

To: Board of Directors
Bow Mar Water and Sanitation District

From: Cynthia Lane

CC: Ty Holman, Haynie & Co.
Scott Hand, Platte Canyon WSD

Date: September 8, 2022

Subject: Capital Improvement Plan for Water & Sewer Infrastructure

Water Projects

Based on the previously accepted criteria for determining the need for water main replacements in the Bow Mar Water and Sanitation District, and pursuant to an extensive review of all remaining unprotected cast iron pipe water mains not yet replaced, five (5) water main replacement projects are proposed through 2037.

The priority and schedule for pipe replacements continues to be heavily weighted toward the number of pipe failures (main breaks) and water quality concerns. However, other factors such as hydraulic adequacy, age of pipe, potential property damage, and repair costs are also considered.

The total capital improvement costs for the proposed water main replacement projects equals \$4,165,076. For financial planning purposes, the replacements are scheduled to begin in 2023 and then occur every third year thereafter.

Sewer Projects

This year, an evaluation of the district's wastewater collection system was completed using the Pipeline Assessment Certification Program (PACP). This is a program that provides for proper and consistent assessment condition coding of pipelines, laterals and manholes. As a result of this assessment, four (4) sewer rehabilitation projects are proposed in the next ten years.

The goal of using PACP is to create a comprehensive database to properly identify, plan, prioritize, manage, and renovate their assets based on condition evaluation. Segments of pipe are inspected and assigned a "condition grade" in two categories: structural or operations and maintenance. Scoring is on a numerical scale with the highest (5) denoting the worst conditions and the lowest (1) designating minor defects—and zero indicating no defects at all. Defects may include observations like cracks, fractures, or broken segments of pipe. They could also be deformed or collapsed pipe or even displaced joints.

In the district's collection system, the primary defects observed were extensive cracks along the pipe and at joints causing severe root intrusion. In some cases, point repairs are the most appropriate approach and for other segments it is necessary to line/replace the entire segment. Additionally, there have been a number of sewer tap replacements within the district which may

have caused additional cracks that can allow roots to infiltrate the pipe. The total cost of the proposed sewer rehabilitation projects equals \$320,070. We recommend these projects use the design-build process due to the shorter length of sewer rehabilitation work and potential cost efficiencies of the design-build process.

Summary of All Proposed Projects

The following table provides a detailed breakdown of the value of the water and sewer projects proposed through 2037. All costs presented in Table 1 and in the subsequent project summaries are in 2023 dollars and reflect anticipated construction and design engineering charges based on actual costs realized by Platte Canyon, Southwest Metropolitan, and Bow Mar in recent years.

Table 1 – Summary of Capital Projects by Type and Year

Year	Water Projects	Sewer Projects	Annual Total
2023	\$0	\$230,304	\$230,304
2024	\$0	\$0	\$0
2025	\$608,321	\$0	\$608,321
2026	\$0	\$89,776	\$89,776
2027	\$0	\$0	\$0
2028	\$1,419,072	\$0	\$1,419,072
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0
2031	\$930,655	\$0	\$930,655
2032	\$0	\$0	\$0
2033	\$0	\$0	\$0
2034	\$340,608	\$0	\$340,608
2035	\$0	\$0	\$0
2036	\$0	\$0	\$0
2037	\$866,420	\$0	\$866,420
TOTAL	\$4,165,076	\$320,070	\$4,485,146

A summary of the location, rationale, and cost for each project follows. Additionally, maps are attached that depict the location of the proposed water and sewer projects.

Capital Improvement Plan Project Summary

(Project 2023-1S)

On Easement between Lakeshore Dr. and Bow Mar Dr. (8" VCP)

Rationale

There have been no sanitary sewer backups on this segment; however, it is root cut every two years due to severe root intrusion. The age of the pipe along with the consistent root cut activity has caused major cracking along the pipe and at joints allowing severe root growth. Based on the location of this segment, a potential failure exposes several properties to significant property damage. Rehabilitation includes the cured-in-place lining process for the pipe and SpectraShield epoxy lining for the three manholes. This is proposed as a design-build project due to the size and potential for cost efficiencies associated with this approach.

470 feet of 8-inch CPP with associated appurtenances	\$27,055
Contingency (20%)	<u>\$5,411</u>
TOTAL PROJECT COST	\$32,466

(Project 2023-2S)

On Bow Mar Dr. between Redwood and Frontier (8" VCP)
On Frontier St. between Bow Mar Dr. And Aspen DR. (8" VCP)
On Aspen Dr. between Frontier and Bow Mar Dr. (8" VCP)

Rationale

There have been no sanitary sewer backups on these segments of pipe; however, these segments are root cut every two years due to severe root intrusion. Consistent root cutting has caused the cracks to worsen over the years and allowed severe root growth. Several new PVC taps have been installed causing new cracks along the pipe. Rehabilitation includes the cured-in-place lining process for the pipe and SpectraShield epoxy lining for the eight manholes. This is proposed as a design-build project due to the size and potential for cost efficiencies associated with this approach.

2,030 feet of 8-inch CPP with associated appurtenances	\$140,227
Contingency (20%)	<u>\$23,371</u>
TOTAL PROJECT COST	\$140,227

(Project 2023-3S)

On Lakeshore Dr. Between Pinyon and Redwood (8" VCP)
On Redwood Dr. Between Bow Mar and Larkspur (8" VCP)

Rationale

There have been no sanitary sewer backups on these segments of pipe; however, these segments are root cut every two years due to severe root intrusion. Consistent root cutting has caused the cracks to worsen over the years and allowed severe root growth. Rehabilitation includes the cured-in-place lining process for the pipe and SpectraShield epoxy lining for the five manholes. This is proposed as a design-build project due to the size and potential for cost efficiencies associated with this approach.

834 feet of 8-inch CPP with associated appurtenances	\$48,009
Contingency (20%)	<u>\$9,602</u>
TOTAL PROJECT COST	\$57,611

(Project 2025-1W)

On Sombrero Dr. between Sunset Dr. and Bow Mar Dr. (6" C.I.P.)

Rationale

There have been three water main failures on this segment of pipe. The proposed type of pipe for replacement is 6-inch C-900 PVC pipe. This project is proposed to be placed in the existing asphalt as to reduce disruption of customer's private property and landscape.

1,402 feet of 6-inch PVC with associated appurtenances	\$480,8876
Engineering (10%)	<u>\$48,089</u>
	\$528,975
Contingency (15%)	<u>\$79,346</u>
TOTAL PROJECT COST	\$608,321

(Project 2026-1S)

On Sombrero St. between Bow Mar Dr. and Sunset Dr. (8" VCP)

Rationale

There have been no sanitary sewer backups on this segment of main.; however, there are a significant number of cracks and roots in the pipe. Rehabilitation includes the cured-in-place lining process for the pipe and SpectraShield epoxy lining for the four manholes. This is proposed as a design-build project due to the size and potential for cost efficiencies associated with that approach.

1,065 feet of 8-inch CPP with associated appurtenances	\$74,805
Contingency (20%)	<u>\$14,961</u>
TOTAL PROJECT COST	\$89,776

(Project 2028-1W)

On Bow Mar Dr. between Ridge Trail and S. Sheridan Blvd. (8" C.I.P.)

Rationale:

This section of 8" cast iron pipe has experienced three water main failure to date. The existing pipe is proposed to be replaced with 12-inch C-900 PVC pipe. This project is proposed to be placed in the existing asphalt as to reduce disruption of customer's private property and landscape.

2,397 feet of 12-inch PVC with associated appurtenances	\$1,121,796
Engineering (10%)	<u>\$112,180</u>
	\$1,233,976
Contingency (15%)	<u>\$185,096</u>
TOTAL PROJECT COST	\$1,419,072

(Project 2031-1W)

On Bow Mar Dr. between Quincy Master Meter Vault and Ridge Trail (12” C.I.P.)

Rationale:

There has been one water main failure on this section of water main. The criticality of this segment is a main feed into the district’s system. The proposed type of pipe for replacement is 12-inch C-900 PVC Pipe. This project is proposed to be placed in the existing asphalt as to reduce disruption of customer’s private property and landscape.

1,572 feet of 12-inch PVC with associated appurtenances	\$735,696
Engineering (10%)	<u>\$73,570</u>
	\$809,266
Contingency (15%)	<u>\$121,390</u>
TOTAL PROJECT COST	\$930,655

(Project 2034-1W)

On Yellowstone between Ridge Trail and S. Sheridan Blvd. (4” C.I.P.)

Rationale:

This section of 4” cast iron pipe has experienced one water main failure to date. Fire flows may not be met through 4 inch main in Yellowstone. The existing pipe is proposed to be replaced with 6-inch C-900 PVC pipe. This project is proposed to be placed in the existing asphalt as to reduce disruption of customer’s private property and landscape.

785 feet of 6-inch PVC with associated appurtenances	\$269,255
Engineering (10%)	<u>\$26,926</u>
	\$296,181
Contingency (15%)	<u>\$44,427</u>
TOTAL PROJECT COST	\$340,608

(Project 2037-1W)

On Sunset Dr. between Bow Mar Dr. and S. Sheridan Blvd. (6" & 8" C.I.P.)

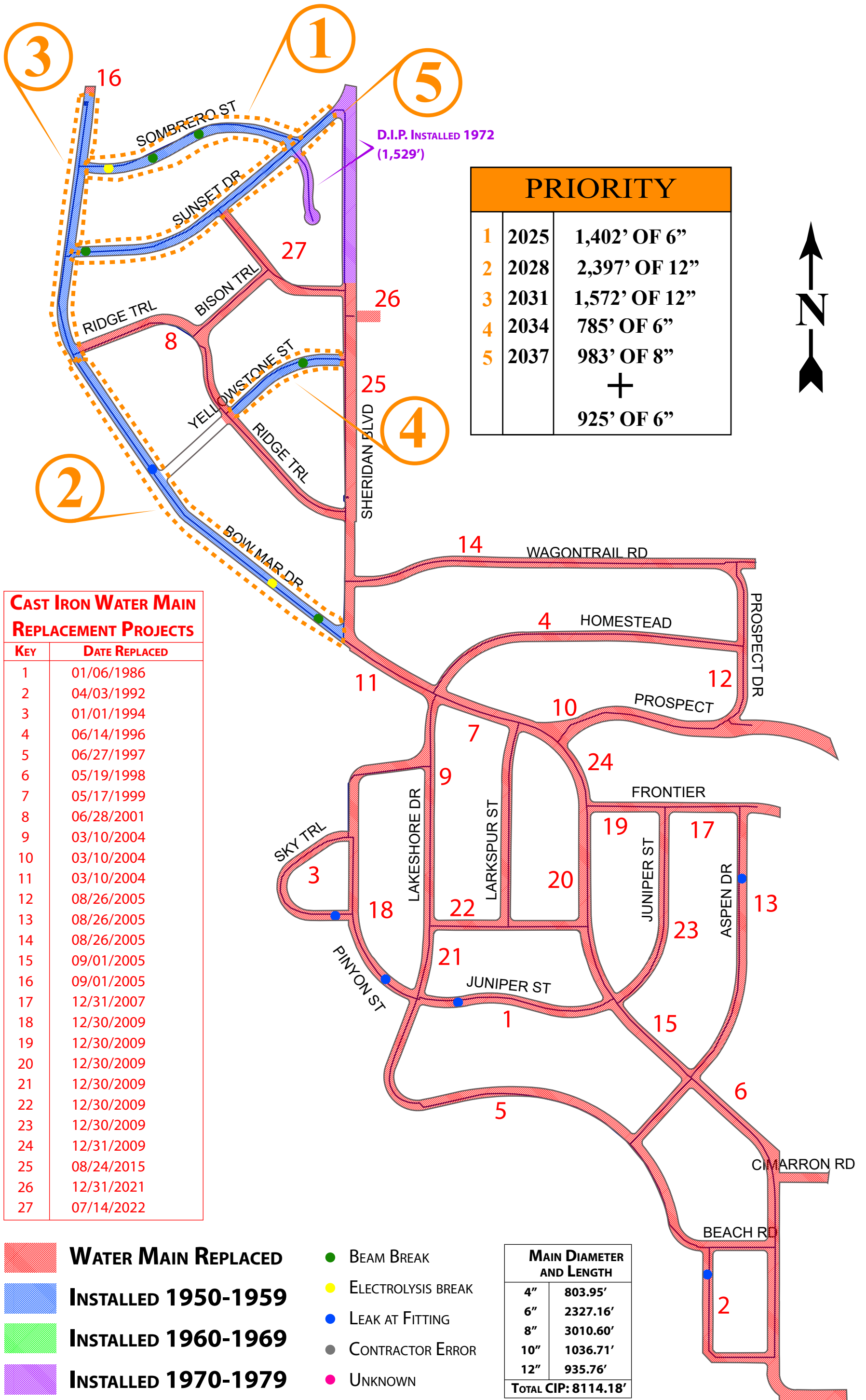
Rationale:

This section of 6" and 10" cast iron pipe has experienced one water main failure to date. The existing pipe is proposed to be replaced with 6-inch and 8-inch C-900 PVC pipe. This project is proposed to be placed in the existing asphalt as to reduce disruption of customer's private property and landscape.

925 feet of 6-inch PVC with associated appurtenances	\$349,003
983 feet of 8-inch PVC with associated appurtenances	\$404,406
	<u>\$527,304</u>
Engineering (10%)	<u>\$52,730</u>
	\$753,409
Contingency (15%)	<u>\$113,011</u>
TOTAL PROJECT COST	\$866,420

BOW MAR WATER & SANITATION DISTRICT

WATER MAIN REPLACEMENTS 1986-2022 & PROPOSED REPLACEMENTS 2023-2037



BOW MAR WATER & SANITATION DISTRICT

SEWER MAIN REHABILITATION PROPOSED REHABILITATION 2023-2026

