



Civil & Sanitary Consultants

MEMORANDUM

Date: 4/15/21 Job# 8934

To: Bonner Beuhler, General Manager

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Company: Homestead Valley Sanitary District

Re: Long Range CIP Plan Update: FY 2021 – 2042

Per your request we have reviewed many historical records of the Homestead Valley Sanitary District (HVSD) cleaning, CCTV (Closed Circuit Television Video inspection) project data and reports dating back several decades, along with past capital improvement projects and spot repairs, and the Hotspot List to determine the overall age, condition and rehabilitation needs of the HVSD sewer system.

BACKGROUND

The past CCTV projects have inspected accessible pipelines and generated electronic database information which has been coordinated and integrated with the HVSD GIS (electronic) System Maps. See Figure 1. The pipe footage, material, and condition comment statistics from these sources, along with cleaning footage, Hotspot records and Roto Rooter work orders are used by the district to determine maintenance frequency and if the pipe should be prioritized for repair or rehabilitation. Additionally, the District actively re-evaluates all the sewers targeted as the worst pipes (hot-spots) for spot repairs or complete rehabilitation to reduce the maintenance requirements. The District has performed smoke testing in the past with some benefits of discovered rainwater infiltration points.

We have found that about 95% of the original District gravity sewer were Vitrified Clay Pipe with poor or non-existent gaskets subject to root intrusions, leaks and cracks, while the remaining ~4% was Ductile Iron Pipe, Steel Pipe and less than ~1% was ACP (Asbestos Concrete Pipe). There are over 500 pipe segments totaling over 12 miles of sewer pipes, with a similar number of rod inlets (RHs) and maintenance ports (MHs). See Figure 2. Additionally, due to the rural steep hill topography of the District there are 17 creek crossings requiring extra pipe support and protection. See Table 1. Also, HVSD has more length of pipe per household than that of a traditional block-plan development. With installation of most of the District sewer pipes taking place between ~1948 and about 1960, the average age of the existing infrastructure is about 65 years old. Up to the mid 2000's the district mostly operated on a cleaning program, only making sewer repairs when specific problems presented themselves. Regulatory changes in 2006, 2009, and 2013, and significant State and federal enforcement requirements have required a more detailed inspection program with a proactive rehabilitation program to reduce possible sewer spills and rain/ground water inflow and infiltration (I&I) into the sewer system which overwhelms the treatment system at SASM.

We have estimated present value for all pipe, manhole and other facilities in the district for current replacement cost, with tiered for pipe and other facility sizes. HVSD has a significant cost savings advantage compared with most of the neighboring sanitary districts and towns in that it does not have any pump stations to move sewage, rather all wastewater flow leaves the District via gravity pipelines. These values along with combine to a present value of District Sewer Assets in almost \$34M. Since 2009 HVSD had maintained a steady capital rehabilitation plan and has rehabilitated about 63% of the District so far. See Table 1. This CIP program has been steadily increasing the project sizes with a goal of cost-effective sewer management with maximum protection of the environment.

CIP LONG RANGE

It a State mandated requirement in conjunction with the District Sewer System Management Plan (SSMP), that each sanitary agency in the state develop and follow a Capital Improvement Plan (CIP) which is supported and paid for by rates collected from the sanitary district customers. Annual system reviews of infrastructure condition and maintenance records are to be used to advance and update the plan priorities.

We are recommending a target for HVSD of maximum facility age of approximately 100 years. This would be the age of oldest (longest service life) facility (pipe or manhole) when it is finally replaced. Not many pipes were upgraded in the first 50 years of service.

Remaining projects are estimated to be \$9.8M to meet the 100 year life cycle goal. See Table 2. With this target, a capital investment of between approximately 1.0%-1.8% annually from inception if replacements had started immediately in 1949. Targeting \$450,000 annual CIP for remaining work would produce a replacement rate of 4.7%/year, annually, considering the existing ages of the system. Looking forward this would complete remaining projects, considering the existing ages of the system, and engineering construction cost index increases in the near term. This translates into a replacement a goal of 1,200 – 2,000 feet of pipe per year plus a creek crossing repair every other year for the next approximately 21-25 years to complete the remaining facility rehabilitation, before the cycle starts over again.

Planning for emergency repairs and rainy-day funds (also called Sewer Reserve Funds) and also critical for sewer Special Districts which receive funds only annually based on property tax collection. For years where larger projects are anticipated and for financial protection against emergencies, we recommend additional CIP and lateral infiltration research funds be placed into Sewer Reserves, with a minimum of 1/2 - 1/3 the annual CIP project budget target as a reserve minimum of \$350,000, and a recommended maximum of about 3 and 1/2 times the CIP budget target project, or approximately \$1.5M in 2021 dollars, (amounts to be inflation adjusted over time.) These targets CIP reserve amounts are to be considered separate from emergency and operation reserves. Other factors such as capital expenditures related to sewer treatment and maintenance costs at SASM need to be analyzed and may significantly increase these Max/Min. levels of reserve cash recommendations for consideration by the District when setting a reserve policy.

MAINTAINING ANNUAL CLEANING, CCTV and SPOT REPAIRS

Sewer pipe maintenance and inspection of pipes falls into three categories and must be considered alongside a CIP program. The First goal is to maintain the older pipes to keep them free of roots and debris to ensure they can function properly until the time by which it is rehabilitated. Second is to take closer inspection of problem areas and areas where conditions of pipes worsen to determine if a spot repair is needed to immediately prevent a spill or to make the pipe last until the year in which it is expected to be upgraded. And Third, ensure the new pipes remain free of debris and be sure soil movement has not caused any pipe segments to separate.

SUMMARY

It is typical to budget about 10% of the average CIP Program for Spot Repairs and additional 5% for CCTV inspections which would be about \$45,000 and \$25,000 respectively, annually. Direct costs of the cleaning program was not reviewed by our firm at this time, but is expected to gradually reduce over time as fewer original pipes remain in the District as the CIP progresses rehabilitation of pipes. Additional spot repairs and CCTV work can both be in association with annual CIP projects, or on a case by case need basis. Once pipes are rehabilitated the planned (and State recommended) continued cleaning rate for the District would be to complete District wide cleaning approximately every 5 years, targeting an average sewer improvement project (SIP) size of about \$450,000 per year. To allow for continual assessment and re-prioritization, along with unique concerns and possible changes of existing pipes, Staff would annually present the Board of Directors with an updated 5 year CIP for annual budget planning and annual project selection.

TRANSMITTED WITH THIS MEMO: Sketch 01

- For approval** For your use As requested
 For review and comment Returning prints on loan to us

Other: SEE Attachments

Signed: Pippin Cavagnaro, PE 4/15/2021



ATTACHMENTS:

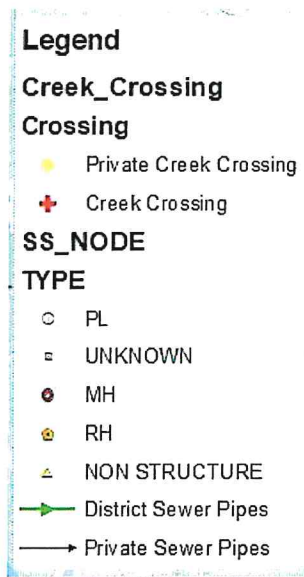
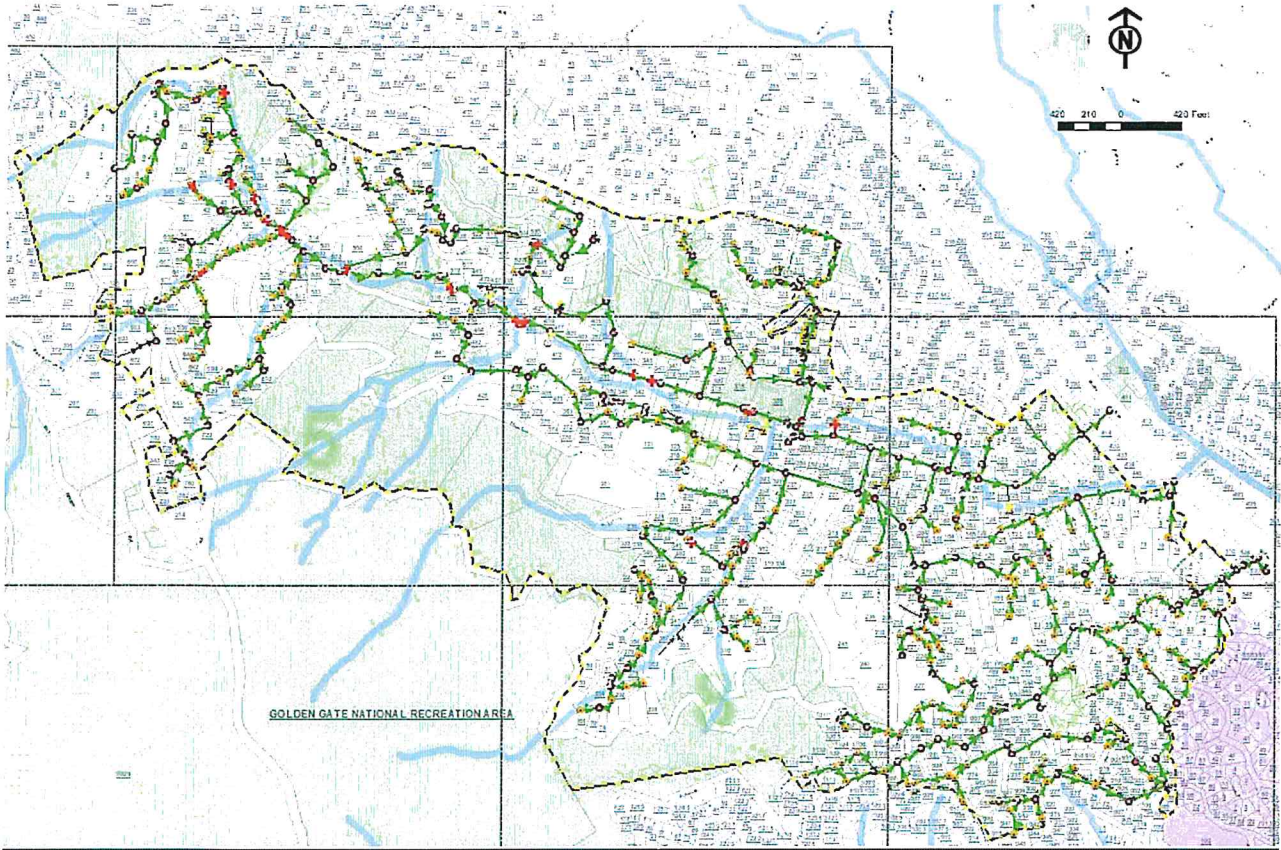


Figure 1: HVSD System Map showing pipe segments, maintenance ports, creek crossings for District sewers. Some private pipes are only noted occasionally for reference, and the District does not maintain private facilities.

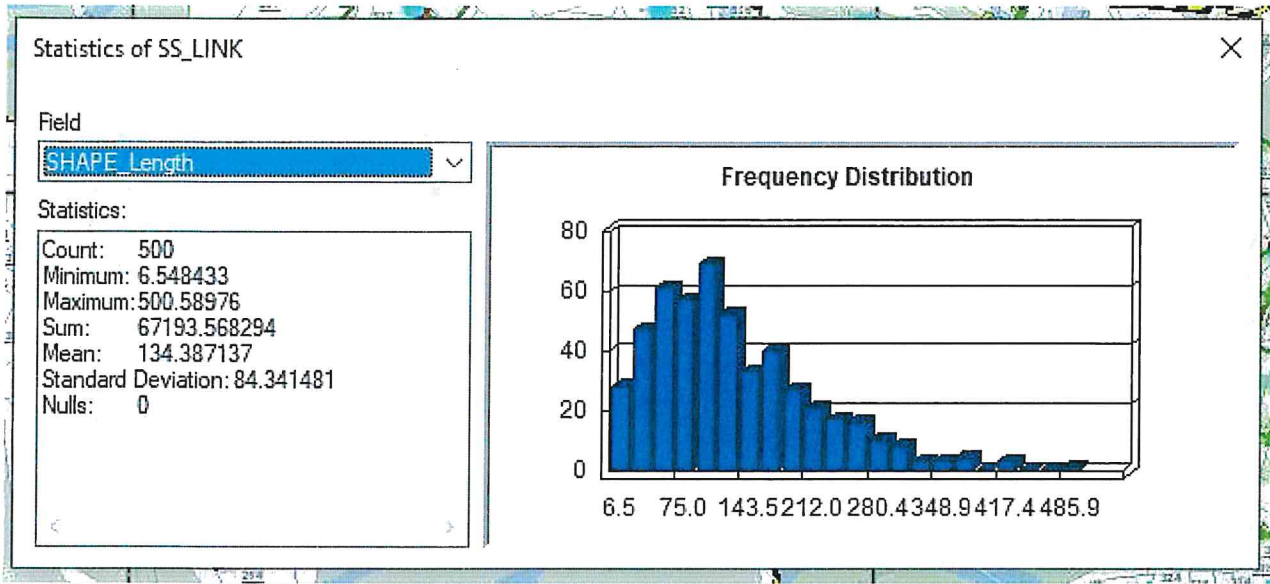


Figure 2: HVSD has shorter than average pipe segments with a Mean of about 135 feet long, compared to regular block neighborhoods with 300 foot pipe segments. This translates to more maintenance ports, rodholes and manholes per mile of sewer than the average sanitary system.

Homestead Valley Sanitary District Facility Statistics				
Pipe Length	Mi	Ft	Count	
Total Segments	12.79	67,543	500	Est Pipe Segments
Manholes			230	Est MH count
Rodholes			259	Est RH count
Tee Connections			5	Tees/wyes on main
Creek Crossings (large)			5	Large Crossings
Creek Crossings (small)			12	Small Crossings
Segments VCP ~#				Est Segments VCP + other
			264	(original)
Segments plastic ~#			236	Est Segments replaced
% segments replaced by 2013		-31,880	47.2%	% new as of 2013
% segments replaced by 2020		-42,327	62.7%	% new as of 2020
Footage Pipes Remaining to replace		25,216	37.3%	% to replace by 2042

Table 1: HVSD has over 12 miles of pipe for ~ 2000 population, this is higher than typical compared with CA state or rev average.

Homestead Valley Sanitary District Long Range CIP Summary

Remaining 10-14" Pipe to rehabilitate:	\$840,000	
Remaining 6-8" pipe to rehabilitate:	\$8,170,854	(include RHs in ft. price)
Manhole Reconnects	\$107,238	
Crossings, large and small remaining	\$510,000	
Remaining Rehab Estimates	\$9,628,092	2021-2042
CIP at 2021		
dollars	\$450,000	CIP \$/Year
Years for Repair cycle	21	Years

Table 2: HVSD has had success with pipe bursting as a primary method of rehabilitation which has offered some savings particularly on Manhole and Rodhole structures compared to open trenching. Possible open trench segments may cost more than the average pipe burst planned projects.