August 13, 2026

Update on Year 1 & 2 of the Large Diameter Pipeline Inspection Program

District Project 8443

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Agenda

- Background
- Purpose
- Summary of Year 1 & 2
- Overview of the Field Work
- Overview of Multi-Sensor Inspection (MSI)
- Preliminary Observations and Photos
- Project Status

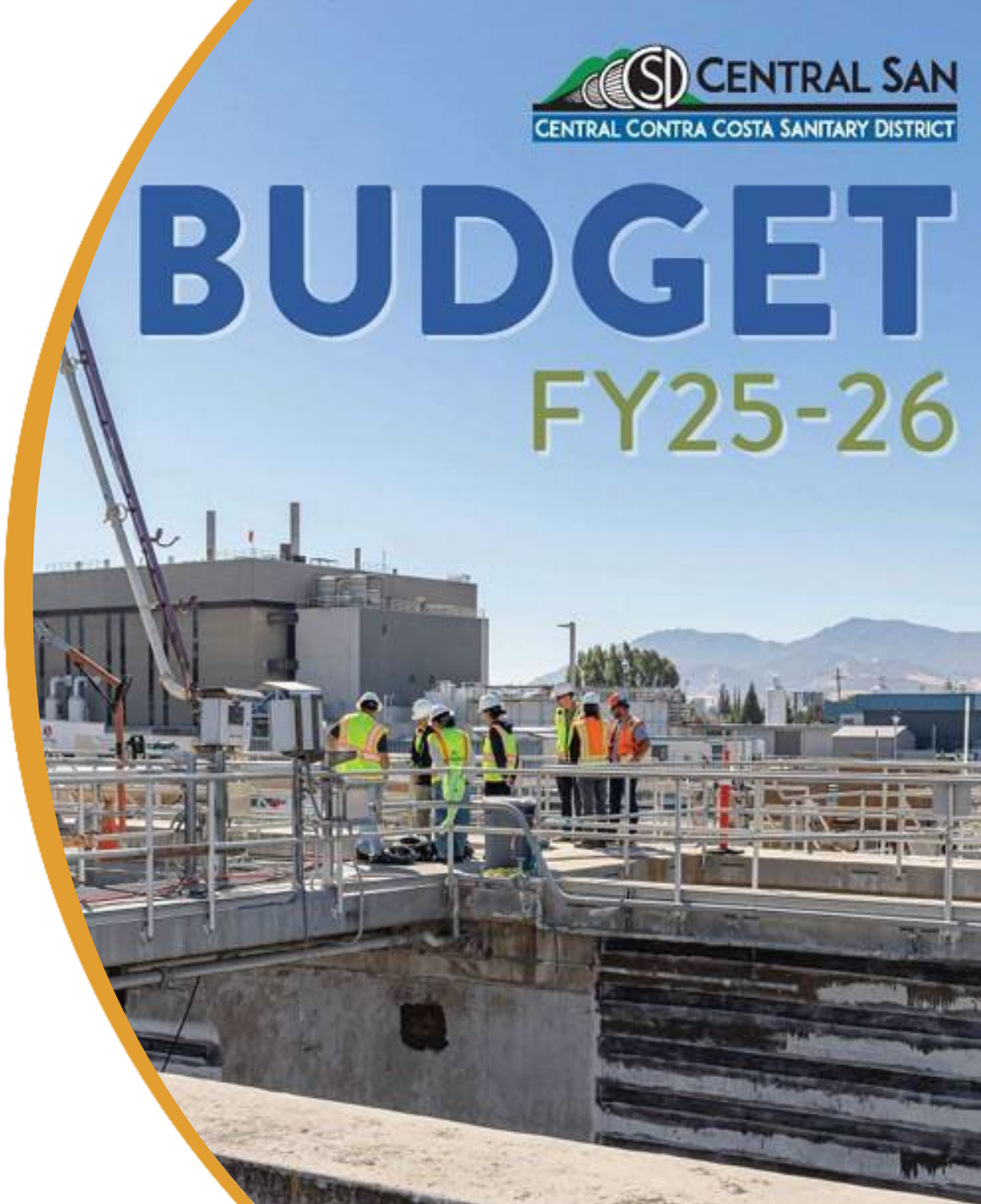
Background

Central San maintains 88 miles of large-diameter pipes (>18 inches) that were installed between 1940 and 2010 and constructed, primarily, of unlined, reinforced concrete.

Their replacement cost estimate is over $2 billion.

Purpose

- Given the maturity of the pipes, it is appropriate to undertake a **comprehensive condition assessment** to optimize the lifecycle of assets by:
  - proactively identifying and repairing early failure;
  - estimating assets' remaining life to better inform the Capital Improvement Program (CIP); and
  - developing a re-inspection program.



Agreement with National Plant Services

Technical Consulting Services Agreement awarded in June 2024, with a cost ceiling of $11.5 million over a 5-year term.

Consultant Responsibilities:

- Yearly prioritization (after year 1)
- Multi-sensor inspections (MSIs), including siphon cleaning and inspection
- Permits, safety, flow bypasses, debris removal/testing/disposal, etc.
- Quality control
- Transmittal of all data to Central San (to load into ITPipes or store reports in Laserfiche)
- Annual reports and end-of-year workshop with Central San
  - Develop program recommendations including repairs, re-inspection schedules, etc.

Summary of Year 1 & 2

- ✓ Field work completed
  - ✓ 16 of 21 siphons cleaned and inspected
    - ✓ remainder completed in Year 2
  - ✓ 68,360 linear feet (LF) of large-diameter pipes inspected
    - ✓ 93,336 LF inspected in Year 2
- In Progress
  - Significant data processing to correlate the MSIs
  - Preliminary Review Workshop September each year
    - Followed by Final Annual Report the following month

Repeat each year of the program

Set-Up: Access and Traffic Control

Tripod to raise/lower staff when setting up MSI equipment; supplied air to reduce condensation on camera

Night work either required by encroachment permit or due to high flow in pipes

Traffic control required in roadways

Siphon/Pipe Cleaning

Debris includes silt/gravel, fats-oil-grease, large rocks/cement pieces, or metal

Dewatering, then crawler used to drag in flex suction hoses

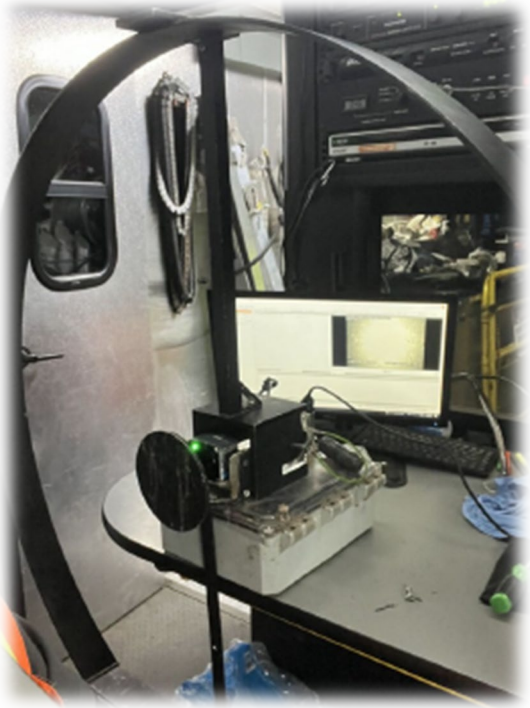
Hydro cleaning

Siphon Debris Disposal

Debris hauled to storage bins, then disposed of in landfill (as non-hazardous waste)

Set-Up: MSI equipment

CCTV crawler with sonar and GoPro mounted to it



Laser/3D lidar ring

Manned entry required to configure laser ring on crawler in the pipe

MSIs

What	How	Why
HD CCTV	Visual	Used as a baseline condition assessment across the entire asset class
Sonar	Acoustic	Identify if there is debris build-up ➢ Determine if cleaning needed
Lidar	Laser	Identify wall loss ➢ Determine if repairs needed ➢ Estimate a deterioration rate to determine remaining useful life, thus future CIP and renovation priority

MSI: High-Definition Closed Circuit Television (HD CCTV)

- **When:** All pipes
- **Why:** Used as a baseline condition assessment across the entire asset class
- Using PACP™ scoring
- Consultant will provide two CCTV exports: original CCTV export and GoPro merged (as shown)
- Benefits of GoPro:
  - Camera underwater, but GoPro still captured the pipe (as shown)
  - Less susceptible to light feedback on lens or condensation

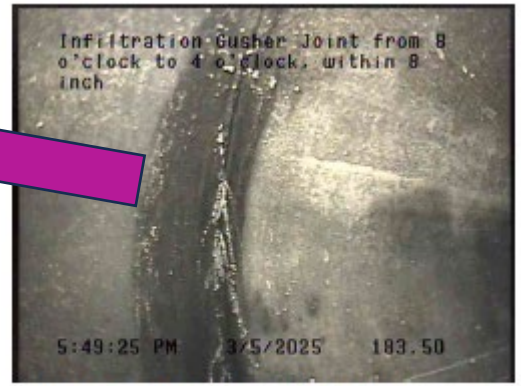
PACP™ - Pipeline Assessment Certification Program

PACP™ Inspection Report

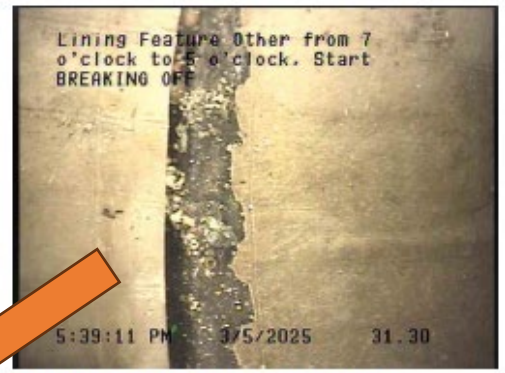
- NASSCO's PACP™ includes coding/scoring for all defect types
- Whereas "CCCSD Scoring" developed prior to national system and focused on small-diameter pipe defects

1:1985	Distance		Code	Observation	Counter	Photo	Grade
	125.4	F02	LD	Line Down, 30%, Finish	00:12:04	72077_35 2025 54519	M4
	125.4	F04	DAGS	Deposits Attached Grease, 10% of cross sectional area from 8 o'clock to 4 o'clock, Finish	00:12:17	72077_35 2025 54532	M2
	183.5		IRJ	Infiltration Runner Joint from 8 o'clock to 1 o'clock, within 8 inch	00:16:10	72077_35 2025 54926	M4
	261.8	F05	MWLS	Miscellaneous Water Level, Sag, 40% of the vertical dimension, Finish	00:18:29	72077_35 2025 55145	S3
	261.8	S06	DSF	Deposits Settled Fine, 5% of cross sectional area from 5 o'clock to 7 o'clock, Start	00:19:11	72077_35 2025 55227	
	334.4	S07	LU	Line Up, 30%, Start	00:22:30	72077_35 2025 55544	
	334.4	F06	DSF	Deposits Settled Fine, 5% of cross sectional area from 5 o'clock to 7 o'clock, Finish	00:22:13	72077_9d 4d37f0-8d 05-4d19-a	M2
	402.8		IS	Infiltration Stain from 2 o'clock to 4 o'clock	00:24:52	72077_35 2025 55808	M1
	414.5	F07	LU	Line Up, change to: 30%, Finish	00:25:50	72077_f42 79877-a05 a-4cd5-b5	M4
	414.5	S12	LLU	Line Left Up, change to: 15%, Start	00:25:51	72077_d3 e840dc-bb 3c-4a07-9	
	432.6		MMC	Miscellaneous Material Change, Other (State in comments) / RCP TO LINER	00:26:35	72077_35 2025 55951	
	432.6	S09	LFB	Lining Feature Blistered from 8 o'clock to 4 o'clock, Start / DEFECT WANDERS	00:27:05	72077_35 2025 60020	
	472.2	F12	LLU	Line Left Up, change to: 15%, Finish	00:28:10	72077_e9 e06bf0-ce 09-4da4-b	M2
	472.2	S13	LU	Line Up, change to: 15%, Start	00:28:10	72077_ef9 a4d3c-e49 d-45ee-b0	
	494.9	F13	LU	Line Up, change to: 15%, Finish	00:28:56	72077_26 1218e1-c7 e7-40d8-8	M2
	505.0	F09	LFB	Lining Feature Blistered from 8 o'clock to 4 o'clock, Finish / DEFECT WANDERS	00:30:12	72077_35 2025 60328	S3
75B1-JS111	505.0		AMH	Manhole / 75B1-JS111	00:30:24	72077_35 2025	

Siphon at 785 Ygnacio Valley



72077_352025 54926 PM.jpg, 00:16:10, 183.50ft
Infiltration Runner Joint from 8 o'clock to 1 o'clock, within 8 inch



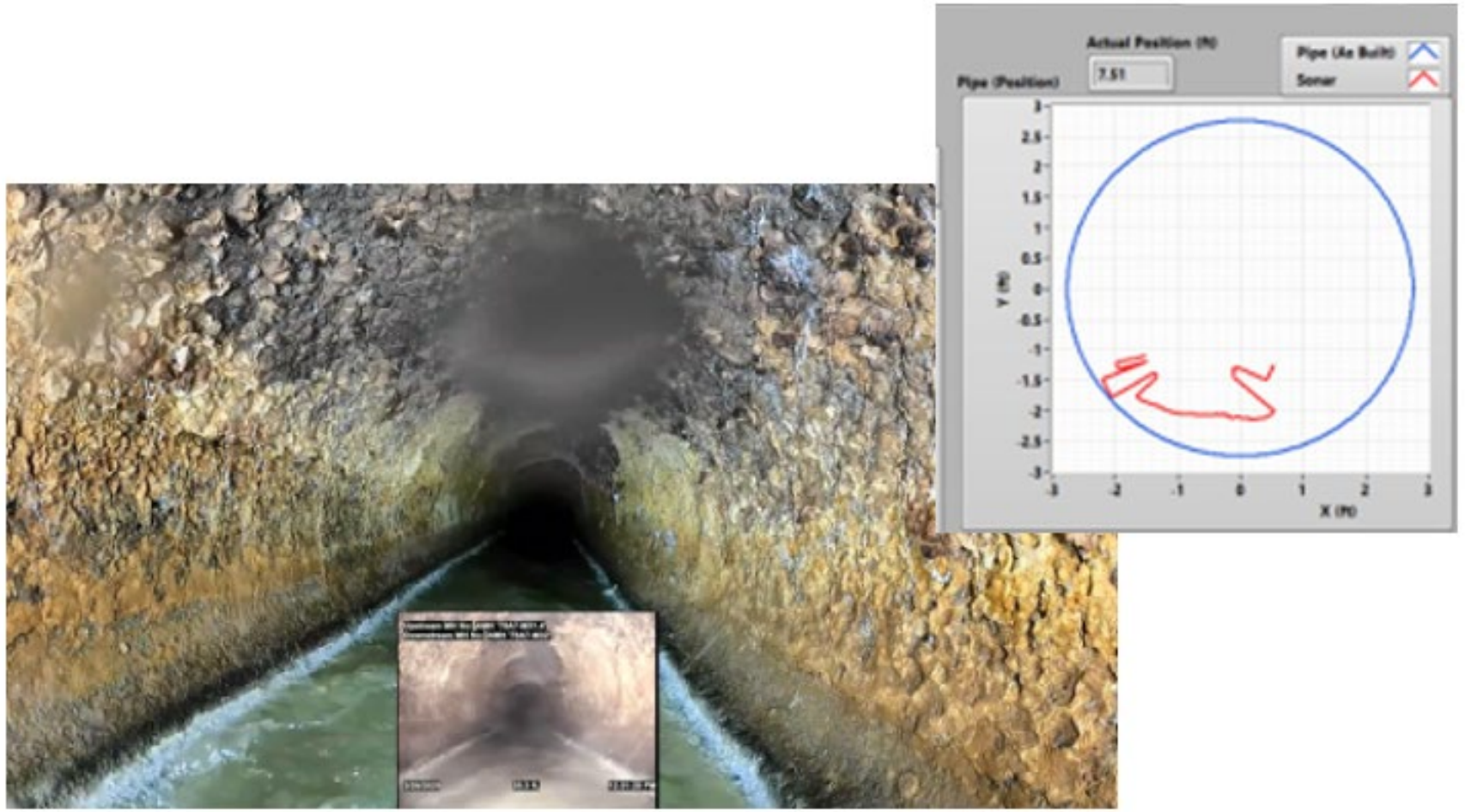
72077_352025 53912 PM.jpg, 00:05:58, 31.30ft
Lining Feature Detached from 4 o'clock to 11 o'clock

MSI: Sonar

When: There is enough water (min 10”) to float over the bottom, but not fast flow since it disrupts sonar acoustic

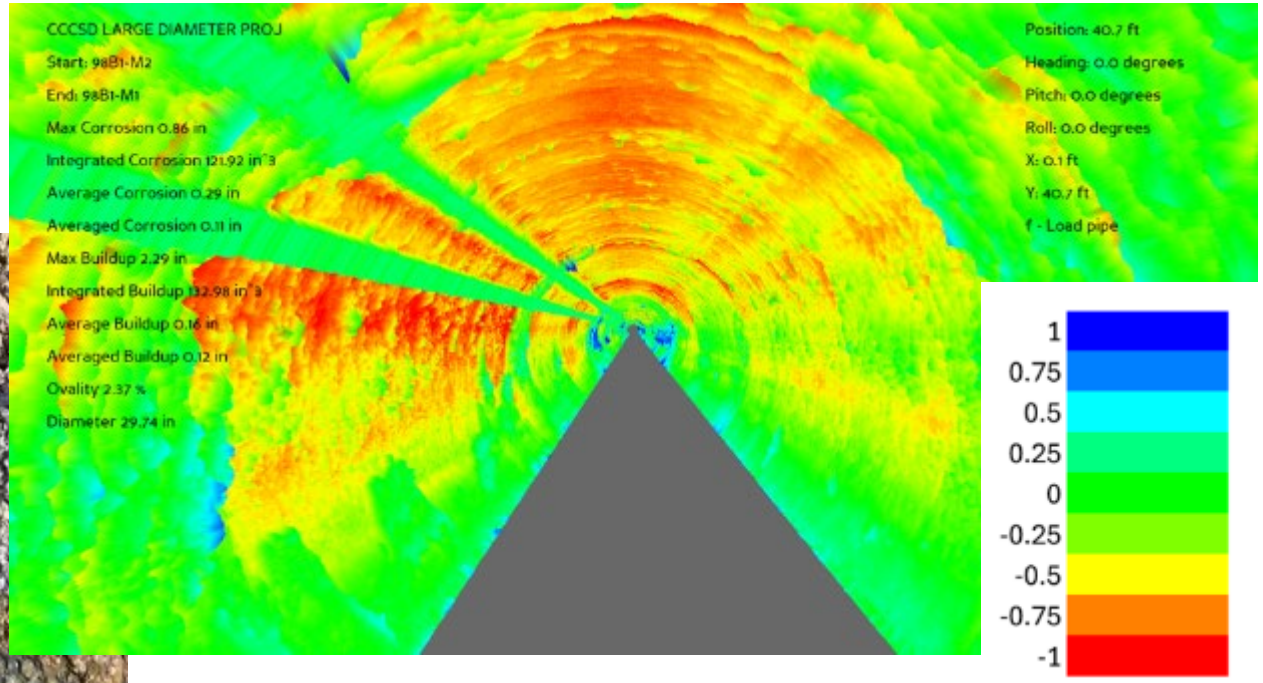
Why: Identify if there is debris build-up

- Determine if cleaning needed



MSI: 3D Light Detection and Ranging (Lidar)

- **When:** Used at Operator's discretion based on initial visual assessment



GIS Id#78368 (Danville Blvd) - 41.8 feet, Surface Spalling of Coating. Max Corrosion to 1.23 inches, Average Corrosion to 0.56 inches

Why: Identify wall loss

- Determine if repairs needed
- Estimate a deterioration rate to determine remaining useful life, thus future CIP and renovation priority

Preliminary Observations: Siphons

- Generally, condition okay
- 15 of 21 large diameter siphons are in Walnut Creek
- Averaging 2-3 days on most siphons
- Over 15 days on challenging* siphons
  - *deeper, longer, larger

<u>Preliminary Recommendation</u>: Develop cleaning program for large siphons

- Challenging siphons: clean ~10 years and consider installing grit traps upstream
- All others: clean ~20-30 years

Why do some siphons have more debris than others?

- ✓ Greatest siphon depth and volume (e.g. does not self-flush)
- Not age (e.g. time since last cleaned)
  - Large siphons range in age from 33 to 77 years
  - The challenging siphons were installed in 1991, so are newer

Location	Days to Clean	Diameter (in)	Length (ft)	D/S Siphon Depth (ft)	U/S Siphon Depth (ft)	Install Year
IHT/ 785 Ygnacio Vly, WC	45	54	517	57	47	1991
	25	36	513	57	47	1991
IHT/ Mt Diablo & S Broadway, WC	15	42	373	31	31	1992
	6	24	370	31	31	1992
1295 S Main St, WC	5	30	145	36	33	1960
	2	36	145	36	33	1960
1400 Mt Diablo, WC	5	18	110	34	31	1965
	4	24	110	34	31	1965
2520 Cherry Ln, WC	3	24	138	33	34	1967
	2	15	138	33	34	1967
911 Bancroft Rd, WC	3	18	117	39	39	1961
	2	12	117	39	39	1961
1496 Newell Ave, WC	2	18	70	25	25	1948
	2	18	70	25	25	1948
877 Ygnacio Vly, WC	1	18	194	34	34	1962
947 Fourth St, LAF	1	21	114	25	22	1960
	1	30	114	24	21	1960
IHT/ Wayne Ave, AL	Week 8/18	48	100	23	26	1989
		33	100	23	26	1989
IHT/ Larkwood Cir, DAN	Week 8/25	33	133	23	21	1989
		24	133	23	21	1989

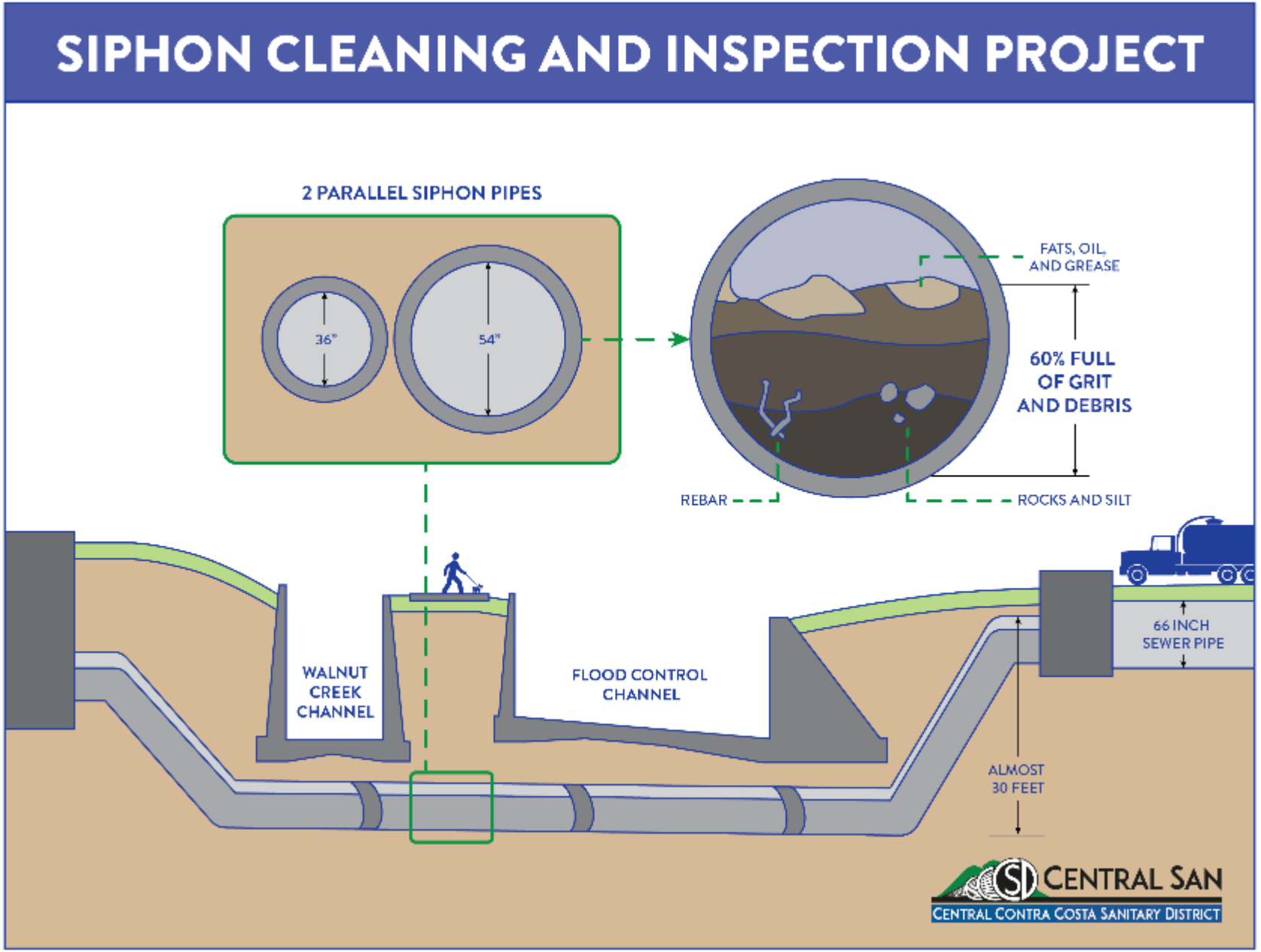
Most Challenging Siphons

<u>785 Ygnacio Valley Rd.</u>

- Deepest, largest, longest of the siphons
- A-Barrel: 54", 517 LF, 45 days
  - 60 percent full of debris including large rocks, roots, metal rods
- B-Barrel: 36", 513 LF, 25 days
  - storm infiltration and "gusher"

<u>1400 Mt. Diablo</u>

- B-Barrel: 42", 373 LF, 17 days



Large Asphalt/Cement/Rock, Metal, Misc.

"…we keep running into issues with large chunks of rock getting stuck inside of flex causing us to pull out crawler and flex all the way out of manhole to clear…"

"The Perfect Storm" of Challenges for Siphons at 785 Ygnacio Valley

Jan 27 - Mar 3: B-Barrel (36")

- Reduced work hours of 9am-3pm in encroachment permit for Ygnacio Corridor
- Late spring rainfall increased dewatering challenges including joint "gusher"
- Length and depth created challenges for cleaning equipment
- Heavy debris required extensive cleaning
- Defer A-Barrel (54") till "dry" season and to give neighbors a break from the noise

May 14: Began A-Barrel (54")

- Same challenges: length and depth, heavy debris, reduced work hours
- June 6 delivered notices to nearby residents/businesses about extended cleaning
- Early June, Plant Ops noticed elevated effluent TSS
- Despite disposing of settled debris in Vac Trucks, decant sample had 10 percent total solids
- Treatment capacity reduced due to capital projects, so plant couldn't handle additional loading

June 13: Paused A-Barrel

- June 13 delivered notices to nearby residents/businesses about pausing cleaning for 2-3 weeks; and June 17 Communications Manager, Emily Barnett, spoke at Walnut Creek City Council Meeting
- Developed a decant disposal plan to finish cleaning without impacting the treatment plant

July 15- Aug 15: Resumed A-Barrel

- July 10 mailed notices to nearby residents/businesses about resuming; and Aug 6 notice of cleaning status
- Plant okay!
- Continued cleaning to remove heavy debris including large cement pieces, large rocks, roots, metal rods

Preliminary Observations: Large Diameter

- Averaging 1500 LF/day
- Previous *crown spray* impacts ability to **see** the pipe
  - Hydro cleaning some of these to get a better look
- Often no sonar collected due to low flow (<10”)
- Some pipe segments had high hydrogen sulfide (H_2S)
  - No MSI since mounting laser requires manned entry
  - List of segments to be reviewed at Annual Workshop with stakeholders for follow-up

Preliminary Photos

Visual corrosion will be verified in post-processing of laser data

Visually, wall in good condition

Preliminary Photos

GIS Id# 70171 (Danville Blvd) – worst condition pipe, to first layer of rebar

Dia	Class	Wall Type	Circumferential Reinforcement	Elliptical Reinforcement	Pipe Wall Profile (inches)
					0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00
36	III	B	Two Lines	Y	

Preliminary Photos

Confirm configuration of junction structures from CCTV

Unlined to lined, generally good (visual) condition

Turbulence at junctions, visible corrosion

Preliminary Photos – Maintenance Access Holes

- All maintenance access holes inspected at MACP Level 1; increased to Level 2 if preliminary observation warrants
- 249 inspections completed: 241 Level 1, 8 Level 2

visual corrosion of barrels

pH testing

easily sloughing off

MACP – Manhole Assessment and Certification Program

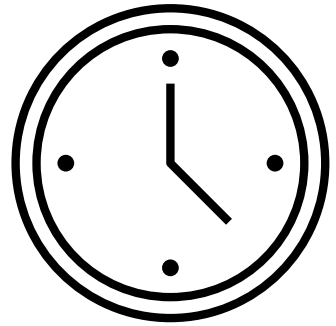
Strategic Plan Fiscal Years (FY) 2024–26

Key Metrics

Goal	Strategy	Initiative	Key Success Measure	Status
6	Manage Assets for Optimal Lifecycle Value	Incorporate asset management practices into the Capital Improvement and Maintenance Programs	Implement large diameter and force main condition and risk assessment programs	☑ In Progress
6	Maintain Facilities and equipment to be dependable, resilient, and long lasting	All large-diameter gravity sewers inspected within 5 years	≥11 miles per year in FY 2024-25	☑
		All large-diameter siphons cleaned and inspected within 3 years	≥3 siphons per year	☑
		All pump station force mains inspected within 5 years	≥5 force mains per year 26-27	⏳

Project Schedule

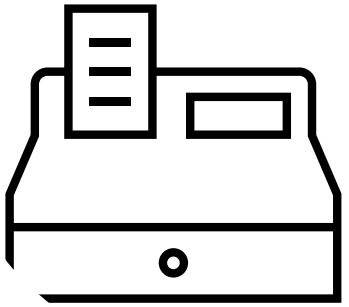
as of 6/30/2026



Year	DP 8443, Large Diameter Pipeline Inspection Program				DP 8444, Forcemain Insp. Program	
	Large Diameter Pipe Inspections		Siphon Cleaning & Inspections			
	Plan	Actual	Plan	Actual	Plan	Actual
1 (FY 2024-25)	79,394	68,360 ☑	1,911	3,097 ☑	--	--
2 (FY 2025-26)	88,953	93,336 ☑	1,910	724 ☑	--	--
3 (FY 2026-27)	88,953		--		16,000	
4 (FY 2027-28)	88,953		--		16,000	
5 (FY 2028-29)	88,953		--		16,000	
Quantity Estimates	**435,206 LF**	**161,696 LF (37%)**	**3,821 LF**	**3,821 LF (100%)**	**48,000 LF**	

Agreement Budget

as of 6/30/2026



	DP 8443, Large Diameter Pipeline Inspection Program ($)		DP 8444, Forcemain Insp. Program ($)	
Year	Budget	Actual	Budget	Actual
1 (FY 2024-25)	2,525,000	1,855,000 ☑		--
2 (FY 2025-26)	2,775,000	1,209,000 ☑		--
3 (FY 2026-27)	1,625,000		320,000	
4 (FY 2027-28)	1,725,000		330,000	
5 (FY 2028-29)	1,850,000		350,000	
Totals	10,500,000	3,064,000	1,000,000	0

Questions