TECHNICAL MEMORANDUM

Client:	City of Chelan and Lake Chelan Sewer District		
Project:	Lake Chelan Sewer District – Financial Analysis and CIP Review		
Project File:	CHE 219.110.01.0101	Project Manager:	Don Popoff, PE
Composed by:	Eric Smith, PE		
Reviewed by:	Don Popoff, PE, and Rick Ballard, PE		
Subject:	Financial Analysis and CIP Review		
Date:	June 26, 2020		

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Background

Lake Chelan Sewer District (District) provides sewer collection service to approximately 300 customers on the south shore of Lake Chelan. The District discharges collected sewage to the City of Chelan (City) collection system. The District retained RH2 Engineering, Inc., (RH2) to review the existing District infrastructure, rates, and future capital improvements.

At the forefront of the review is the infrastructure replacement project identified in both the District's *2010 Lake Chelan Sewer District Capital Improvement Plan* and the *City of Chelan's 2008 General Sewer Plan* (City of Chelan Lift Station No. 5 Upgrades and Force Main Replacement). The City lift station needs to be upgraded, and both City force mains that discharge from the City Lift Station No. 5 need to be replaced due to their current age and condition. The project has been postponed for multiple years and is finally at a point that requires action. The City and District have taken steps to move this project forward given the critical nature of the lift station's location: designing the project in 2020 and constructing the project in 2021. The lift station is currently not meeting the required Washington

State Department of Ecology (Ecology) guidelines for flow capacities. Both force mains have reportedly seen multiple breaks and are deficient for the size and flow that the lift station needs to provide.

In 1978, the City and District entered into an Agreement for the Operation and Joint Use of Sewage Disposal Facilities (Agreement). The Agreement remains in place today. Under the Agreement, the City provides all labor, equipment, and materials related to the operations, maintenance, billing, and administration of the District infrastructure. The District compensates the City for the actual costs incurred by the City on a monthly basis. Additionally, the District compensates the City for costs of constructing, operating, and maintaining City facilities that are jointly used by the City and the District. The District's portion of joint-use facility costs are proportional to flow volumes. Three elected commissioners provide oversight of the District.

Analysis of District System

Overview

The District collection system includes six lift stations and associated force mains. The lift stations consist of cast-in-place concrete wet wells installed partially within Lake Chelan. A 6-inch buried steel force main from Lift Station No. 1 (District LS 1) discharges into the City's collection system. Each lift station discharges in series to the next lift station downstream. District LS 2, 3 and 4 each have a 10-inch high-density polyethylene (HDPE) force main discharging to the next lift station in the series. District LS 5 and 6 include 4-inch HDPE force mains and sections of District-owned gravity collection system piping between these lift stations. An overview map of the District's collection system is included in **Appendix A**.

RH2 toured the lift station's with City staff on August 20, 2019. The site visit information is included in **Appendix B**. Each lift station includes dual Flgyt submersible sewer pumps for redundancy. The ages of the pumps vary, with the oldest being approximately 20 years of age. The typical useful life for similar pumps is approximately 20 to 30 years. As such, in-kind replacement of pumps is anticipated and budgeted as part of the normal maintenance in the current Capital Improvement Plan (CIP) for District LS 1 through 4. Pump replacement is not anticipated during the planning period for District LS 5 and 6.

Upgrades to the District LS 1 telemetry system, including the addition of an electromagnetic flow meter and ultrasonic level transducer, occurred in 2019. These improvements allow for historical trending of flow and wet well levels, which is unavailable at other District lift stations. The current CIP includes telemetry system replacements and upgrades for District LS 1 through 4 in the current planning period, as the age of the existing telemetry system components will prompt replacement. District LS 5 and 6 telemetry equipment is expected to be adequate for the planning period. An annual budget item is included in the current CIP for normal maintenance and replacement of aging items.

No major operational or new capacity-related concerns were identified with the existing lift stations and force mains during the site visit.

2010 District CIP

In 2010, RH2 analyzed the District's existing system capacity and expected future growth, completed a 20-year CIP (from the date of the report), and summarized the findings in the *2010 Lake Chelan Sewer*

District Capital Improvement Plan (2010 Report), of which the executive summary is attached as **Appendix C**. The 2010 Report estimated that the District could serve approximately 808 equivalent residential units (ERUs) and established that the District served 282 ERUs in 2010, equating to approximately 35 percent of District capacity at the time. The remaining 526 ERUs (or 65 percent) were available for growth within the existing system.

The 2010 Report calculated future service to the Tuscan Village and other areas on the south shore within the Urban Growth Area (UGA) that the City could not feasibly serve. The growth rate used by the 2010 Report estimated 928 ERUs to be served by the District in 2020, 1,504 ERUs served in 2030, and 2,251 ERUs served at build-out. The 2010 Report recommended the following capital projects as necessary to provide adequate capacity for the projected growth:

- District LS 1 Pump and Electrical Improvements: Upsize the existing pumps and replace the electrical equipment for this lift station to provide capacity for the planned growth.
- District LS 2 Pump and Electrical Improvements: Upsize the existing pumps and replace the electrical equipment for this lift station to provide capacity for the planned growth.
- District LS 1 Force Main Improvements: Replace the existing 6-inch steel force main with a 10-inch HDPE force main. The existing force main is aging and restricts the lift station capacity.

In addition to projects identified within the District, the 2010 Report includes City CIP's based on the City's *2008 General Sewer Plan* (2008 GSP).

Current Review of District Capacity

Due to the lack of historical flow data collected by the District, the 2010 analyses included rental flow meters to estimate lift station capacity and current usage. In 2019, RH2 performed a limited review of current District capacity based on historical District LS 1 flow data since May 2019. All sewage collected within the District flows through District LS 1. **Figure 1** shows the District LS 1 pump operation during the peak hour flows in 2019.

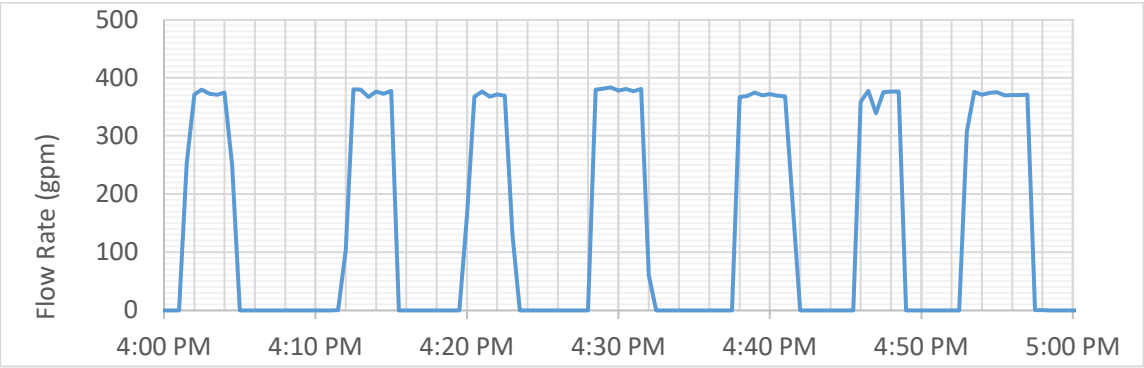

Figure 1 – District LS 1 Peak Hour Flow July 2, 2019 (based on available data)

The peak hour flow rate averaged at 171 gallons per minute (gpm), which required the lift station to operate approximately 45 percent of the time during the peak hour condition. By this approximation, District LS 1 exhibits approximately 55-percent capacity remaining. The 2010 Report showed that District LS 2 exhibits higher capacity than District LS 1, while passing the same volume of influent. The remaining four lift stations have similar or higher capacities than District LS 1 but pass substantially less influent volume. As such, District LS 1 is the piece of District infrastructure that limits the District's

capacity. Based on this analysis, the current system capacity in use by the District is approximately 45 percent, allowing for 55-percent capacity remaining for growth.

Projected Growth in the Current Planning Period

Growth within the District's collection system has been much lower than that projected by the 2010 Report. Per the 2010 Report, there were approximately 97 potential ERUs that were paying a Utility Local Improvement District (ULID) assessment that were not currently served by the District. Additionally, there were an estimated 37 unserved parcels associated with developments that understand that sewer service will be available upon development. Based on the 2010 Report estimation of a total capacity of 808 ERUs, the current remaining capacity of 55 percent, or 444 ERUs, is likely sufficient to cover connection by these properties. Major growth beyond these properties may require developer-funded capacity improvements. However, it is assumed that the current level of capacity is sufficient for future growth within the 20-year planning horizon.

District Capacity Summary

Based on the 2019 review of the existing infrastructure, current level of service, and expected growth, the recommended capital projects for the District are revised from those shown in the 2010 Report. Increasing the capacity of District LS 1 and 2 as recommended by the 2010 Report is not a priority for the current 20-year planning period, unless substantial development occurs, in which case, these improvements should be funded by the prospective developer. Replacement of the District LS 1 force main is recommended within the current planning period based on the age of the force main. However, this replacement is unlikely to be necessitated from a capacity standpoint in the near term. It should be noted that the replacement of this force main likely will increase the output of the existing District LS 1 pumps, which may further delay the need to upsize those pumps.

The current District CIP also includes four minor lift station equipment replacement and rehabilitation projects, as well as a capital budget item for annual device replacement. These projects are identified to budget for normal repair and replacement due to infrastructure age and are not expected to be driven by growth.

CIP Analysis

In addition to the District CIP projects identified, the District is responsible to fund a portion of the City CIP projects that serve the District. In 2018, Gray and Osborne Inc., (G&O) completed an updated capital improvements project list for the City (2018 City CIP). This CIP and associated project mapping are included in **Appendix D**. A summary of the District and City CIP projects of which the District is responsible for a portion of the costs is shown in **Table 1**.

Table 1
District CIP List and Total Capital Costs

CIP No.	Description	Total Estimated Project Costs	District Portion of Project Costs	
			%[1]	Total
LS 01	District LS 1 Improvements	$ 268,000	100%	$ 268,000
LS 02	District LS 2 Improvements	$ 162,000	100%	$ 162,000
LS 03	District LS 3 Improvements	$ 195,000	100%	$ 195,000
LS 04	District LS 4 Improvements	$ 128,000	100%	$ 128,000
LS 05	Annual Device Replacement	$ 13,000	100%	$ 13,000
CS 01	District LS 1 Force Main Improvements	$ 1,052,000	100%	$ 1,052,000
	Totals	**$ 1,818,000**		**$ 1,818,000**
City of Chelan Projects				
18	MH F-25 to MH F-22	$ 128,000	50%	$ 64,000
20	LS No 5 and Force Main Improvements	$ 1,969,000	50%	$ 984,500
23	MH E-21 to MH E-8	$ 114,000	21%	$ 23,940
24	MH E-8 to MH E-6	$ 105,000	21%	$ 22,050
25	MH E-6 to MH E-5	$ 59,000	21%	$ 12,390
26	MH E-5 to MH E-4	$ 254,000	21%	$ 53,340
27	MH E-4 to MH E-3	$ 105,000	21%	$ 22,050
28	MH E-3 to MH E-2	$ 58,000	21%	$ 12,180
29	MH E-2 to MH E-1	$ 60,000	21%	$ 12,600
32	MH C-25 to MH C-26	$ 268,000	8%	$ 21,440
33	MH C-27 to MH C-28	$ 55,000	8%	$ 4,400
34	MH C-28 to MH C-61	$ 175,000	8%	$ 14,000
35	MH C-61 to MH C-73	$ 182,000	8%	$ 14,560
36	MH C-73 to MH C-74	$ 57,000	8%	$ 4,560
37	MH C-74 to MH C-75	$ 274,000	8%	$ 21,920
38	MH C-75 to MH C-76	$ 250,000	8%	$ 20,000
39	MH C-76 to Primary Plant	$ 62,000	8%	$ 4,960
59	Annual Pipe Replacement	$ 250,000	8%	$ 20,000
52A	RBC Media Replacement	$ 345,000	5.5%	$ 18,975
52B	RBC Media Replacement	$ 345,000	5.5%	$ 18,975
52C	RBC Media Replacement	$ 345,000	5.5%	$ 18,975
52D	RBC Media Replacement	$ 345,000	5.5%	$ 18,975
53	Emergency Chlorination	$ 170,000	5.5%	$ 9,350
54	Centrifuge	$ 1,000,000	5.5%	$ 55,000
55	Aerobic Digester	$ 1,089,000	5.5%	$ 59,895
56	Influent Screening	$ 500,000	5.5%	$ 27,500
61	WWTP PLC Upgrade	$ 203,300	5.5%	$ 11,182
62	Public Works Building	$ 450,000	5.5%	$ 24,750
57	GSP and WWTF Plan	$ 100,000	5.5%	$ 5,500
58	Odor Control Study	$ 40,000	5.5%	$ 2,200
	Totals	**$ 9,357,300**		**$ 1,604,167**
		District Total CIP Costs		**$ 3,422,167**

The full CIP is included in **Appendix E**. Capital costs for each project are allocated to the District based on the proportional percentage of District flow served by each project (i.e., 100 percent for each project within the District and lesser percentages for City projects).

The City Lift Station No. 5 and Force Main Replacement project represents a large pending project for which the District is responsible for approximately 50 percent of the total project cost. Currently, the City Lift Station No. 5 is operating beyond its design capacity and is not within Ecology guidelines. Additionally, the force mains discharging from Lift Station No. 5 have been problematic and have reached their useful life. These deficiencies effectively limit any further connections within the District. The project will be funded by bond, with design occurring in 2020 and construction occurring in 2021. The City is leading the Lift Station No. 5 Replacement project given that the City owns and maintains the lift station; however, the project has been developed similar to a joint project because both the City and District are almost equally impacted. The infrastructure improvement has been postponed for multiple years and is finally at a point that requires action.

The CIP project costs are for capital projects over the 20-year period from 2020 through 2039. The estimated total capital cost for the District is $3.4 Million in 2020 dollars.

Summary of Financial Analysis and Findings

FCS GROUP has provided a preliminary financial analysis regarding the rate impacts incurred by the District due to the updated CIP. The full analyses are included in **Appendix F**.

The District's current rates are insufficient to meet the projected Revenue Requirement in both the short and long-term without significant rate increases. This deficiency is driven by two key factors:

- New debt service associated with the City Lift Station No. 5 project will increase the District's annual intergovernmental costs by approximately $84,000 per year.
- Future debt service associated with both City collection system projects and the District LS 1 Force Main Improvements will add an additional $200,000 per year to the District's annual intergovernmental costs.

The District's current rate is $45 per month per ERU. The District has not adjusted rates since 2014. Because of the immediate cash-flow deficiency driven by the City Lift Station No. 5 project, all of these rate scenarios reflect a mid-year adjustment to the rates.

The soonest a rate increase can be enacted is August 1, 2020. Three rate increase scenarios were developed for consideration by the District:

- A periodized approach which front-loads the rate increases to address them in two adjustments; with a 65 percent increase effective August 1, 2020, and a 49 percent increase effective January 1, 2025.
- A hybrid approach which reduces the initial increase, and then establishes an ongoing levelized increase, resulting in a 50 percent increase effective August 1, 2020, followed by 8 percent increases annually beginning January 1, 2022 through 2029.
- A levelized approach, with increases of 22 percent effective August 1, 2020, January 1, 2021, and January 1, 2022, and followed by increases of 2 percent annually beginning January 1, 2023 through 2029.

Table 2 summarizes the impact to the District's rates under each of the alternatives.

Table 2
District Rate Alternatives

	2020	2021	2022	2023	2024
(1) Periodized	$74.30	$74.30	$74.30	$74.30	$74.30
(2) Revised Scenario	$67.50	$67.50	$72.90	$78.70	$85.00
(3) Levelized	$54.90	$67.00	$81.70	$99.70	$101.70
	2025	**2026**	**2027**	**2028**	**2029**
(1) Periodized	$110.70	$110.70	$110.70	$110.70	$110.70
(2) Revised Scenario	$91.80	$99.10	$107.00	$115.60	$124.80
(3) Levelized	$103.70	$105.80	$107.90	$110.10	$112.30

Other Considerations

District ERU Distribution

Based on 2018 billing data, the District currently serves an estimated 328 ERUs, of which 312 are classified as residential (single- and multi-family) and 16 are classified as commercial. This represents 46 new ERUs since the completion of the 2010 Report. A total of 328 ERUs represents approximately 40 percent of the total capacity of 808 ERUs. This level of service aligns closely with the 2019 peak hour flow analyses. However, a detailed analysis of the distribution of ERUs has not been completed. Accurate distribution of ERUs plays an important factor in distribution of capital improvement costs on the ratepayers, especially related to commercial ERUs. The following provides a simple analysis for the current ERU distribution.

The 2019 average summer flow rate for the District was approximately 45.5 gpm. The District's commercial ERUs consist largely of wineries with restaurants that can host large events (weddings, etc.). The commercial ERUs are expected to increase the peak hour flow during these events but are unlikely to significantly increase average flows. For the purposes of these analyses, it is assumed that the average summer flow is completely residential in nature, which estimates that each single-family residence discharges 210 gallons per day (gpd) to the District. This is in line with, or slightly below, estimates for other systems in the area.

Collection system capacity is established based on the peak hour flow, as the system components must be sized to pass the highest average 60-minute flow rates without use of emergency storage or allowing an overflow. A peaking factor (peak hour flow to average summer flow) of 2.5 was used for all ERUs discharging to the City's system as part of the 2008 GSP. Establishing a current peaking factor for residential units within the District is outside the scope of this analysis, but the value of 2.5 likely is a good approximation. As such, the expected residential component of the peak hour flow would be calculated as 210 gpd multiplied by 2.5 multiplied by 312 ERUs divided by 1,440 minutes per day, which equals 114 gpm. Based on the 2019 analyses, the peak hour flow at District LS 1 was 171 gpm. This would estimate that the single-family residences accounted for approximately 66 percent of the peak hour flow. For comparison, single-family residences account for 95 percent (312 residential ERUs divided by 328 total ERUs) of the total District billing.

Based on this limited analysis, it is possible that the commercial component of the District's billing could be too low. It is recommended that a more detailed analysis of the residential peaking factor with additional flow data be completed to accurately derive the residential and commercial components of flow. Additionally, this preliminary analysis did not include a review of infiltration and inflow (I&I), which could affect the results.

Recommendation

Overview

Due to the aging infrastructure and current deficiencies, it is essential that the City and District plan to replace City Lift Station No. 5 and Force Mains as planned by the City. This project has been identified and needed for many years and has now become critical. Additional CIP projects have been identified and restructured for future years in order to lessen immediate impacts to the current District rates.

Increase District Rates

It is recommended that the District increase rates in order to resolve its anticipated cash flow deficiency as soon as feasible. A near-term increase is necessary to address the revenue deficiencies driven by the debt service payments required for the City Lift Station No. 5 project, which begins in October 2020. The financial analyses indicate that the District's monthly rates will need to be raised effective August 1, 2020 in order to make its April 1, 2021 debt service payment to the City without compromising its reserves. Once those rates are enacted, the District can either defer further rate increases until the District LS 1 Force Main project or begin gradually raising rates in anticipation of that need. Three rate increase alternatives were developed, the specifics of which are presented in **Appendix F**.

Assess District ERUs

As previously discussed, completion of a more accurate estimation of the portions of peak hour flow that are attributed to the commercial and residential portions of the District's ratepayers is recommended. Based on the preliminary analyses, the commercial component of ERUs may need to be increased. As an interim step, fixture counts for each commercial discharger could be completed to verify if the ERUs attributed appear to be in line with the expected discharge. Increasing commercial ERUs effectively would lower the total District billing for which single-family residences would be responsible. Additionally, a brief review of the residential ERUs is recommended to ensure single- and multi-family residences, accessory dwelling units, etc. are accurately represented for billing. At the time of this report, the District has taken steps to move this review forward.

Appendices:

Appendix A – District Overview Map from 2010 Report
Appendix B – Lift Station Site Visit Information
Appendix C – Executive Summary from 2010 Report
Appendix D – 2018 City CIP Documents
Appendix E – District CIP
Appendix F – FCS GROUP Financial Analyses

Appendices

Appendix A

District Overview Map from 2010 Report

LAKE CHELAN SEWER DISTRICT

EXISTING SEWER SYSTEM

Lake Chelan

Lift Station 6

Lift Station 5

Lift Station 4

Lift Station 3

Lift Station 2

Lift Station 1

To City of Chelan

8 inch

10 inch

Legend

- ULID Boundary
- Lift Station
- Force Main
- Gravity Main

1 INCH = 800 FEET

0 800 1,600

DRAWING IS NOT TO SCALE
IF BAR IS NOT 2" LONG

RH2 ENGINEERS PLANNERS SCIENTISTS

REV DATE: MAY 14, 2010

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Appendix B

Lift Station Site Visit Information

Lift Station No. 1	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	Flygt C-impeller. Both pumps >20 years old.
	Output of approx. 380 gpm during site visit.
Motors	30 HP. Motors have been rebuilt.
	Across the line starters. Multiple starter replacements have occurred.
Wetwell	Cast in place rectangular concrete wetwell partially submerged at shoreline.
	Minor concrete spalling. Walls are in fair condition.
	No major known infiltration.
Control	Original control panel recently upgraded with PLC and HMI.
	Electromagnetic flowmeter and ultrasonic level sensor recently added.
	Remote alarming via radio.
Forcemain	10-inch HDPE. Discharges up hill to City gravity collection system to CC 5.
	New installed mechanical piping is very rigid and operating well.
General Notes	Operator generally believes there to be adequate capacity with the lift station.

Photos

Lift Station No. 2	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	Flygt N-impeller. Both pumps approx. 7 years old.
	No flow test done during site visit.
Motors	5 HP motors.
	Across the line starters. At least one starter replacement has occurred.
Wetwell	Cast in place rectangular concrete wetwell partially submerged at shoreline.
	Minor concrete spalling. Walls are in fair condition.
	No major known infiltration.
	Adjacent retaining wall requires minor repair.
Control	Original control panel - no significant upgrades.
	No flowmeter and level sensor installed. Control based on level floats.
	Remote alarming via radio.
Forcemain	10-inch HDPE in lake discharges to LCSD No. 1.
	Mechanical piping is original - no visual assessment made during site visit.
General Notes	Operator believes substantial capacity exists with the lift station.

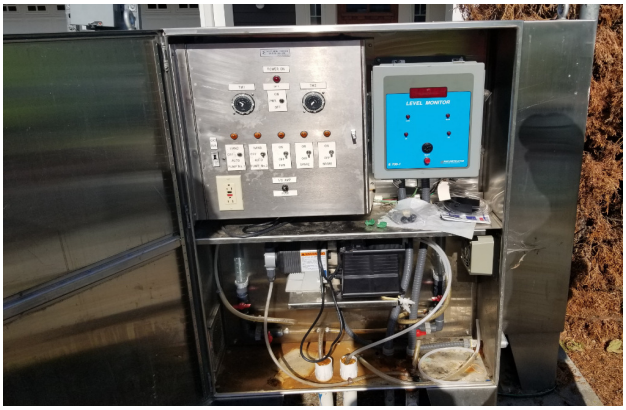
Photos

Lift Station No. 3	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	One Flygt N-impeller pump ~5 years old; one Flygt C-impeller pump ~15 years old.
	No flow test done during site visit.
Motors	5 HP motors.
	Across the line starters. Both starters have been replaced.
Wetwell	Cast in place rectangular concrete wetwell offset from shoreline.
	Minor concrete spalling. Walls are in fair condition.
	No major known infiltration.
Control	Original control panel recently upgraded with PLC and HMI.
	Ultrasonic level sensor has been installed.
	Remote alarming via radio.
Forcemain	10-inch HDPE in lake discharges to LCSD No. 2.
	Mechanical piping is original - no visual assessment made during site visit.
	Forcemain overflows to wetwell during all pump runs - likely due to overpressure issue.
General Notes	Operator believes substantial capacity exists with the lift station.
	No back-up generator plug included.
	Odor complaints have occurred at this lift station.

Photos

Lift Station No. 4	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	One Flygt N-impeller pump ~6 years old; one Flygt C-impeller pump ~15 years old.
	No flow test done during site visit.
Motors	5 HP motors.
	Across the line starters.
Wetwell	Cast in place rectangular concrete wetwell offset from shoreline.
	Minor concrete spalling. Walls are in fair condition.
	No major known infiltration.
Control	Original control panel - no significant upgrades.
	No flowmeter and level sensor installed. Control based on level floats.
	Remote alarming via radio.
Forcemain	10-inch HDPE in lake discharges to LCSD No. 3.
	Mechanical piping is original - no visual assessment made during site visit.
General Notes	Operator believes substantial capacity exists with the lift station.
	Automated bioxide injection system installed at this lift station.

Photos



Lift Station No. 5	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	Flygt C-impeller. Both pumps approx. 20 years old.
	No flow test done during site visit.
Motors	5 HP motors.
	Across the line starters.
Wetwell	Cast in place rectangular concrete wetwell.
	Concrete condition unknown - likely to be in good condition.
	No major known infiltration.
Control	Original control panel - no significant upgrades.
	No flowmeter and level sensor installed. Control based on level floats.
	Remote alarming via radio.
Forcemain	4-inch HDPE discharges to gravity system to LCSD No. 4.
	Mechanical piping is original - no visual assessment made during site visit.
General Notes	Operator believes substantial capacity exists with the lift station.
	Has emergency generator plug.

Photos

None available - could not visit lift station due to adjacent house construction.

Lift Station No. 6	8/20/19 Site Visit
Type	Duplex submersible sewage pumps.
Pumps	Flygt C-impeller. Both pumps approx. 20 years old.
	No flow test done during site visit.
Motors	5 HP motors.
	Across the line starters.
Wetwell	Cast in place rectangular concrete wetwell offset from shoreline.
	Concrete walls are in good condition.
	No major known infiltration.
Control	Original control panel - no significant upgrades.
	No flowmeter and level sensor installed. Control based on level floats.
	Remote alarming via radio.
Forcemain	4-inch HDPE discharges to gravity system to LCSD No. 5.
	Mechanical piping is original - no visual assessment made during site visit.
General Notes	Operator believes substantial capacity exists with the lift station.
	Has emergency generator plug.
	One pump has check valve stuck open.

Photos

Appendix C

Executive Summary from 2010 Report

EXECUTIVE SUMMARY

The Lake Chelan Sewer District (District) desires to plan for future development within its service area. This requires a better understanding of future improvement required to serve anticipated development and a plan to finance those improvements.

Because the City of Chelan (City) transmits and treats the District's waste, the District must include consideration of the City's system and system requirements in this planning activity. Much of that planning work has been accomplished through the City's 2008 General Sewer Plan.

EXISTING SYSTEM CAPACITY

An assessment of the existing capacity of the system was performed previously using very limited data. In order to more realistically assess the existing capacity of the system, the District rented temporary meters to better assess maximum existing system flows. The details of the revised existing capacity assessment are presented in **Chapter 1**. The result of this assessment indicates that the capacity of the existing system is 808 ERUs. The number of existing ERUs is 282, so the capacity of the existing system for future growth is 526 ERUs.

The excess capacity of the City's system was estimated by G&O in 2007 to be 100 ERUs. With additional meter data, G&O has revised that estimate to 70 ERUs.

ESTIMATE OF FUTURE GROWTH

Zoning and allowable density information from Chelan County and the City were utilized to determine saturation ERUs for the existing LCSD service area. Assumed growth was used to estimate interim ERU values for the next 20 years. The service area was assumed to expand to include all of Tuscan Village (Tuscan) and the portions of the urban growth area (UGA) not logically served by the City. The details of the ERU evaluation are presented in **Chapter 2**. The total number of ERUs in the service area at build-out based on existing zoning is 2251 ERUs. The estimated number of ERUs is 928 in 2020 and 1504 in 2030.

REQUIRED 20-YEAR IMPROVEMENTS

Improvements to Lift Stations No. 1 and No. 2 and the force main from Lift Station No. 1 into the City are required to serve the projected 20 year ERU flow. The cost of the improvements is estimated at $2,667,000 in 2010 dollars. The details of the improvement analysis are provided in **Chapter 3**.

Improvements to the City's transmission system as determined by G&O are summarized in their March 13, 2009 letter to Dwane Van Epps (not included). The estimated cost of improvements to the City's transmission system to serve the 20-year anticipated growth is $5,219,000. Future treatment plant improvements required to serve the 20-year growth were estimated to be $8,976,000 in the 2008 General Sewer Plan.

A phasing plan for required improvements based on ERU values, including required improvements to the City's system, is provided in **Chapter 3.** It is estimated that improvements to the City's

system will be required in 2012, and to the District's system in approximately 2019. This time frame may vary based on actual growth.

FINANCING OPTIONS AND RECOMMENDATIONS

Financing options, including development of a capital facilities charge (CFC), implementing a tiered rate schedule, forming a utility local improvement district (ULID) and applying for the appropriate grant and loan programs are addressed in **Chapter 4**. It is recommended that the District collect CFCs for both the City and the District portions of the system, and that the City's portion be passed directly through to the City upon collection.

Appendix D

2018 City CIP Documents

City of Chelan
Sanitary Sewer Capital Improvements Summary
(May 2018 ENR Seattle Construction Cost Index #11472)
October 8, 2018

No.	Improvement	Design Engineering	Construction Engineering	Construction Cost	Total Estimated Cost	City Funded	Developer Funded	Year	Trigger
7.	MH A-47 to MH A-38	$19,800.00	$13,200.00	$130,000.00	$163,000.00	$163,000.00		2025	growth
8.	MH A-38 to MH A-20	$21,000.00	$14,000.00	$138,000.00	$173,000.00	$173,000.00		2025	growth
9.	MH A-20 to MH A-19	$6,000.00	$4,000.00	$37,000.00	$47,000.00	$47,000.00		2025	growth
10.	MH A-19 to MH A-18	$18,600.00	$12,400.00	$122,000.00	$153,000.00	$153,000.00		2025	growth
11.	MH A-18 to MH A-17	$7,800.00	$5,200.00	$50,000.00	$63,000.00	$63,000.00		2025	growth
12.	MH A-17 to MH A-16	$7,800.00	$5,200.00	$50,000.00	$63,000.00	$63,000.00		2025	growth
13.	MH A-16 to MH A-15	$24,000.00	$16,000.00	$158,000.00	$198,000.00	$198,000.00		2025	growth
14.	MH A-15 to MH A-14	$17,400.00	$11,600.00	$116,000.00	$145,000.00	$145,000.00		2025	growth
15.	MH A-14 to MH A-13	$6,000.00	$4,000.00	$37,000.00	$47,000.00	$47,000.00		2025	growth
16.	MH A-13 to MH A-12	$19,800.00	$13,200.00	$129,000.00	$162,000.00	$162,000.00		2025	growth
17.	New 10-inch FM from LCSD				$481,000.00		$481,000.00		development
18.	MH F-25 to MH F-22	$15,600.00	$10,400.00	$102,000.00	$128,000.00		$128,000.00		development
20.	LS No. 5 Improvements	$327,000.00	$218,000.00	$2,179,000.00	$2,724,000.00		$2,724,000.00		development
22.	LS No. 7 Emergency Storage		$18,000.00	$178,000.00	$196,000.00	$196,000.00		2019	replacement/redundancy
23.	MH E-21 to MH E-8	$13,800.00	$9,200.00	$91,000.00	$114,000.00		$114,000.00		development
24.	MH E-8 to MH E-6	$12,600.00	$8,400.00	$84,000.00	$105,000.00		$105,000.00		development
25.	MH E-6 to MH E-5	$7,200.00	$4,800.00	$47,000.00	$59,000.00		$59,000.00		development
26.	MH E-5 to MH E-4	$30,600.00	$20,400.00	$203,000.00	$254,000.00		$254,000.00		development
27.	MH E-4 to MH E-3	$12,600.00	$8,400.00	$84,000.00	$105,000.00		$105,000.00		development
28.	MH E-3 to MH E-2	$7,200.00	$4,800.00	$46,000.00	$58,000.00		$58,000.00		development
29.	MH E-2 to MH E-1	$7,200.00	$4,800.00	$48,000.00	$60,000.00		$60,000.00		development
31.	New Lift Station No. 16		$48,000.00	$473,000.00	$521,000.00	$521,000.00		2019	replacement/capacity
32.	MH C-25 to MH C-26	$32,400.00	$21,600.00	$214,000.00	$268,000.00	$268,000.00		2024	growth
33.	MH C-27 to MH C-28	$6,600.00	$4,400.00	$44,000.00	$55,000.00	$55,000.00		2024	siphon abandonment
34.	MH C-28 to MH C-61	$21,000.00	$14,000.00	$140,000.00	$175,000.00	$175,000.00		2024	growth
35.	MH C-61 to MH C-73	$22,200.00	$14,800.00	$145,000.00	$182,000.00	$182,000.00		2024	growth
36.	MH C-73 to MH C-74	$7,200.00	$4,800.00	$45,000.00	$57,000.00	$57,000.00		2024	growth
37.	MH C-74 to MH C-75	$33,000.00	$22,000.00	$219,000.00	$274,000.00	$274,000.00		2024	growth
38.	MH C-75 to MH C-76	$30,000.00	$20,000.00	$200,000.00	$250,000.00	$250,000.00		2024	growth
39.	MH C-76 to Primary Plant	$7,800.00	$5,200.00	$49,000.00	$62,000.00	$62,000.00		2024	growth
41.	Chelan Hills 1 & 2	$907,800.00	$605,200.00	$6,050,000.00	$7,563,000.00		$7,563,000.00		LID
42.	Lift Station No. 10		$47,000.00	$466,000.00	$513,000.00	$513,000.00		2019	replacement/redundancy
43.	Golf Course Road from MH H-37	$18,000.00	$12,000.00	$120,000.00	$150,000.00	$150,000.00		2021	replacement
44.	MH A-9 to MH A-7	$11,400.00	$7,600.00	$76,000.00	$95,000.00	$95,000.00		2026	growth
45.	MH A-7 to MH A-6	$9,000.00	$6,000.00	$58,000.00	$73,000.00	$95,000.00		2026	growth
46.	MH A-6 to MH A-3	$9,000.00	$6,000.00	$57,000.00	$72,000.00	$73,000.00		2026	growth
47.	MH A-3 to MH A-1	$6,600.00	$4,400.00	$42,000.00	$53,000.00	$72,000.00		2026	growth

City of Chelan
Sanitary Sewer Capital Improvements Summary
(May 2018 ENR Seattle Construction Cost Index #11472)
October 8, 2018

No.	Improvement	Design Engineering	Construction Engineering	Construction Cost	Total Estimated Cost	City Funded	Developer Funded	Year	Trigger
48.	MH A-1 to LS No. 1	$6,600.00	$4,400.00	$42,000.00	$53,000.00	$53,000.00		2026	growth
50.	MH C-68 to MH C-78	$12,000.00	$8,000.00	$77,000.00	$97,000.00	$97,000.00		2021	growth
51.	LS No. 1 Conversion	$109,800.00	$73,200.00	$731,000.00	$914,000.00	$914,000.00		2020	replacement/redundancy
52A	RBC Media Replacement	$0.00	$0.00	$345,000.00	$345,000.00	$345,000.00		2019	replacement
52B	RBC Media Replacement	$0.00	$0.00	$345,000.00	$345,000.00	$345,000.00		2020	replacement
52C	RBC Media Replacement	$0.00	$0.00	$345,000.00	$345,000.00	$345,000.00		2021	replacement
52D	RBC Media Replacement	$0.00	$0.00	$345,000.00	$345,000.00	$345,000.00		2022	replacement
53.	Emergency Chlorination	$20,400.00	$13,600.00	$136,000.00	$170,000.00	$170,000.00		2019	redundancy
54.	Centrifuge				$1,000,000.00	$1,000,000.00		2023	growth
55.	Aerobic Digester	$130,800.00	$87,200.00	$871,000.00	$1,089,000.00	$1,089,000.00		2033	growth
56.	Influent Screening				$500,000.00	$500,000.00		2033	growth
57.	General Sewer and WWTF Plan	$100,000.00			$100,000.00	$80,000.00		2019	replacement/redundancy
58.	Odor Control Study	$40,000.00			$40,000.00	$40,000.00		2019	replacement/redundancy
59.	Annual Sewer Pipe Replacement	$38,000.00	$25,000.00	$187,000.00	$250,000.00	$250,000.00		Annual	replacement/redundancy
60.	Webster Ave. Grinder Pump Installations	$0.00	$6,000.00	$57,000.00	$63,000.00	$63,000.00		2019	replacement/redundancy
61.	WWTP PLC Upgrade	$24,600.00	$16,400.00	$162,300.00	$203,000.00	$203,000.00		2019	replacement/redundancy
62.	Public Works Building	$33,400.00	$16,600.00	$400,000.00	$450,000.00	$450,000.00		2020	replacement/redundancy

City of Chelan
General Sewer Plan – CIP Updates
Preliminary Sewer System Improvements

Below is a list of Sewer Capital Improvement projects from the *2008 General Sewer Plan*. Projects which have been completed since the *2008 Plan* are crossed out as seen below. Cost estimates were updated for all projects which have not been completed. Construction costs were updated by updating the June 2008 ENR Construction Cost Index to the May 2018 Cost Index. In addition, the sales tax was updated and restoration costs in paved areas were increased. Lastly, known projects which were not identified in the *2008 General Sewer Plan* were added.

CIP Updates

1. ~~*New Lift Station No. 12 and 4-Inch Discharge Force Main* – The construction of new Lift Station No. 12 and the associated force main pipe is needed immediately. Orchard View Estates has already been constructed, and the Granite Ridge development is currently under construction. New Lift Station No. 12 will pump directly into the new Northshore Interceptor and will be sized for ultimate build-out of the anticipated sewered area, which includes Chelan Hills Division 2, the east portion of Chelan Hills Division 1, the area south of SR 150 and the proposed developments as shown on Figure 4-3.~~

2. ~~*Cleanouts for 8-Inch Force Main on SR 150* – These improvements consist of the installation of cleanouts for the old Northshore Interceptor force main between the Lift Station No. 14 discharge and Lift Station No. 11 (NS No. 4) and are needed to provide the City with access to clean/flush the old Northshore Interceptor force main that now acts as a low-pressure sewer force main since the LCRD Northshore Interceptor replacement project was completed in 2005.~~

3. ~~*Lift Station No. 14 and No. 10 Telemetry & New 8-Inch Gravity Sewer* – These improvements consist of the installation of a new 8-inch gravity main along SR 150 that will replace a portion of the old Northshore Interceptor force main (at adverse grade) that is currently being used as a low-pressure sewer main conveying sewage flows from Lift Station No. 10 and No. 14 to Lift Station No. 11 (NS No. 4). The new 8-inch gravity main will connect to the existing 8-inch gravity main along SR 150 that currently serves the southeast portion of the Chelan Hills Division 3 subdivision. The telemetry improvements to Lift Station Nos. 10 and No. 14 will allow these lift stations to operate independently in order to minimize flow volumes through the 8-inch gravity section.~~

4. ~~*New 2-inch Slipline on SR 150 from Rocky Point to Crystal Drive* – This improvement consists of sliplining the old 8-inch Northshore Interceptor force main from the point of connection between the LCSD and City's service areas to the Crystal Drive/SR 150 intersection with 2-inch HDPE low-pressure force main pipe. This 2-inch low-pressure force main will discharge into the new 8-inch gravity sewer section and sewage flows will be conveyed directly to Lift Station No. 11. This improvement will alleviate long~~

~~sewage detention times in this section of the old Northshore Interceptor that must currently be flushed weekly through a connection to the new Northshore Interceptor to control odors.~~

~~5. *New 8-inch Sewer on SR 150 from Crystal Drive to Lift Station No. 11* – Sewage flows from the Crystal View Estates subdivision currently flow into the old Northshore Interceptor force main. These sewage flows are eventually conveyed to Lift Station No. 11 once enough surcharge is provided to overcome existing head conditions. This improvement will allow sewage flow by gravity from Crystal View Estates to Lift Station No. 11.~~

~~6. *New 8-Inch Sewer Line on SR 150 from Golf Course Road to MH H-4* – Improvements include construction of new gravity sewer main on SR 150 from the intersection at Golf Course Road to MH H-4, the discharge manhole for Lift Station No. 8.~~

7-16: New 15-inch Sewer From MH A-47 to MH A-12

7. *New 15-Inch Sewer from MH A-47 to MH A-38* – This improvement consists of the replacement of approximately 300 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

8. *New 15-Inch Sewer from MH A-38 to MH A-20* – This improvement consists of the replacement of approximately 350 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

9. *New 15-Inch Sewer from MH A-20 to MH A-19* – This improvement consists of the replacement of approximately 25 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

10. *New 15-Inch Sewer from MH A-19 to MH A-18* – This improvement consists of the replacement of approximately 300 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

11. *New 15-Inch Sewer from MH A-18 to MH A-17* – This improvement consists of the replacement of approximately 75 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

12. *New 15-Inch Sewer from MH A-17 to MH A-16* – This improvement consists of the replacement of approximately 75 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

13. *New 15-Inch Sewer from MH A-16 to MH A-15* – This improvement consists of the replacement of approximately 400 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

14. *New 15-Inch Sewer from MH A-15 to MH A-14* – This improvement consists of the replacement of approximately 275 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

15. *New 15-Inch Sewer from MH A-14 to MH A-13* – This improvement consists of the replacement of approximately 25 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

16. *New 15-Inch Sewer from MH A-13 to MH A-12* – This improvement consists of the replacement of approximately 325 lineal feet of existing 10-inch sewer main with 15-inch sewer main pipe along SR 150.

17. *New 10-Inch Force Main from LCSD Lift Station No. 1 to MH F-27* – This improvement consists of the replacement of approximately 2,000 lineal feet of existing 6-inch force main with 10-inch force main pipe. This improvement is needed to accommodate the proposed Tuscan Village development discussed in the drainage basin G analysis.

18. *New 10-Inch Sewer from MH F-25 to MH F-22* – This improvement consists of the replacement of approximately 318 lineal feet of existing 8-inch sewer main with 10-inch sewer main pipe along SR 97.

~~*19. New 15-Inch Sewer from MH F-19 to Lift Station No. 5* – This improvement consists of the replacement of approximately 620 lineal feet of existing 8-inch sewer main with 15-inch sewer main pipe along SR 97.~~

20. *New Pumps for Lift Station No. 5 and New 8-Inch and 12-inch Discharge Force Mains*– This improvement consists of the replacement of the pumps and accessories at Lift Station No. 5, and the replacement of approximately 1,800 lineal feet of existing 6-inch force main pipe with 3,000 lineal feet of 8-inch force main pipe. The new force main will be routed along SR 97 and connected to the existing 8-inch force main pipe near Lift Station No. 4 that was constructed as a bypass around Lift Station No. 4.

~~*21. Lift Station No. 5 and Lift Station No. 4 Telemetry* – This improvement consists of the installation of telemetry for Lift Station Nos. 5 and 4 (drainage basin E) that would allow Lift Station No. 4 to operate only when Lift Station No. 5 is not pumping. Since these lift stations will discharge into the same manhole once Lift Station No. 5 improvements are made, this improvement would reduce the flow quantity in the downstream gravity sewer main.~~

22. *Lift Station No. 7 Emergency Storage* – This improvement consists of the installation of an emergency storage tank and piping to provide additional storage capacity in case of pump or power failure. The close proximity of this lift station to the lake demands this additional safeguard.

23-29: New 15-inch, 18-inch, and 21-inch sewer from MH E-21 to MH E-1

23. *New 15-Inch Sewer from MH E-21 to MH E-8* – This improvement consists of the replacement of approximately 185 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe along Woodin Avenue.

24. *New 21-Inch Sewer from MH E-8 to MH E-6* – This improvement consists of the replacement of approximately 172 lineal feet of existing 15-inch sewer main with 21-inch sewer main pipe along Woodin Avenue.

25. *New 18-Inch Sewer from MH E-6 to MH E-5* – This improvement consists of the replacement of approximately 75 lineal feet of existing 15-inch sewer main with 18-inch sewer main pipe along Woodin Avenue.

26. *New 21-Inch Sewer from MH E-5 to MH E-4* – This improvement consists of the replacement of approximately 510 lineal feet of existing 15-inch sewer main with 21-inch sewer main pipe along Woodin Avenue.

27. *New 21-Inch Sewer from MH E-4 to MH E-3* – This improvement consists of the replacement of approximately 172 lineal feet of existing 15-inch sewer main with 21-inch sewer main pipe along Woodin Avenue.

28. *New 21-Inch Sewer from MH E-3 to MH E-2* – This improvement consists of the replacement of approximately 70 lineal feet of existing 15-inch sewer main with 21-inch sewer main pipe along Woodin Avenue.

29. *New 18-Inch Sewer from MH E-2 to MH E-1* – This improvement consists of the replacement of approximately 79 lineal feet of existing 15-inch sewer main with 18-inch sewer main pipe along Woodin Avenue.

~~30. *New Lift Station No. 2 and 12-Inch Discharge Force Mains* – This improvement consists of the demolition of the comminutor, abandonment of the inverted siphons, and the construction of a new lift station and approximately 4,000 lineal feet of 12-inch force main pipe.~~

31. *New Lift Station No. 16* – This improvement consists of the replacement of the existing 6-inch steel inverted siphon located between MH D-19 and MH D-6 with a new Lift Station that pumps to MH D-17 on Webster Avenue and installing grinder pumps for services that tied into the siphon.

32-39: New 24-inch and 27-inch Sewer From MH C-25 to Primary WWTP

32. *New 24-Inch Sewer from MH C-25 to MH C-26* – This improvement consists of the replacement of approximately 494 lineal feet of existing 18-inch sewer main with 24-inch sewer main pipe.

33. *New 24-Inch Sewer from MH C-26 to MH C-27* – This improvement consists of the replacement of approximately 470 lineal feet of existing 18-inch sewer main with 24-inch sewer main pipe.

34. *New 27-Inch Sewer from MH C-28 to MH C-61* – This improvement consists of the replacement of approximately 300 lineal feet of existing 18-inch sewer main with 27-inch sewer main pipe.

35. *New 27-Inch Sewer from MH C-61 to MH C-73* – This improvement consists of the replacement of approximately 310 lineal feet of existing 18-inch sewer main with 27-inch sewer main pipe.

36. *New 27-Inch Sewer from MH C-73 to MH C-74* – This improvement consists of the replacement of approximately 43 lineal feet of existing 18-inch sewer main with 27-inch sewer main pipe.

37. *New 27-Inch Sewer from MH C-74 to MH C-75* – This improvement consists of the replacement of approximately 498 lineal feet of existing 18-inch sewer main with 27-inch sewer main pipe.

38. *New 27-Inch Sewer from MH C-75 to MH C-76* – This improvement consists of the replacement of approximately 451 lineal feet of existing 21-inch sewer main with 27-inch sewer main pipe.

39. *New 27-Inch Sewer from MH C-76 to Primary Wastewater Treatment Plant* – This improvement consists of the replacement of approximately 65 lineal feet of existing 21-inch sewer main with 27-inch sewer main pipe.

~~40. *New 8-Inch Sewer from MH C-47 to MH C-46* – This improvement consists of the replacement of approximately 370 lineal feet of existing 8-inch sewer main in an area identified with root intrusion problems with new 8-inch sewer main pipe.~~

41. *Chelan Hills Divisions 1 & 2 Sewer Improvements* - It is assumed for this study that the additional 185 ERUs from the Chelan Hills Divisions 1 and 2 subdivisions will become sewered beyond the 6-year planning period, but within the 20-year planning period. The costs for the improvements could be borne by a Local Improvement District (LID) formed at that time.

42. *New Lift Station No. 10* – This improvement consists of the replacement of the existing Smith & Loveless package pump station with a new submersible pump lift station.

43. *New 8-Inch Sewer on Golf Course Road from MH H-37* – Improvements include construction of new gravity sewer main on Golf Course Road from the intersection at Golf Course Drive (MH H-37) south to connect with the existing sewer.

44-49: New 15-inch Sewer from MH A-9 to Lift Station No. 1

44. *New 15-Inch Sewer from MH A-9 to MH A-7* – This improvement consists of the replacement of approximately 125 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe.

45. *New 15-Inch Sewer from MH A-7 to MH A-6* – This improvement consists of the replacement of approximately 100 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe.

46. *New 15-Inch Sewer from MH A-6 to MH A-3* – This improvement consists of the replacement of approximately 100 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe.

47. *New 15-Inch Sewer from MH A-3 to MH A-1* – This improvement consists of the replacement of approximately 50 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe.

48. *New 15-Inch Sewer from MH A-1 to Lift Station No. 1* – This improvement consists of the replacement of approximately 50 lineal feet of existing 12-inch sewer main with 15-inch sewer main pipe.

~~*49. New 21-Inch Sewer from MH C-27 to MH C-28* – This improvement consists of the replacement of approximately 46 lineal feet of existing 18-inch sewer main with 21-inch sewer main pipe~~

50. *New 18-Inch Sewer from MH C-68 to MH C-78* – This improvement consists of the replacement of approximately 125 lineal feet of existing 15-inch sewer main with 18-inch sewer main pipe.

51. *Lift Station No. 1 Conversion to Submersible Pump Lift Station* – This improvement consists of the conversion of Lift Station No. 1 to a submersible pump lift station. The City is moving toward converting all existing lift stations to submersible pump lift stations.

52-58: New Projects not identified in *2008 General Sewer Plan*

52. RBC Media Replacement – The City's 8 older Rotating Biological Contractors are nearing the end of their life and the media is breaking down. It is anticipated that the City will need to rehabilitate the media on these units in the near future to keep the units running. This project will rehabilitate the 8 older RBCs by replacing the media on the units. The project will replace 2 units annually for 4 years.

53. Emergency Chlorination– The City has no backup system to treat effluent discharging to the Columbia River in the event that the power is off and the UV treatment is not working. This project would provide a backup chlorination system to treat the effluent discharge in emergency situations to meet the conditions of the City's NPDES discharge permit.

54. Centrifuge – The existing centrifuge is expected to be over capacity by the year 2023 and this project will add an additional centrifuge or replace one of the existing centrifuges with a new one with a larger capacity.

55. Aerobic Digester – The existing aerobic digester is expected to be over capacity by the year 2033 and this project will install a new aerobic digester.

56. Influent Screening – The influent screen capacity would need to be increased by the year 2033 and this project would include the installation of a new bar screen.

57. General Sewer and WWTF Plan – The City's last *2008 General Sewer Plan* and *2008 Wastewater Treatment Facilities Engineering Report* are both approximately 10 years old and in need to be updated. This project would updated both of these planning documents including the sewer collection system and the wastewater treatment facilities in one document and would include the latest estimates for growth and development within the City.

58. Odor Control Study – The City will perform a study to look at ways to control the odor from some of the lift station force mains which are causing odor issues. The odors will be measured and methods to reduce odors will be explored.

59. Annual Sewer Replacement – The City will start an annual replacement program to replace old pipe which is nearing the end of its useful life.

60. Webster Avenue Grinder Pump Installations – This improvement consists of the installation of 2 grinder pumps for 2 residents who are currently connected to the siphon pipe downstream of the new Lift Station No. 16 project. This siphon will be abandoned as part of the Lift Station No. 16 project and these 2 residents will need to be disconnected from the siphon. Grinder pumps will be required to pump up to the gravity

sewer in Webster to serve these residents.

61. *WWTP PLC Upgrade* – This improvement consists of an upgrade to the PLC at the main MCC room at the WWTP which runs critical functions at the plant. The existing PLCs located in this room are 15 – 20 years old and nearing the end of their effective life. They are outdated and replacement parts will be very difficult to obtain.

62. *Public Works Building* – The City's existing public works office has exceeded it useful lifespan. The building is outdated with failing systems and the space no longer effectively houses the functions of the department. The existing building will be replaced by a new building at the same site. The project will be funded by a 35% contribution from the sewer fund to the total estimated cost.

SCALE: 1" = 1500'

LEGEND

- CORPORATE LIMITS
- URBAN GROWTH AREA BOUNDARY
- SEWER LINE
- FORCE MAIN
- MANHOLE
- LAMPHOLE
- CLEANOUT
- LIFT STATION
- L.C.S.D. (N.S.) — LAKE CHELAN SEWER DISTRICT NORTH SHORE
- PROPOSED SEWER LINE AND FLOW DIRECTION
- PROPOSED MANHOLE
- PROPOSED FORCE MAIN
- LIFT STATION (ABANDONED)
- FORCE MAIN (ABANDONED)
- FORCE MAIN CONVERTED TO GRAVITY SEWER

(X–X) (X) IMPROVEMENT IDENTIFICATION – SEE TABLE

IMPROVEMENT IDENTIFICATION

(1) ~~NEW LIFT STATION NO. 12 AND 4-INCH DISCHARGE FORCE MAIN~~
(2) ~~CLEANOUTS FOR 8-INCH FORCE MAIN ON S.R. 150~~
(3) ~~LIFT STATION NO. 14 & NO. 10 TELEMETRY AND 8-INCH SEWER~~
(4) ~~NEW 2-INCH SLIPLINE ON S.R. 150 FROM ROCKY POINT TO CRYSTAL DRIVE~~
(5) ~~NEW 8-INCH SEWER ON S.R. 150 FROM CRYSTAL DRIVE TO LIFT STATION NO. 11~~
(6) ~~NEW 8-INCH SEWER ON S.R. 150 FROM GOLF COURSE ROAD TO MH H-4~~
(7–16) NEW 15-INCH SEWER FROM MH A-47 TO MH A-12
(17) NEW 10-INCH FORCE MAIN FROM LCSD LIFT STATION NO. 1 TO MH F-27
(18) NEW 10-INCH SEWER FROM MH F-25 TO MH F-22
(19) ~~NEW 15-INCH SEWER FROM MH F-19 TO LIFT STATION NO. 5~~
(20) NEW PUMPS FOR LIFT STATION NO. 5 AND NEW 8-INCH AND 12-INCH DISCHARGE FORCE MAINS
(21) ~~LIFT STATION NO. 5 & NO. 4 TELEMETRY~~
(22) LIFT STATION NO. 7 EMERGENCY STORAGE
(23–29) NEW 15-INCH, 18-INCH, AND 21-INCH SEWER FROM MH E-21 TO MH E-1
(30) ~~NEW LIFT STATION NO. 2 AND 12-INCH DISCHARGE FORCE MAINS~~
(31) NEW 4-INCH, 6-INCH AND 8-INCH INVERTED SIPHONS
(32–39) NEW 24-INCH AND 27-INCH SEWER FROM MH C-25 TO PRIMARY WWTP
(40) ~~NEW 8-INCH SEWER FROM MH C-47 TO MH C-46~~
(41) CHELAN HILLS DIVISIONS 1 AND 2 SEWER IMPROVEMENTS
(42) NEW LIFT STATION NO. 10
(43) NEW 8-INCH SEWER ON GOLF COURSE ROAD FROM MH H-37
(44–48) NEW 15-INCH SEWER FROM MH A-9 TO LIFT STATION NO. 1
(49) ~~NEW 21-INCH SEWER FROM MH C-27 TO MH C-28~~
(50) NEW 18-INCH SEWER FROM MH C-68 TO MH C-78
(51) LIFT STATION NO. 1 CONVERSION TO SUBMERSIBLE PUMP LIFT STATION
(52) SECONDARY TREATMENT
(53) EMERGENCY CHLORINATION
(54) CENTRIFUGE
(55) AEROBIC DIGESTER
(56) INFLUENT SCREENING

(60) **WEBSTER GRINDER PUMPS**

LAKE CHELAN

LIFT STATION NO. 12 (PROPOSED)
LIFT STATION NO. 12 (ABANDONED)
TO BE ABANDONED
LIFT STATION NO. 2 (PROPOSED)
PRIMARY WASTEWATER TREATMENT PLANT
10" & 14" FM
8" & 10" FM
2 – 12" FM

CITY OF CHELAN
GENERAL SEWER PLAN
FIGURE 1
COLLECTION SYSTEM IMPROVEMENTS

Gray & Osborne, Inc.
CONSULTING ENGINEERS

\\GOSERVER3\DATA1\CHELAN\15045 GENERAL ENGINEERING\SEWER CIP UPDATE\FIGURE\FIG.DWG

Appendix E
District CIP

Lake Chelan Sewer District
2019 Capital Improvements Projects List
4/15/2020

CIP No.	Description	Purpose		Total Estimated Project Costs			LCSD Portion of Project Costs				Improvement Year (Cost Multiplier starting with 4% in 2020 to reflect estimates in 2018/2019 $) Only LCSD Portion of Costs Shown						
				Direct	Indirect	Total	%[1]	Direct	Indirect	Total	2020 (Yr. 1) 1.04	2021 (Yr. 2) 1.08	2022 (Yr. 3) 1.12	2023 (Yr. 4) 1.16	2024 (Yr. 5) 1.18	2025 - 2029 1.40	2030 - 2039 1.80
LCSD Projects																	
Collection System Projects																	
LS 01	LCSD L.S. No. 1 Improvements	Replace two pumps; replace pump control panel and telemetry panel; minor rehab		$ 206,000	$ 62,000	$ 268,000	100%	$ 206,000	$ 62,000	$ 268,000						$ 375,200	
LS 02	LCSD L.S. No. 2 Improvements	Replace two pumps; replace pump control panel and telemetry panel; minor rehab		$ 124,000	$ 38,000	$ 162,000	100%	$ 124,000	$ 38,000	$ 162,000						$ 226,800	
LS 03	LCSD L.S. No. 3 Improvements	Replace one pump; replace pump control panel and telemetry panel; minor rehab; over-pressure issue		$ 150,000	$ 45,000	$ 195,000	100%	$ 150,000	$ 45,000	$ 195,000							$ 351,000
LS 04	LCSD L.S. No. 4 Improvements	Replace one pump; replace pump control panel and telemetry panel; minor rehab		$ 98,000	$ 30,000	$ 128,000	100%	$ 98,000	$ 30,000	$ 128,000							$ 230,400
LS 05	Annual Device Replacement	Replace or upgrade items as necessary for O&M		$ 10,000	$ 3,000	$ 13,000	100%	$ 10,000	$ 3,000	$ 13,000	$ 13,520	$ 14,040	$ 14,560	$ 15,080	$ 15,340	$ 91,000	$ 234,000
CS 01	LCSD L.S. No. 1 - Forcemain	Replace and upsize aging 6-inch steel forcemain		$ 769,000	$ 283,000	$ 1,052,000	100%	$ 769,000	$ 283,000	$ 1,052,000						$ 1,472,800	
Planning Projects																	
None																	
		Totals		**$ 1,357,000**	**$ 461,000**	**$ 1,818,000**		**$ 1,357,000**	**$ 461,000**	**$ 1,818,000**	**$ 13,520**	**$ 14,040**	**$ 14,560**	**$ 15,080**	**$ 15,340**	**$ 2,165,800**	**$ 815,400**
City of Chelan Projects																	
Collection System Projects																	
18	MH F-25 to MH F-22	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 102,000	$ 26,000	$ 128,000	50%	$ 51,000	$ 13,000	$ 64,000				$ 74,240			
20	LS No. 5 Improvements	Future development per 2018 CIP by G&O; Cost updated by RH2	(noted as developer funded in CIP)	$ 1,599,000	$ 370,000	$ 1,969,000	50%	$ 799,500	$ 185,000	$ 984,500	$ 192,400	$ 863,460					
23	MH E-21 to MH E-8	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 91,000	$ 23,000	$ 114,000	21%	$ 19,110	$ 4,830	$ 23,940				$ 27,770			
24	MH E-8 to MH E-6	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 84,000	$ 21,000	$ 105,000	21%	$ 17,640	$ 4,410	$ 22,050				$ 25,578			
25	MH E-6 to MH E-5	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 47,000	$ 12,000	$ 59,000	21%	$ 9,870	$ 2,520	$ 12,390				$ 14,372			
26	MH E-5 to MH E-4	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 203,000	$ 51,000	$ 254,000	21%	$ 42,630	$ 10,710	$ 53,340				$ 61,874			
27	MH E-4 to MH E-3	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 84,000	$ 21,000	$ 105,000	21%	$ 17,640	$ 4,410	$ 22,050				$ 25,578			
28	MH E-3 to MH E-2	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 46,000	$ 12,000	$ 58,000	21%	$ 9,660	$ 2,520	$ 12,180				$ 14,129			
29	MH E-2 to MH E-1	Future development per 2018 CIP by G&O	(noted as developer funded in CIP)	$ 48,000	$ 12,000	$ 60,000	21%	$ 10,080	$ 2,520	$ 12,600				$ 14,616			
32	MH C-25 to MH C-26	Increase collection system capacity per 2018 CIP by G&O		$ 214,000	$ 54,000	$ 268,000	8%	$ 17,120	$ 4,320	$ 21,440					$ 25,299		
33	MH C-27 to MH C-28	Increase collection system capacity per 2018 CIP by G&O		$ 44,000	$ 11,000	$ 55,000	8%	$ 3,520	$ 880	$ 4,400					$ 5,192		
34	MH C-28 to MH C-61	Increase collection system capacity per 2018 CIP by G&O		$ 140,000	$ 35,000	$ 175,000	8%	$ 11,200	$ 2,800	$ 14,000					$ 16,520		
35	MH C-61 to MH C-73	Increase collection system capacity per 2018 CIP by G&O		$ 145,000	$ 37,000	$ 182,000	8%	$ 11,600	$ 2,960	$ 14,560					$ 17,181		
36	MH C-73 to MH C-74	Increase collection system capacity per 2018 CIP by G&O		$ 45,000	$ 12,000	$ 57,000	8%	$ 3,600	$ 960	$ 4,560					$ 5,381		
37	MH C-74 to MH C-75	Increase collection system capacity per 2018 CIP by G&O		$ 219,000	$ 55,000	$ 274,000	8%	$ 17,520	$ 4,400	$ 21,920					$ 25,866		
38	MH C-75 to MH C-76	Increase collection system capacity per 2018 CIP by G&O		$ 200,000	$ 50,000	$ 250,000	8%	$ 16,000	$ 4,000	$ 20,000					$ 23,600		
39	MH C-76 to Primary Plant	Increase collection system capacity per 2018 CIP by G&O		$ 49,000	$ 13,000	$ 62,000	8%	$ 3,920	$ 1,040	$ 4,960					$ 5,853		
59	Annual Pipe Replacement	Aging equipment replacement/redundancy per 2018 CIP by G&O		$ 187,000	$ 63,000	$ 250,000	8%	$ 14,960	$ 5,040	$ 20,000	$ 20,800	$ 21,600	$ 22,400	$ 23,200	$ 23,600	$ 140,000	$ 360,000
WWTP Projects																	
52A	RBC Media Replacement	Aging equipment replacement per 2018 CIP by G&O		$ 345,000	$ -	$ 345,000	5.5%	$ 18,975	$ -	$ 18,975	$ 19,734						
52B	RBC Media Replacement	Aging equipment replacement per 2018 CIP by G&O		$ 345,000	$ -	$ 345,000	5.5%	$ 18,975	$ -	$ 18,975		$ 20,493					
52C	RBC Media Replacement	Aging equipment replacement per 2018 CIP by G&O		$ 345,000	$ -	$ 345,000	5.5%	$ 18,975	$ -	$ 18,975			$ 21,252				
52D	RBC Media Replacement	Aging equipment replacement per 2018 CIP by G&O		$ 345,000	$ -	$ 345,000	5.5%	$ 18,975	$ -	$ 18,975				$ 22,011			
53	Emergency Chlorination	Redundancy per 2018 CIP by G&O		$ 136,000	$ 34,000	$ 170,000	5.5%	$ 7,480	$ 1,870	$ 9,350	$ 9,724						
54	Centrifuge	Increase capacity per 2018 CIP by G&O		$ 1,000,000	$ -	$ 1,000,000	5.5%	$ 55,000	$ -	$ 55,000				$ 63,800			
55	Aerobic Digester	Increase capacity per 2018 CIP by G&O		$ 871,000	$ 218,000	$ 1,089,000	5.5%	$ 47,905	$ 11,990	$ 59,895							$ 107,811
56	Influent Screening	Increase capacity per 2018 CIP by G&O		$ 500,000	$ -	$ 500,000	5.5%	$ 27,500	$ -	$ 27,500							$ 49,500
61	WWTP PLC Upgrade	Aging equipment replacement/redundancy per 2018 CIP by G&O		$ 162,300	$ 41,000	$ 203,300	5.5%	$ 8,927	$ 2,255	$ 11,182	$ 11,629						
62	Public Works Building	Aging equipment replacement/redundancy per 2018 CIP by G&O		$ 400,000	$ 50,000	$ 450,000	5.5%	$ 22,000	$ 2,750	$ 24,750	$ 25,740						
Planning Projects																	
57	GSP and WWTF Plan	Per 2018 CIP by G&O		$ -	$ 100,000	$ 100,000	5.5%	$ -	$ 5,500	$ 5,500	$ 5,720						
58	Odor Control Study	Per 2018 CIP by G&O		$ -	$ 40,000	$ 40,000	5.5%	$ -	$ 2,200	$ 2,200	$ 2,288						
		Totals		**$ 7,996,300**	**$ 1,361,000**	**$ 9,357,300**		**$ 1,321,282**	**$ 282,885**	**$ 1,604,167**	**$ 288,035**	**$ 905,553**	**$ 43,652**	**$ 367,169**	**$ 148,491**	**$ 140,000**	**$ 517,311**
			LCSD Total CIP Costs					**$ 2,678,282**	**$ 743,885**	**$ 3,422,167**	**$ 301,555**	**$ 919,593**	**$ 58,212**	**$ 382,249**	**$ 163,831**	**$ 2,305,800**	**$ 1,332,711**

Notes:

1. Portions of total WWTP flow volumes are: 5.5% LCSD, ~30% LCRD, ~65% City. Allocation throughout collection system projects is approximated based on proportional flow volumes by capital project location.
   LCSD ~5% of capital improvements cost at old Primary plant and downstream to WWTP
   LCSD ~8% of capital improvements cost between Lift Station #2 discharge and old Primary plant
   LCSD ~50% of capital improvements cost between LCSD and lift station #2

Appendix F

FCS GROUP Financial Analyses

FCS GROUP
Solutions-Oriented Consulting

| Memorandum

To: Don Popoff, RH2 **Date:** June 24, 2020
From: Andy Baker, Project Manager
RE Lake Chelan Sewer District – Sewer Utility Rate Study

FCS Group, Inc. was engaged as a subconsultant to RH2 Engineering, Inc. by Lake Chelan Sewer District (the "District") to conduct a Sewer Utility Rate Study. The scope of work for this study includes an assessment of the District's ongoing rate requirements, as well as scenarios around options for meeting these ongoing rate revenue requirements. This memorandum summarizes the analysis, projections, and recommendations developed in the course of this Study.

BACKGROUND

LAKE CHELAN SEWER DISTRICT

Lake Chelan Sewer District is a special purpose district authorized under the Revised Code of Washington, Title 57. It serves approximately 300 connections in Chelan County, partially within the urban growth boundary of the City of Chelan. The District provides sewer collection service and conveys wastewater to the City of Chelan for treatment through a combination of gravity and force mains. The District contracts with the City of Chelan to provide operations, maintenance, and administrative activities. The District pays a treatment charge to the City based on volume of wastewater and pays for a proportionate share of City capital projects from which it benefits, or which the City conducts on its behalf.

Charges for Services have historically made up 87 percent of the District's operating revenue. The District charges a uniform rate structure to its ratepayers, based on a monthly charge of $45.00 per Equivalent Residential Unit (ERU). The District's customer base, as of year-end 2018 billing data, is shown in Table 1.

Table 1. LCSD Customer Base

Customer Type	Number of Accounts	Number of ERUs
Residential	264	263.3
Multifamily	22	49.1
Commercial	9	15.6
Total	**295**	**328**

Based on 2018 billing data. Residential Customers with greater than 1 ERU assumed to be Multifamily.

The District has historically adjusted rates on an infrequent basis. Prior to this Study, the District previously adjusted rates in July 2014, from $40.00 per ERU to the current $45.00 per ERU. Monthly rates were previously adjusted to $40.00 per ERU in 1997. The rate history for the District is presented in Table 2.

Table 2. LCSD Rate History

	1997 - July 2014	July 2014 - Current
Monthly Rate per ERU	$ 40.00	$ 45.00

In addition to the monthly sewer service utility rate, District customers pay an additional assessment to the County as repayment for a Department of Ecology loan. Annual debt service on this loan is $139,000 per year, and this obligation will be retired in 2022. This assessment and debt obligation are separate from the operating revenues and expenditures of the District, and not shown in the rate projections and budgets in this study. There is approximately $200,000 held in a debt service fund which will be remitted to the District once the debt obligation is retired in 2022, and will be available for the general purposes of the District.

The District's annual capital expenditures and Intergovernmental debt has averaged approximately $92,500 per year for the 2015-2020 historical period. However, this level of capital spending has not kept pace with the system reinvestment needs of the District, and there are significant projected capital projects needed in coming years. The projected capital improvement needs and funding sources are discussed in the Financial Projection Scenarios section of this memorandum.

FINANCIAL PROJECTION SCENARIOS

Financial Projection models were developed to evaluate the alternative approaches to addressing the revenue requirements of the District.

STATUS QUO FINANCIAL CONDITION

Assumptions and Historical Revenue Requirements

The Status Quo Financial Projections are based on the District's 2020 operating budget, the District's Capital Improvement Plan developed by RH2, and the financial projections developed in the 2018 City of Chelan rate study. Cost Escalation assumptions are summarized on Table 3.

Table 3. Projection Assumptions

Cost Component	Assumption	Comments
General Cost Inflation	2.00%	Consistent with City of Chelan Rate Study
Construction Cost Inflation	4.00%	Based on RH2 CIP Projection
Labor Cost Inflation	2.00%	Consistent with City of Chelan Rate Study
Benefit Cost Inflation	6.00%	Consistent with City of Chelan Rate Study
Investment Interest	1.00%	Based on 2015-2018 Performance
State Excise	3.852%	
Treatment Share	31.745%	Based on 2018

The District's historical and budgeted revenue requirements are summarized in Table 4.

Table 4. LCSD Historical and Budget Revenue Requirements

	2015	2016	2017	2018	Budget 2019	Budget 2020
Operating Revenues						
Charges for Services	$ 163,987	$ 167,354	$ 180,106	$ 182,223	$ 180,300	$ 180,250
Miscellaneous Revenues	17,786	27,813	36,513	47,028	16,000	18,000
Subtotal: Operating Revenues	**$ 181,774**	**$ 195,167**	**$ 216,619**	**$ 229,250**	**$ 196,300**	**$ 198,250**
Operating Expenses						
Salaries & Wages	$ 3,657	$ 4,052	$ 3,929	$ 4,077	$ 4,600	$ 4,600
Supplies	6,985	5,967	2,930	1,567	6,500	13,000
Other Services	98,447	105,171	77,307	80,914	133,000	174,939
Subtotal: Operating Expenses	**$ 109,089**	**$ 115,190**	**$ 84,165**	**$ 86,558**	**$ 144,100**	**$ 192,539**
Net Operating Cash Flow	$ 72,685	$ 79,977	$ 132,454	$ 142,693	$ 52,200	$ 5,711
Intergovernmental (Debt Payments)	$ 60,411	$ 60,121	$ 59,853	$ 59,586	$ 16,620	$ 16,600 [(1)]
Capital Projects	0	49,784	54,845	8,823	75,000	93,261
Net Cash Flow	**$ 12,274**	**$ (29,927)**	**$ 17,755**	**$ 74,284**	**$ (39,420)**	**$ (104,150)**

1: 2020 Budget for Debt Payment does not include LCSD share of City LS5 Bond Repayment, estimated at $14,400.

PROJECTED FINANCIAL CONDITIONS AND SCENARIOS

Fiscal Policies

The basic framework for evaluating utility revenue needs consists of a set of financial policies. For purposes of this Study, FCS GROUP evaluated the existing practices of the District and made projections based on those practices.

It is the existing policy of the District to maintain a single reserve fund. It has historically maintained a cash balance between $300,000 and $400,000. Based on discussion with the District, they intend to maintain a similar level of cash-on-hand, with an objective that any extraordinary uses of these cash reserves be replenished within two years.

Reserves

While industry standards provide guidance for operating reserves and capital reserves, because the District operates with a single combined fund, we have evaluated the District's financial performance relative to Total Cash on Hand. In evaluating the reserve levels of a combined fund, it is essential to consider that the fund balance serves multiple purposes commonly considered separately for Operating Reserves and Capital Reserves.

For Sewer utilities, general industry practice recommends an operating reserve level between 30 days and 60 days of operating expenses, with the intent being to provide a liquidity cushion, protecting the utility from the risk of short-term variations in revenue collection or expense.

Capital Reserves are intended to maintain funds on hand to cover unplanned rehabilitation or replacement of assets which wear out before the expected useful life, to levelize fluctuations in cash funding of capital projects, and to set aside funds for major capital improvements in the future. They are not intended to guard against catastrophic system failure or extreme acts of nature.

Recommendation: Maintain a minimum reserve of between $300,000 and $400,000 based on anticipated emergency maintenance needs. This threshold should be revisited periodically to ensure it will meet the needs for which it is intended.

Debt Service Coverage

Debt service coverage is typically a requirement associated with revenue bonds and some State loans, and it is an important benchmark to measure the riskiness of the utility's capital funding plans. The District does not issue bonds, and, as discussed above, relies on the City of Chelan for operating assessments for large capital project funding. Based on discussion with the City of Chelan, the District is not required to maintain a debt service coverage covenant associated with its operating assessments.

Recommendation: Maintain a minimum Debt Service Coverage ratio of 1.00.

Rate-Funded System Reinvestment

The concept of system reinvestment funding entails funding long-term infrastructure replacement needs through a regular and predictable rate provision. A system reinvestment funding program can be structured to take into account the defined funding source (rates), accumulation of funds when funding exceeds near-term needs, and augmentation of funds (e.g. through debt) when replacement needs exceed available cash resources.

Determining an appropriate funding level for ongoing rate-funded system reinvestment is a challenge. Many municipal utilities rely on estimates based on depreciation expense or replacement cost estimates as the basis for establishing targets for Rate-Funded System Reinvestment, or a comprehensive Asset Management Plan. Based on the information available, the District has an annual device replacement program with an identified minimum funding level of $13,500 per year.

Recommendation: Fund the Annual Device Replacement Program as a minimum Rate-Funded System Reinvestment target. This is approximately $13,500 per year in current dollars. This target should be revisited periodically in order to assess its sufficiency to meet ongoing need.

Capital Improvement Needs

The District's Capital Improvement Plan is summarized in Table 5. It is grouped in two categories:

- LCSD Projects: these projects are for LCSD-owned assets.
- City of Chelan Projects: these represent the allocated share of the cost of capital projects constructed by the City of Chelan that the District is responsible for under the terms of their service contract.

Table 5. LCSD Capital Improvement Plan

Description	2020	2021	2022	2023	2024	2025-2029	2030-2039
LCSD Projects	$ 13,520	$ 14,040	$ 14,560	$ 15,080	$ 15,340	$ 2,165,800	$ 815,400
City Collection System	213,200	885,060	22,400	281,357	148,492	140,000	360,000
City WWTP	66,827	20,493	21,252	85,811	-	-	157,311
City Planning	8,008	-	-	-	-	-	-
Total CIP	**$ 301,555**	**$ 919,593**	**$ 58,212**	**$ 382,248**	**$ 163,832**	**$ 2,305,800**	**$ 1,332,711**

Due to the scale of the District and its relationship with the City of Chelan, the City has historically used its bonding capacity to finance the construction of large District projects. The District then pays an Operating Assessment to the City for its proportional share of debt service. The District has one outstanding Operating Assessment for Phase II Construction costs, in the amount of $16,500 per year, through 2032.

Based on discussion with the District and City, it is assumed that the following major projects will be funded through a City debt issuance and associated Operating Assessment:

- City Lift Station No. 5 Line Improvement. District share of cost is a total of $1,055,860 in 2020 and 2021.
- Upgrade sewer from MH E-21 to MH E-1, MH C-25 to WWTP. District share of cost is $308,809 in 2023 and 2024.
- District Lift Station No. 1 Forcemain Replacement. District cost is $1,472,800 in 2025.
- District Lift Station No. 1 & No. 2 Improvements. District cost is $602,000 in 2025-2029.
- District Lift Station No. 3 & No. 4 Improvements. District cost is $581,400 in 2030-2039.

For the City Lift Station No. 5 Line Improvements, financing assumptions are based on the anticipated bond terms as of April 2020. For later projects, the assumptions are based on the City of Chelan's Water Rate Study. These assumptions are summarized in Table 6.

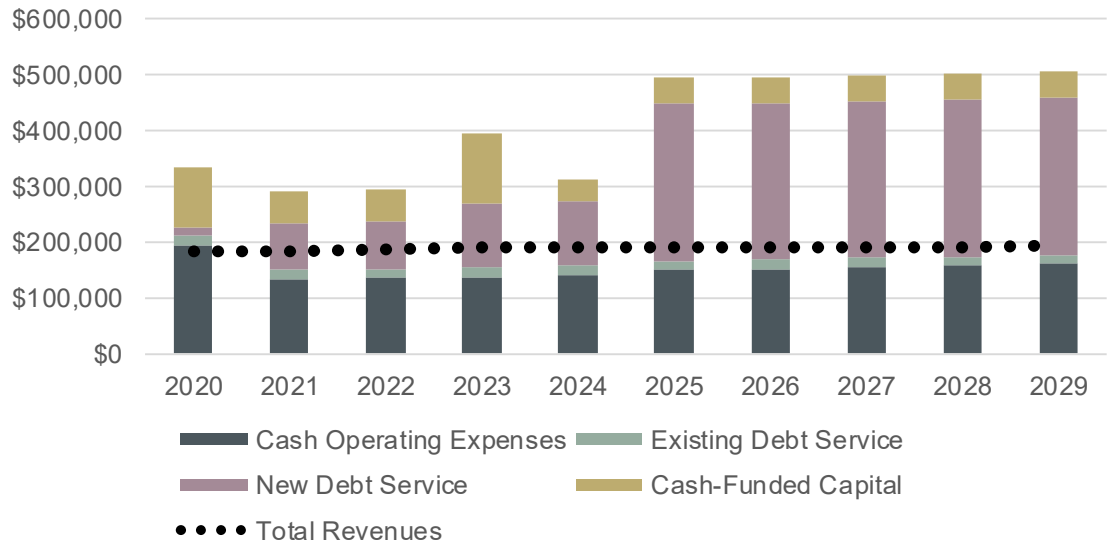
Table 6. City Bonding Assumptions

	2020 Bond	Future Assumptions
Term (years)	15	20
Interest-Only	1 year	0 years
Interest Cost	1.35%	5.00%
Issuance Cost	1.20%	0.00%

Revenue Requirement Projection

The Revenue Requirement projection was developed for the 2020 through 2029 time period. While the District's financial plan extends to 2039, the degree of certainty in timing of projects is significantly lower after 2029. The Revenue Requirement consists of the projected operating and maintenance expenses, rate-funded capital, and debt service. Figure 1 presents a summary of the overall revenue requirements for the study period.

Figure 1. LCSD Revenue Requirement



Summary of the Revenue Requirement:

- Current rate revenue levels are insufficient to meet existing financial obligations in 2020, and remain insufficient throughout the study period.
- The deficiency is a result of the following costs, which were not included in the District's 2020 Budget:
  - » New debt service obligations associated with the City Lift Station No. 5 Line Improvement project.

Rate Recommendations

In evaluating the need for rate adjustments to address the District's revenue requirements, two key factors were identified:

- In the immediate term, a rate adjustment is necessary to address minimum fund balance requirements and to raise operating revenues to the level needed to pay for the operating assessment for the City Lift Station 5 (LS5) Project.
- In the longer term, further rate adjustments will be necessary to pay for the operating assessment for the District Lift Station 1 (LS1) Forcemain Project.

There are two general strategies to making major rate adjustments. A Periodized or Variable rate strategy makes fewer, but larger rate adjustments. A Levelized rate strategy makes consistent rate adjustments, relying on more variable reserve balances to make up differences in rate revenue needs in any one year. Either approach can meet utility needs given sufficient reserves, and should be selected based on the policy preferences, risk tolerance, and rate tolerance of the individual utility.

Based on direction from the District's Board, a Revised Rate Scenario was developed which balances the rate increases between these two bookend approaches.

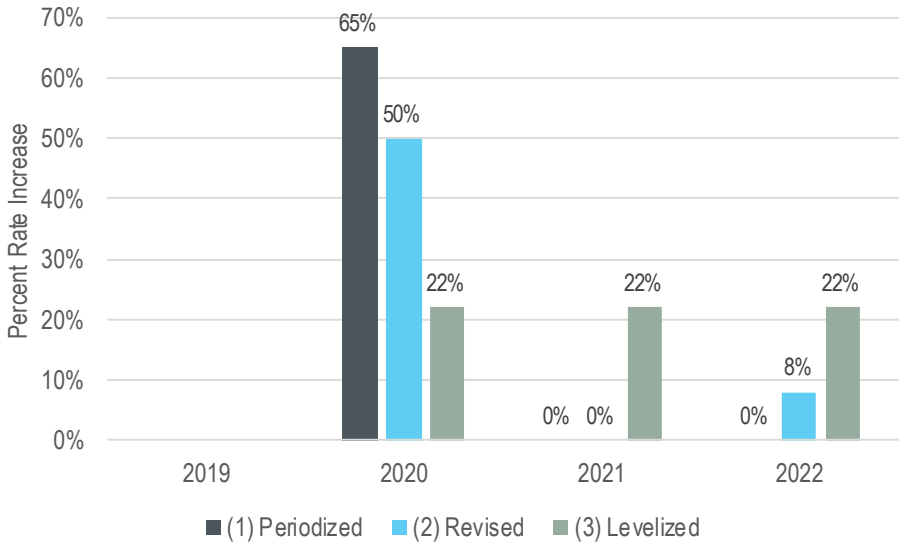
Short-Term Rate Alternatives (2020 – 2022)

In addressing short-term needs, the District has less flexibility, because of the significant pressure that current-year capital projects place on its existing reserves. A Periodized rate strategy calls for a single rate adjustment of 65 percent, effective August 1, 2020, to address both the City LS5 Project operating assessment and to rebuild reserves to the target level of $300,000 - $400,000. A Levelized rate strategy would require at least three years of 22 percent rate increases, but would result in lower reserve levels, creating a risk for the District should unanticipated emergency maintenance projects arise.

Under the Board-directed Revised Rate Scenario, a 50 percent rate adjustment, effective August 1, 2020, will address the immediate cash-flow deficiency of the District, allowing the subsequent 8 percent per year rate adjustments to begin January 1, 2022, rather than additional increases in 2021.

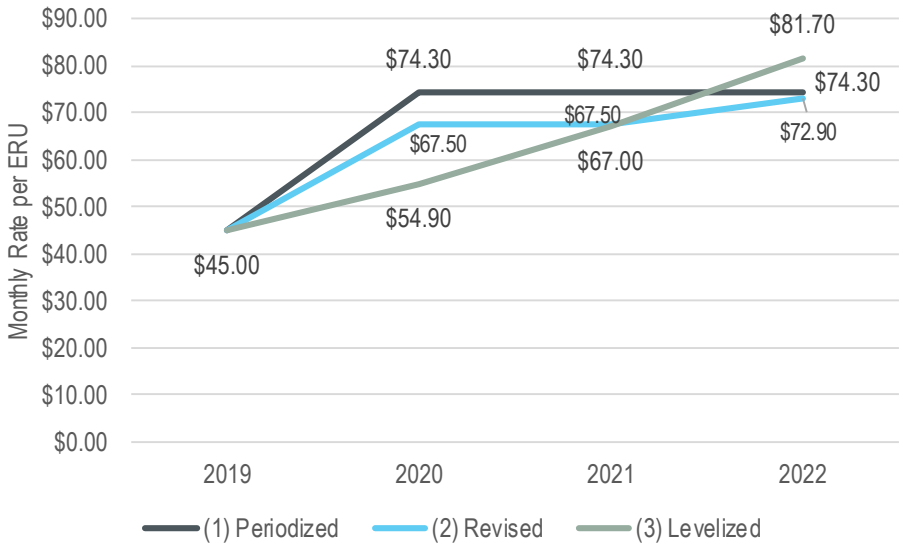
While mid-year rate increases can be challenging, the extent of deficiencies in the revenue requirement projection requires their consideration. Based on discussion with the District, rate alternatives were developed with an assumed effective date of August 1, 2020. Subsequent rate increases are assumed to be effective on January 1 of each year. The short-term rate alternatives and resulting reserve levels are presented in Figures 2, 3, and 4.

Figure 2. Short-Term Rate Increase Alternatives



A single front-loaded increase raises rate revenues to the level they need to be to meet the District's short-term revenue requirements immediately. The levelized approach will temper this impact, but the overall level of rates necessary is higher due to losing the compounding revenue in 2020 and 2021. The Revised scenario achieves a lower outcome in 2022 by relying more heavily on use of reserves in 2020 and 2021. This outcome is shown in Figure 3.

Figure 3. Short-Term Monthly Rate Alternatives



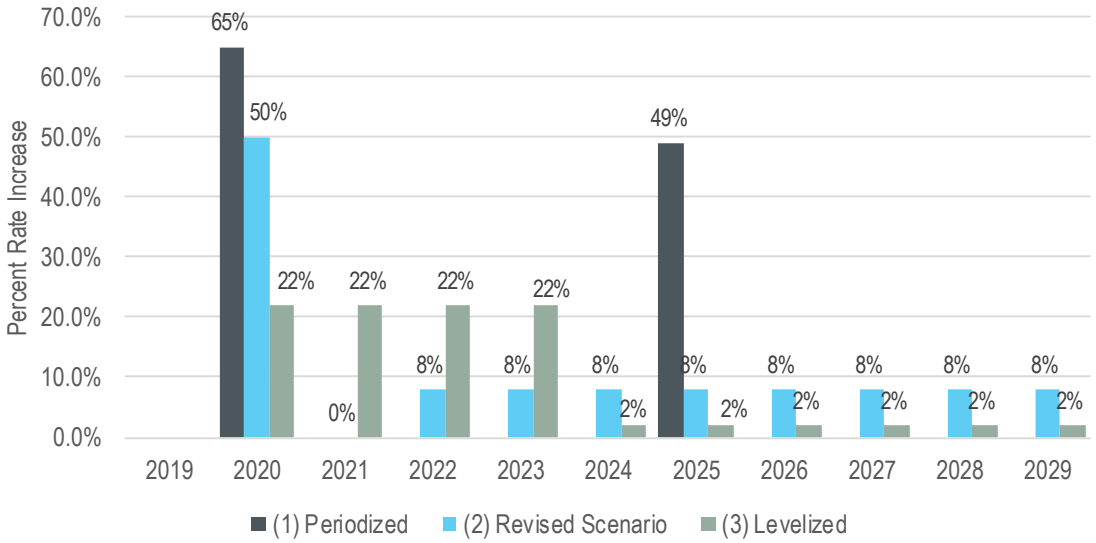
Under each of these scenarios the operating reserves will be maintained at the full target of between $300,000 and $400,000. Reserve levels are lower in all short-term years under the levelized alternative, but remain within the target.

Long-Term Rate Alternatives (2022 – 2029)

In considering the longer term revenue requirements, the major variable is the timing of the District LS1 Forcemain Project. Based on the age and condition of the existing forcemain, replacement is recommended by RH2 within the current planning period, with a likely range of 2025 to 2029, but an exact year for replacement has not yet been identified. For financial modeling purposes, we have assumed that the project will be conducted in 2025. As with the short-term needs, the District can either raise rates a single time, in whichever year the District LS1 Forcemain Project is ultimately required, or it can begin raising rates following a levelized strategy, targeting a 2025 construction date. A Periodized rate strategy calls for a single rate adjustment of 49 percent. There are two possible Levelized strategies, depending on how the Short Term rate adjustment is addressed. These three alternatives and resulting reserve levels are presented in Figures 4, 5, and 6, and Table 7.

Under the Board-directed 'Revised' alternative, the short-term rate needs would be addressed through the 50 percent increase in August 1, 2020, allowing the subsequent series of 8 percent increases to wait until January 1, 2022, rather than beginning five months after the major front-loaded increase.

Figure 4. Long-Term Rate Increase Alternatives



As with the short-term alternatives, both levelized alternatives result in a higher long term monthly rate, due to the compounding effect of revenue.

Figure 5. Long-Term Monthly Rate Alternatives

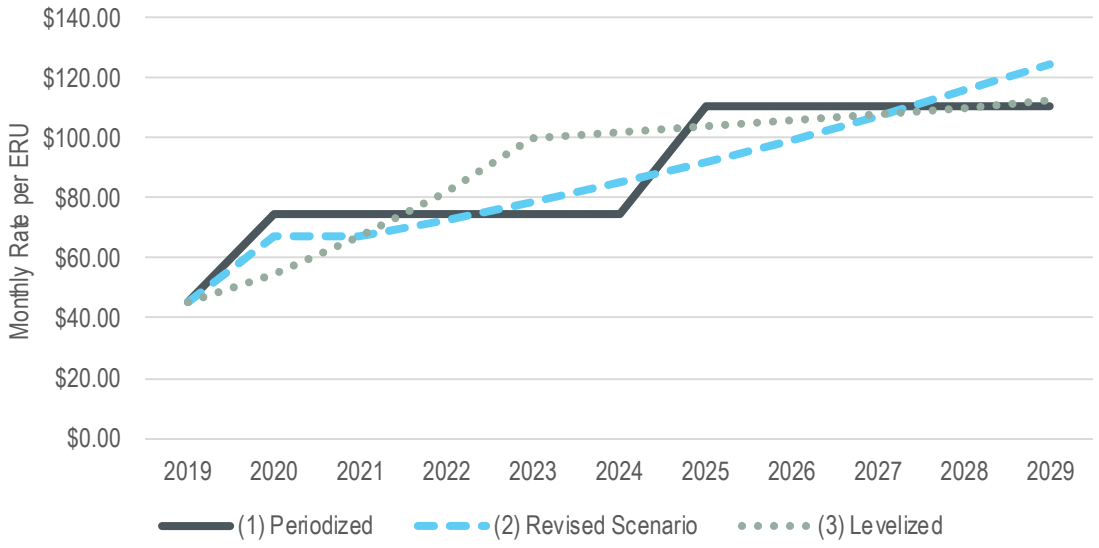


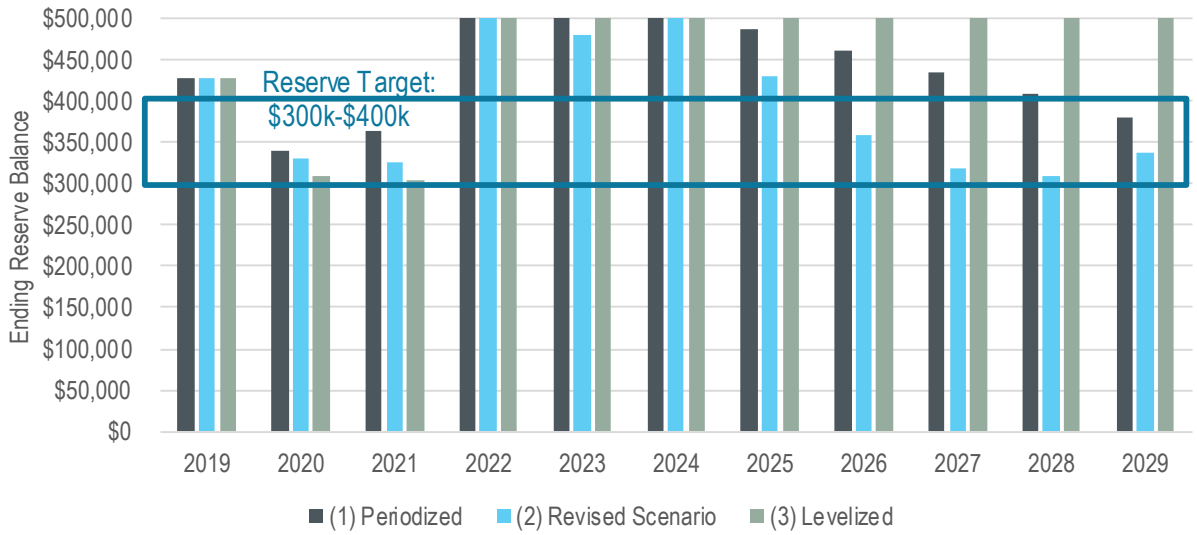
Table 7. Long-Term Monthly Rate Alternatives

	2020	2021	2022	2023	2024
(1) Periodized	$74.30	$74.30	$74.30	$74.30	$74.30
(2) Revised Scenario	$67.50	$67.50	$72.90	$78.70	$85.00
(3) Levelized	$54.90	$67.00	$81.70	$99.70	$101.70

	2025	2026	2027	2028	2029
(1) Periodized	$110.70	$110.70	$110.70	$110.70	$110.70
(2) Revised Scenario	$91.80	$99.10	$107.00	$115.60	$124.80
(3) Levelized	$103.70	$105.80	$107.90	$110.10	$112.30

The long term reserve levels meet or exceed the reserve target under all three scenarios. The levelized approach spenpds more years exceeding the overall reserve target due to the need to build up reserves to maintain a levelized rate adjustment. Of the three options, the Revised Scenario minimizes the number of years exceeding the reserve target.

Figure 6. Long-Term Reserve Levels



FINDINGS AND CONCLUSIONS

The findings of the financial analysis indicate there is an immediate short-term need for the rate adjustments by the District to address its revenue requirement deficiency. Long term rate are driven by the District's capital needs, most significantly its Lift Station 1 Forcemain project. The timing of this project is critical to the long term rate scenarios.

Given these findings, the District should proceed with addressing its capital needs under the existing status quo. The rate alternatives include short term and long term options:

- Periodized: a 65 percent increase, effective August 1, 2020, followed by a 49 percent increase, effective January 1, 2025.
- Revised: a 50 percent increase, effective August 1, 2020, followed by 8 percent increases annually, beginning January 1, 2022, through 2029.

- Levelized: Three 22 percent increases, effective August 1, 2020, January 1, 2021, and January 1, 2022. Followed by 2 percent increases annually, beginning January 1, 2023, through 2029.

It is important to note that these Rate Scenarios represent the best available information as of June 2020. Our recommendation is that the District adopt the proposed rate increases, but that in each budget year the rate adjustments for 2022 and beyond be evaluated after consideration of the District's operating and capital needs at that time, and reflecting findings from the considerations for future study described below.

A full description of each alternative is included in the Projected Financial Conditions and Scenarios section.

CONSIDERATIONS FOR FUTURE STUDY

There are a number of areas of consideration for future study by the District, pertaining both to its overall financial management and the specifics of its rate strategy.

- Identifying the exact year in which the District LS1 Forcemain project is needed will allow better rate planning around any levelized rate strategy.
- Developing an asset management approach and comprehensive condition assessments of existing assets will better inform the level of reserves necessary to manage the risk of emergency projects, as well as guiding a long term plan for system reinvestment.
- The District should consider separating its Operating and Capital reserves into separate funds to better manage reserves relative to specific capital spending initiatives.
- The District has a scope of work with its consultant team to evaluate two additional areas relevant to the District's financial plan:
  - Evaluating the determination of Equivalent Residential Units for existing and future ratepayers to ensure that it is consistent with the impact on the District's capacity, and
  - Evaluating the District's General Facilities Charges to ensure that the proportional cost of growth is appropriately reflected in the District's fees.