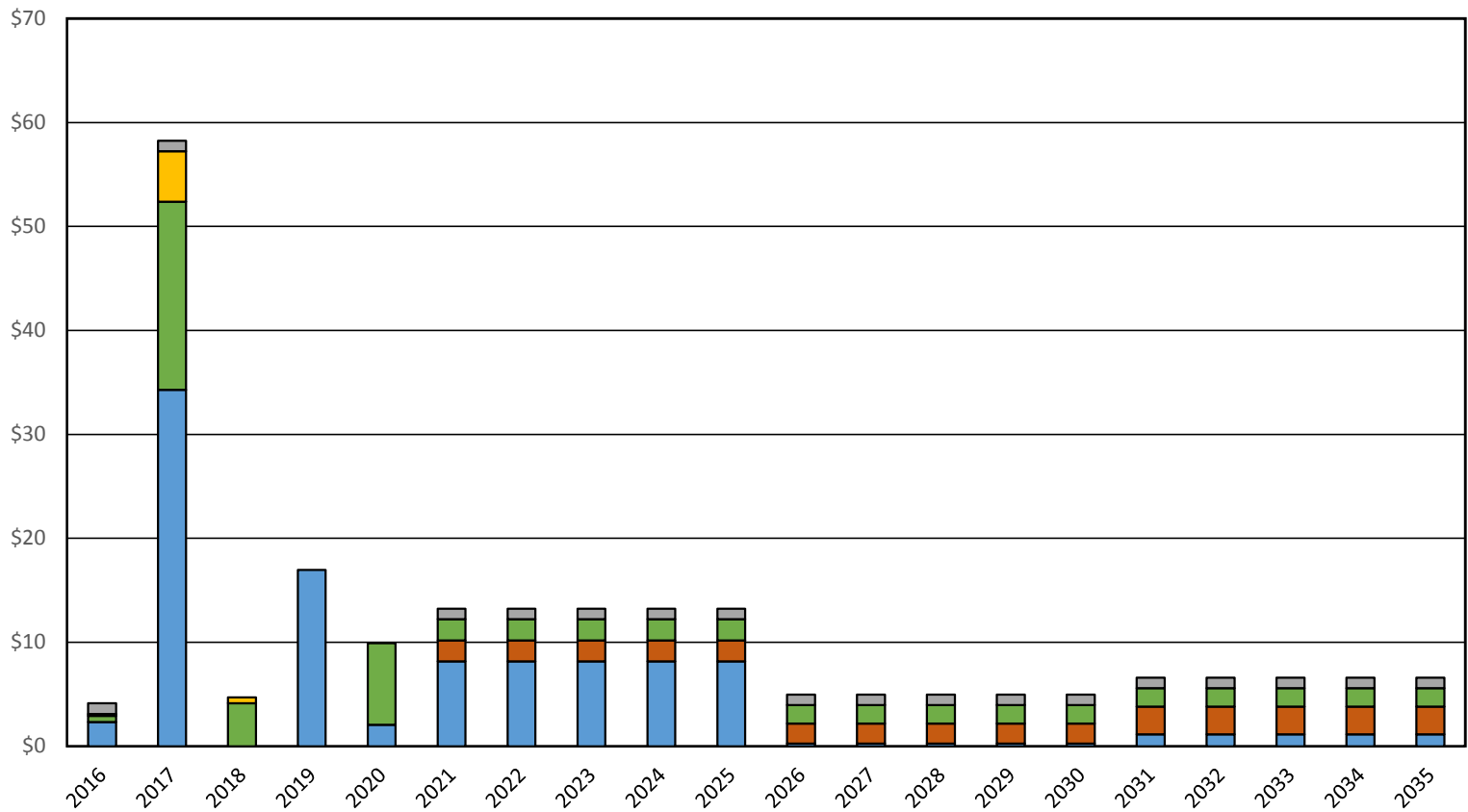


- Capacity Improvements
- New Growth Improvements
- R&R Improvements
- Reliability Improvements
- Storm Drain Removal

CSMP CIP COSTS BY PROJECT CATEGORY

FIGURE 9.2





- Storm Drain Removal
- Reliability Improvements
- R&R Improvements
- New Growth Improvements
- Capacity Improvements

CSMP CIP CASH FLOW

FIGURE 9.3

CITY OF MODESTO
WASTEWATER COLLECTION SYSTEM MASTER PLAN



