CHAPTER 7. RECOMMENDED CAPITAL IMPROVEMENT PROJECTS (CIP)

7.1 SUMMARY

IEC utilized the results of the hydraulic analysis in Chapter 6, to develop a phased and prioritized Capital Improvement Program (CIP). Recommendations include gravity main replacements, lift station wet well capacity improvements, and increasing treatment capacity alternatives. As part of the hydraulic analysis, all improvements were evaluated with a recommended timeframe for replacement. There is a portion of pipelines as identified by the City that were not included in the CIP costs and were designated as Developer Imposed Fee (DIF) projects. All CIP projects through year 2050 have an estimated probable cost of $160M, $189M, and $297M (depending on which treatment alternative the City decides to move forward with).

There were two main elements of the CIP: analysis and cost estimation. The analysis phase consists of evaluating the wastewater collections system (system) at different time intervals and under various operational scenarios. Where necessary, additional entities (pipes, manholes, etc.) are proposed for construction at the time interval they are needed to assist the system in meeting the required design criteria. Details regarding treatment alternatives for the City are included in the April 2012 Report completed by RMC, *City of Chula Vista Acquisition of Additional Wastewater Capacity Project*. This master plan update has addressed CIP costs based on the results of the April report, accounting for escalation in 2050 only. The cost estimation phase incorporates estimating construction costs for the proposed facilities in terms of dollar value in the year 2013.

7.2 UNIT COSTS

Unit costs used to develop capital cost estimates for proposed facilities were developed using the Engineering News Record Construction Cost Index and recently completed projects by IEC of a similar nature. These estimates are based on the best available data at the time of this report; however, since prices of materials and labor fluctuate with time, new estimates should be obtained during pre-design for proposed facilities to confirm budget amounts. Recent market trends have indicated substantial volatility in the price of construction materials such as steel and concrete. These factors, coupled with the high level of similar work currently being performed, have on occasion resulted in a generally unpredictable bidding environment.

The Engineering News Record Construction Cost Index used for the additional wastewater capacity report was for the Los Angeles, California area (ENR-CCI-LA) of 10305 for September 2013. The cost estimates for the pipe unit costs presented in Table 1 is based on an ENR-CCI (20 City Average) of 9552 for September 2013. Costs estimated herein for recommended facilities should be adjusted in the future either by making new estimates or by comparing the future ENR-CCI-LA index to 10305.43 for the wastewater treatment capacity or the ENR-CCI (20 City Average) of 9552.

Engineering, administration services and contingencies were included as a percentage of total construction costs for pipeline improvements. A factor of 30 percent of total construction cost has been used for engineering and administration, which includes but is not limited to the following:

- Planning and design reports
- Design
- CEQA compliance/Environmental Approval Process
- Permits – Coastal Commission and/or CalTrans approval as required
- Surveying
- Service during construction (submittals, as-builts)
- Inspection

Pipe materials, pavement saw cutting, removal, and replacement, traffic control, installation of miscellaneous appurtenances, bi-pass piping, excavation, bedding and backfill were taken into consideration in developing unit costs for wastewater pipeline construction. A factor of 45 percent of construction costs has been used to develop the total project cost.

7.2.1 *Pipeline, Manhole and Flow Meter Vault Unit Costs*

Table 7-1 shows pipeline, manhole and flow meter vault unit costs used to determine the total costs of recommended pipeline improvements. These costs are based on conventional pipeline replacement construction.

Table 7-1: Manhole/Flowmeter/Pipeline Unit Costs

Manhole	Manhole Unit Cost ($/ea)
ea	$5,000
Flow Meter Vault	**Flow Meter Vault ($/ea)**
ea	$400,000
Diameter	**Pipe Unit Cost ($/LF)**
8	$154
10	$193
12	$231
15	$290
18	$347
21	$405
24	$462
27	$521
30	$579
36	$694

7.2.2 *Wastewater Treatment Capacity*

The April 2012 report completed by RMC for the City, additional wastewater treatment capacity alternatives were evaluated for the City. For purposes of this report, treatment capacity costs were taken from the RMC report and escalated for today's values and shown in Table 7-2. These costs are based on a cost per gallon of additional storage for the three alternatives as discussed in RMC the report.

Table 7-2: Additional Wastewater Treatment Capacity Unit Costs

Treatment Expansion Alternatives	$/gallon
METRO	$16.82
New Treatment Plant	$19.98
PLWWTP Secondary Expansion	$31.97

7.3 Proposed Sewer Collection System Improvements and Cost Estimates

Proposed pipeline improvements were assigned project numbers, and wet well emergency storage improvements are denoted based on their names. Improvements presented in this Master Plan are presented in Tables 7-3 through 7-6.

Wastewater pipeline, manhole, and wet well emergency storage improvements are shown in Figure 7-1. All cost estimates developed for this Master Plan Update are based upon minimum construction costs for pipelines and storage facilities as determined by IEC project experience. Estimates of probable capital costs provided herein represent "Class 4 for Studies or Feasibility Reports" level costs as established by the American Association of Cost Engineers (AACE) and represent an accuracy of +50% to -30%. Cost estimates should be verified and updated during the pre-design phase of each project.

Capital cost estimates for these entities are discussed in the following sections.

7.3.1 RECOMMENDED PIPELINE IMPROVEMENTS AND COST ESTIMATES

The pipeline improvements were separated out into 46 projects that consist almost entirely of pipeline upsizing as shown in Figure 7-1 and Table 7-3. This upsizing comprises approximately 2.5% of the City's total collection system. There are areas/projects designated as Developer Imposed Fee (DIF) projects that will separated out of the CIP costs since those fees will be paid for by the developers already designated to those projects. DIF projects will be consistent with the same unit costs as previously described Table 7-1. Pipeline improvements were based upon the collection systems ability to meet PWWF scenarios, while meeting the established design criteria. Pipeline improvements are assumed to be replacement projects (i.e. not parallel). Figures 7-2 thru 7-30 show the individual projects.

In addition to the pipeline replacement projects, two new pipelines and one new manhole were added along the south perimeter of the City along Main Street. These two new pipelines allow for flow diversion from the 10-inch pipeline into the existing 42-inch as shown in Figures 7-28 (P-27) and 7-27 (P-23). In addition to the new pipelines allowing for flow diversion, two more new pipelines were added (P-24), one stretch of 8-inch diameter pipe, approximately 100 ft in length, along Main Street and one stretch of 10-inch diameter along Otay Valley Rd approximately 13 ft in length. These added pipes allow for flow splits and flow continuity based on the existing infrastructure. These new pipelines are shown in Figure 7-27 (P-24). These improvements allow for optimizing the existing infrastructure and minimizing the number of pipelines in the area to be replaced allowing for the additional growth.

Manhole replacement costs were also included in the pipeline replacement projects. It was assumed all manholes along the pipelines being replaced will also be replaced due to the aging infrastructure.

As part of project P-40 on the corner of J Street and Marina Blvd., it is recommended to upsize the existing 30-inch outfall pipeline to the METRO connection up to a 36-inch pipeline in 2050. As part of P40 project, a new metering vault will be required replacing the existing vault. Those costs are also included as part of the P40 project and shown on Figure 7-5.

Cost estimates for each project were developed based upon the unit costs shown in Table 7-1 and presented in Table 7-3, the proposed diameter and the estimated length of each project.

Table 7-3: Recommended Pipeline/Manhole Improvements

Project ID	Area Map No.	Length (ft)	Diameter (in)	Year Proposed	Planning Project Cost	Existing Projects to be Removed from CIP Connection Fees (2013)	Developer Imposed Fees (DIF)
P1	2	997	15	2013	$309,000	$309,000	$0
P2	2	2,503	21	2042	$1,053,600	$0	$0
P3	6	661	12	2042	$167,800	$0	$0
P4	6	1,304	10 & 12	2017	$301,000	$0	$0
P5	11	65	10	2017	$22,500	$0	$0
P6	3	1,642	12 & 15	2050	$432,200	$0	$0
P7	3	788	12	2027	$242,000	$0	$0
P8	4	469	15	2,042	$156,100	$0	$0
P9	4	1,314	18 & 24	2013	$513,600	$513,600	$0
P10	5	3,180	18	2013	$1,148,500	$1,148,500	$0
P11	7	984	10 & 12	2017	$242,400	$0	$0
P12	7	655	10	2042	$136,500	$0	$0
P13	13	6,216	12 & 15 & 24	2013	$2,144,900	$2,144,900	$0
P14	14	1,227	21 & 24	2017	$516,900	$0	$0
P15	15	3,462	21	2022	$1,462,100	$0	$0
P16	8	962	12	2017	$247,300	$0	$0
P17	9	2,701	15	2017	$833,400	$0	$0
P18	10	1,508	12 & 15 & 18	2013	$447,200	$447,200	$0
P19	4	773	15	Developer Exaction Fee	$0	$0	$254,100
P20	20	289	15	2017	$93,700	$0	$0
P21	21	992	15	2017	$317,700	$0	$0
P22	22	341	15	2013	$113,800	$113,800	$0
P23	23	728	12	2013	$198,200	$198,200	$0
P24	23	111	8 & 10	2017	$31,500	$0	$0
P25	25	621	10	2032	$139,800	$0	$0
P26	26	1,348	21	POGGI DIF	$0	$0	$625,800
P27	27	1,201	12	2037	$317,400	$0	$0
P28	16	2,544	21	2037	$1,085,300	$0	$0
P29	28	1,163	15	Developer Exaction Fee	$0	$0	$387,400
P30	29	174	18	Developer Exaction Fee	$0	$0	$80,400
P31	18	396	15	2013	$124,900	$124,900	$0
P32	17	99	12	2050	$32,900	$0	$0
P33	19	375	12	2037	$106,700	$0	$0
P35	22	724	15	2017	$225,000	$0	$0
P36	24	949	12	2037	$244,100	$0	$0
P37	24	1,490	12	2017	$379,200	$0	$0
P38	3	547	15	2032	$188,600	$0	$0
P39	4	907	27	2,050	$492,400	$0	$0
P40	4	58	36	2050	$440,300	$0	$0
P42	29	394	18	2027	$0	$0	$146,600
P43	29	3,237	18	2032	$0	$0	$1,233,400

Project ID	Area Map No.	Length (ft)	Diameter (in)	Year Proposed	Planning Project Cost	Existing Projects to be Removed from CIP Connection Fees (2013)	Developer Imposed Fees (DIF)
P44	3	1,555	15	2042	$476,100	$0	$0
P45	25	311	10	2037	$75,100	$0	$0
P46	2	975	15	2050	$302,800	$0	$2,727,700
Grand Total		***52,940***			***$15,762,500***	-	***$2,727,700***
Total Existing Improvement Costs						**$5,000,100**	**-**
CIP Costs (Minus Existing Improvement Costs)					**$10,762,400**	-	-

Table 7-4 identifies the one new manhole recommended allow for a flow split, however, this manhole is along the DIF area associated to the POGGI DIF and will not be included in the CIP costs for this master plan update.

Table 7-4: Recommended Pipeline Improvements

Project ID	Quantity	Year Proposed	New Manhole Costs
MH01	1	2037	$5,000

7.3.2 Recommended Treatment Capacity Alternatives Cost Estimates

As mentioned previously, treatment capacity costs were based on the report done in April 2012 by RMC, *City of Chula Vista Acquisition of Additional Wastewater Treatment Capacity Project*. The CIP costs in this master plan update escalate their costs from the April 2012 CCI-LA index up to September 2013 CCI-LA index of 10305.43. In addition to the escalating costs, the flow in 2050 is projected to increase up to approximately 29.9 mgd, the RMC report was based on 26.8 mgd. The existing capacity rights for the City are only 20.864 mgd, a difference of 9.03 mgd of additional treatment. To meet these additional treatment demands, the report by RMC evaluated three different alternatives for meeting those additional flows. The three alternatives and associated CIP costs are provided below in Table 7-5. The costs below are based on the unit $/gallon identified in Table 7-2.

Table 7-5: Additional Treatment Capacity Alternatives Costs

Additional Treatment Capacity Alternatives	Existing Metro Capacity (MGD)	2050 Flow Projections (MGD)	Additional Treatment Capacity (MGD)	Additional Treatment Capacity Costs ($)*
METRO	20.864	29.9	9.03	**$ 151,833,600**
New Treatment Plant	20.864	29.9	9.03	**$ 180,354,800**
PLWWTP Secondary Expansion	20.864	29.9	9.03	**$ 288,567,700**

*Present Value, ENR-CCI -LASept. 2013 = 10305.43

7.4 Summary of Proposed Capital Improvements

This section identifies future system improvements and associated costs with the applicable treatment capacity alternatives, etc. As mentioned previously, DIF projects were removed from the costs below, however, are included in Table 7-3 above. The three alternatives for the additional treatment capacity are further described in detail in the 2012 RMC report and this report does not recommend one alternative over the other, it simply includes the costs associated in order to meet the increased treatment based on projected flow through 2050. Table 7-6 shows a summary of capital costs broken down based on the three different treatment capacity alternatives.

Table 7-6: Summary of Proposed Capital Improvement Costs and Treatment Capacity Alternatives

Description	Alternative 1	Alternative 2	Alternative 3
Pipelines/Manholes/Flow Meter Vault	$ 15,762,500	$ 15,762,500	$ 15,762,500
Treatment Costs			
METRO	$ 151,833,600		
New Treatment Plant		$180,354,800	
PLWWTP Secondary Expansion			$ 288,567,700
Total CIP	**$ 167,596,100**	**$196,117,300**	**$ 304,330,200**
Total CIP minus Existing Improvements	***$ 162,596,000***	***$191,117,200***	***$ 299,330,100***

Table 7-7 provides a summary of pipeline improvements and emergency storage projects broken down by year. The table also shows the projected wastewater flows and timeframe additional treatment capacity will be required for the City.

Table 7-7: Summary of Proposed Capital Improvement Costs and Additional Treatment Capacity

Year Proposed	Pipeline Improvements	Manhole/Flow Meter Vault Replacements	Wastewater Flow Projections (MGD)	Additional Treatment Capacity Required (MGD)
Existing	$5,000,100	$265,000	15.73	-
2017	$3,210,600	$265,000	17.59	-
2022	$1,462,100	$60,000	19.46	-
2027	$242,000	$65,000	21.32	1.14
2032	$328,400	$105,000	23.18	3.10
2037	$1,828,600	$180,000	25.05	5.07
2042	$2,078,300	$125,000	26.91	7.04
2050	$1,612,400	$465,000	29.89	9.03
Total	***$15,762,500***	***$1,530,000***	**-**	**-**

* Manholes/flow meter vaults are included in the cost of pipeline improvements.