

APPLEWOOD SANITATION DISTRICT

2023 SYSTEM STATUS REPORT

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PREPARED BY:



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APPLEWOOD SANITATION DISTRICT
2023 SYSTEM STATUS REPORT**Table of Contents**

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EXECUTIVE SUMMARY

The work in 2023 included the following:

1. District Wide Annual Maintenance - Root Cutting & Cleaning
 - Performed annually for problematic areas
2. Zone Cleaning and Inspections
 - Sanitary sewer pipe cleaning – 2 zones per year – **Zones A & B**
 - Manhole inspections – 1 zone per year – **Zone C**
3. Video Sewer Line Examination – 1 zone per year – **Zone A**

1. District Wide Annual Maintenance

The 2023 Annual Maintenance - Root Cutting and Cleaning targets District wide known problem areas that need annual maintenance. The *2023 Annual Root Cutting Map* is included as a part of this report.

This work included root cutting and cleaning of debris and fats collected in sanitary sewer lines and post root cutting and cleaning video. Each root cutting video was also reviewed after the post root cutting video to ensure root cutting was completed appropriately.

The total linear footage of each action performed is listed below:

- Root Cutting – 10,104 LF
- Cleaning – 5,644 LF
- Total Maintenance – 15,748 LF

2. Zone Cleaning and Inspections

Cleaning - The 2023 Jet Cleaning included locations within Zone **A & B**. The *2023 Line Cleaning Zone Map* is included as a part of this report.

The total linear footage of the zones was an estimated quantity of 32,383 LF. This work entailed jet cleaning, debris collection and removal of buildup and other ancillary items.

Manhole Inspection - The 2023 Manhole Inspection included locations within **Zone C**. The *2023 Manhole Condition Map* is included as a part of this report.

The total amount of manholes inspected as a part of this report is 27 existing manholes. This work included review of each existing manhole within **Zone C** for any structural deficiencies, infiltration, steps, buildup, chimney condition and any other condition assessment observed. Each existing manhole inspection sheet is included within this report detailing conditions observed in the field. There

are 74 new manholes, as in the last 5 years +/- that do not require inspections in the Clear Creek Crossing development due to modern construction practices. Also, these are either under warranty or are monitored during construction in the area.

All existing manholes are in good to fair condition. Minor maintenance and repair items such as raising covers to gain access, modifications to the drop or slope of sanitary sewer lines to help reduce waste accumulation, correcting rim offsets from manhole barrel, line chimney/barrel to reduce infiltration, and chimney grouting of loose rings/bricks are addressed in the 2023 and future capital improvement plans.

3. Video Sewer Line Examination

This opinion of sewer condition status reflects 12,807 linear feet of video sewer line examination of **Zone A**, after cleaning, which was completed during 2023. The **2023 Video and Manhole Zone Map** is included as a part of this report.

The condition of the approximate 12,807 feet of pipe examined in **Zone A** are as follows:

Zone A	(Ref: 2023 System Condition Spreadsheet-Zone A)
<u>Results of Videoing</u>	
Category 1: (GREEN-Good Condition)	28%
Category 2: (YELLOW-Fair Condition)	47%
Category 3: (BLUE-Moderate Condition)	20%
Category 4: (PURPLE-Poor Condition)	5%
Category 5: (RED-Emergency)	0%

- As shown, 75% of the lines in **Zone A** are Category 1 or 2, in good to fair condition.
- 20% of the lines are Category 3, in moderate condition and will require future annual maintenance or if conditions deteriorate, slip lining (cured-in-place pipe) or replacement within the next 5 to 10 years.
- 5% of the lines are Category 4, in poor condition and will require future slip lining or replacement within the next 1 to 5 years.
- 0% of the lines are Category 5, in emergency condition, these are spot repair areas and will require emergency repairs.

Overall System Condition Spreadsheet Summary

An updated *2023 Overall System Condition Map*, showing the condition and maintenance categories of the entire District collection system is included. The updated map represents the videos reviewed by RG and Associates for 2013 thru **2023, which includes recent 2023 Capital Improvements** for the entire District.

2013 thru 2023 VIDEO ZONES A thru F - 88,699 FEET OVERALL CONDITIONS

	2013		2023		
Category 1: (GREEN-Good Condition)	42%	37,088 LF	42%	37,521 LF	(0% change)
Category 2: (YELLOW-Fair Condition)	33%	29,519 LF	34%	30,219 LF	(1% increase)
Category 3: (BLUE-Moderate Condition)	14%	12,702 LF	17%	15,212 LF	(3% increase)
Category 4: (PURPLE-Poor Condition)	11%	9,547 LF	6%	5,747 LF	(5% decrease)
Category 5: (RED-Emergency)	0%	0 LF	0%	0 LF	(0% change)

Favorable conditions are increasing in Category 2 & 3 while unfavorable conditions are decreasing in Category 4. Conditions remain stable with no change in Category 1 & 5. The overall condition of the system is improving due to CIP projects.

This Annual System Status Report is modified and reissued each year to reflect the results of continuing video examination, maintenance and capital improvement programs adopted and implemented by the District.

Sanitary Sewer Examination - Zone A Condition 2018 vs 2023

Only **Zone A** was compared to past videos. Continuing with the comparison of videos of same zones at 5 years apart, we have compared 2018 to 2023 videos and have focused on the rate of deterioration of each zone.

2018 vs. 2023 – Zone A Condition Ratings

Category 1: (GREEN-Good Condition)	16% to 28%	(12% increase)
Category 2: (YELLOW-Fair Condition)	42% to 47%	(5% increase)
Category 3: (BLUE-Moderate Condition)	24% to 20%	(4% decrease)
Category 4: (PURPLE-Poor Condition)	17% to 5%	(12% decrease)
Category 5: (RED-Emergency)	0%	(0% change)

Increases in root intrusion, scaling/mineral encrustations, cracks/fractures, and sag conditions were observed within **Zone A** that increased the number of maintenance/repairs that are recommended for next year. Although, the overall condition of **Zone A** improved due to CIP projects.

Favorable conditions are increasing in Category 1 & 2 while unfavorable conditions are decreasing in Category 3 & 4. Category 5 is stable and unchanged with no emergencies.

Recommendations

The 2024 repairs will include repairs postponed from some of 2023 due to budget. There are two complex repairs that require more detailed research to make them constructible. The total cost including other less complex repairs are estimated at \$950,000 for both lining and replacements. The costs include construction, assembling a new bid package, bidding services, and construction management.

The above pricing incorporates a 30% contingency for anticipated increases in construction costs.

LINE CONDITION CATEGORIES

CONDITION CATEGORY 1 (GREEN - GOOD CONDITION)

1. Satisfactory structural condition
2. No significant physical deficiencies
3. No history of operational irregularities

Condition Category 1 pipelines have a Condition Score of 20 or less. Lines in this condition category are expected to provide many additional years of dependable service given routine maintenance.

CONDITION CATEGORY 2 (YELLOW - FAIR CONDITION)

1. Satisfactory structural condition
2. Numerous locations of moderate root intrusions, OR
3. One or more moderate vertical alignment sags, OR
4. A history of operational irregularities including persistent build-up of grease, sediment or sludge

Condition Category 2 sewers have a Condition Score between 21 and 40.

Pipelines in Condition Category 2 are expected to provide additional years of satisfactory service, given regular maintenance.

CONDITION CATEGORY 3 (BLUE - MODERATE CONDITION)

1. Moderate structural deficiencies
2. Moderate physical aberrations (offset or wide joints; heavy root intrusions; protruding service connections; numerous, lengthy, or severe vertical sags)
3. A history of frequent, heavy accumulations of grease, sediment, or sludge
4. Condition Category 3 sewer lines have a condition score between 41 and 60
5. Given Frequent Examination and Maintenance, Condition Category 3 pipelines do not present an immediate dependability crisis and can provide a few years of additional dependable service. However, the problems afflicting these pipes will most likely worsen with time. Condition Category 3 sewer lines are candidates for future renovation or replacement.

CONDITION CATEGORY 4 (PURPLE - POOR CONDITION)

1. Extensive structural deficiencies
2. Extensive physical aberrations (offset or wide joints; heavy root intrusions; protruding service connections; numerous, lengthy, or severe vertical sags)
3. A history of frequent, heavy accumulations of grease, sediment, or sludge
4. Condition Category 4 sewer lines have a condition score of 61 and above

5. Condition Category 4 sewer lines are candidates for near-term renovation or replacement, or emergency spot repaired.

CONDITION CATEGORY 5 (RED - EMERGENCY CONDITION)

Condition Category 5 sewers show alarming signs of impending collapse or have become so severely deteriorated, or so heavily dependent upon frequent cleaning operations, that they cannot be expected to provide dependable continuous service.

Condition Category 5 sewer lines are candidates for immediate repair, renovation, and replacement and/or spot repairs.

Emergency Repairs are areas which need immediate repair. These areas are point repairs within lines in good to fair condition.

MAINTENANCE REQUIREMENT CATEGORIES

Categories in the Video Report Spread sheet under annual maintenance action:

YES: The lines in this category have moderate to extensive sags, roots and debris which could create backups thus these lines should be jetted, root cut and videoed annually.

MANUAL: The manholes in this category have moderate roots and debris which could create backups thus these manholes should be annually monitored.

NO: The lines in this category are in good overall condition and only need to be cleaned and videoed as part of the District's normal cleaning and videoing schedule once every three years.

The District has decided to hydraulic jet clean and video one third of their system each year. This will reduce the number of lines which have been historically listed under accelerated maintenance.

PIPE CONDITION RATINGS

DEFECT	CONDITION	RATE
CRACKS	LIGHT	10
	MODERATE	25
	EXTENSIVE	50
JOINT	LIGHT	10
	MODERATE	20
	EXTENSIVE	30
SAG	LIGHT	10
	MODERATE	30
	EXTENSIVE	60
DETERIORATION	LIGHT	20
	MODERATE	50
	EXTENSIVE	100
BROKEN	LIGHT	10
	MODERATE	50
	EXTENSIVE	100
ROOTS	LIGHT	10
	MODERATE	50
	EXTENSIVE	100
DEBRIS	LIGHT	10
	MODERATE	20
	EXTENSIVE	40
INFILTRATION	LIGHT	10
	MODERATE	20
	EXTENSIVE	40

PIPE CONDITION EXAMPLES

1. CRACKS

LIGHT



EXTENSIVE



2. JOINTS

LIGHT



MODERATE/EXTENSIVE

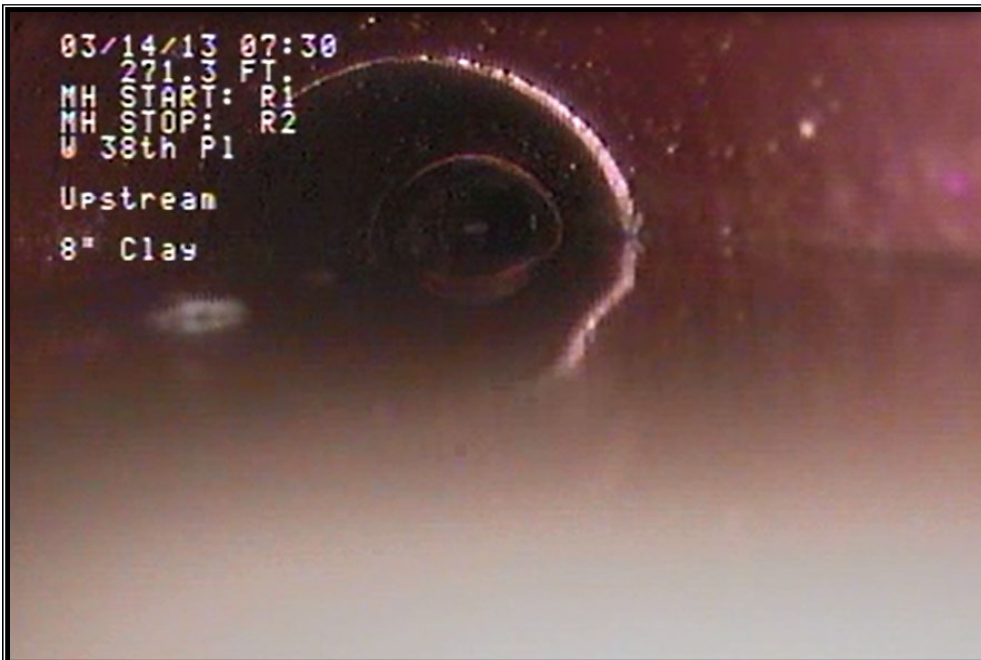


3. SAG

LIGHT



EXTENSIVE



4. DETERIORATION

LIGHT



EXTENSIVE



5. BROKEN

MODERATE



EXTENSIVE

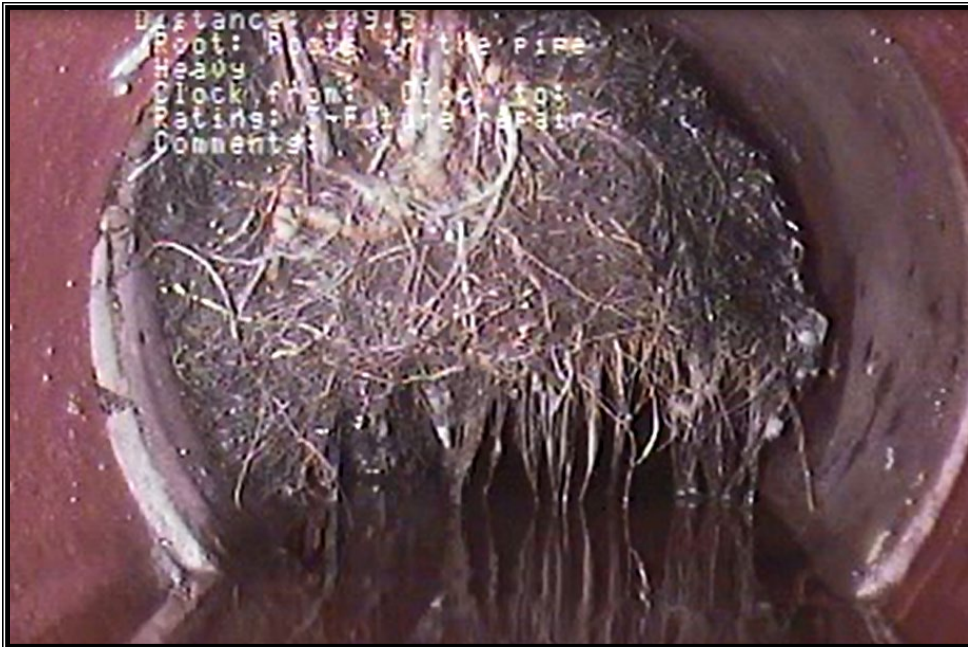


6. ROOTS

LIGHT

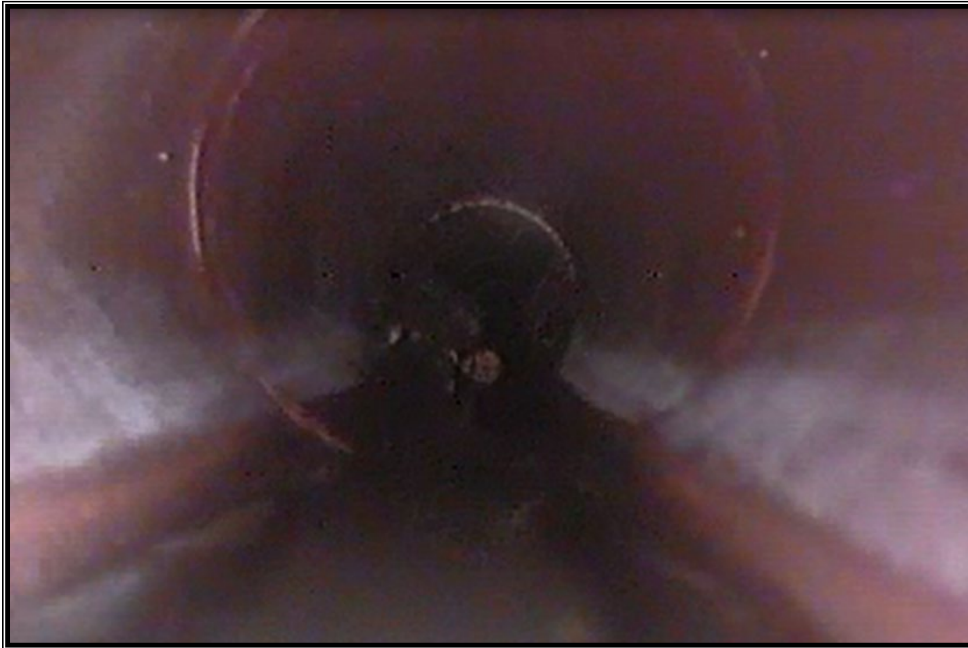


EXTENSIVE



7. DEBRIS

LIGHT



EXTENSIVE



8. INFILTRATION

LIGHT



EXTENSIVE



2023 OVERALL ZONES VIDEO ANALYSIS SPREADSHEET

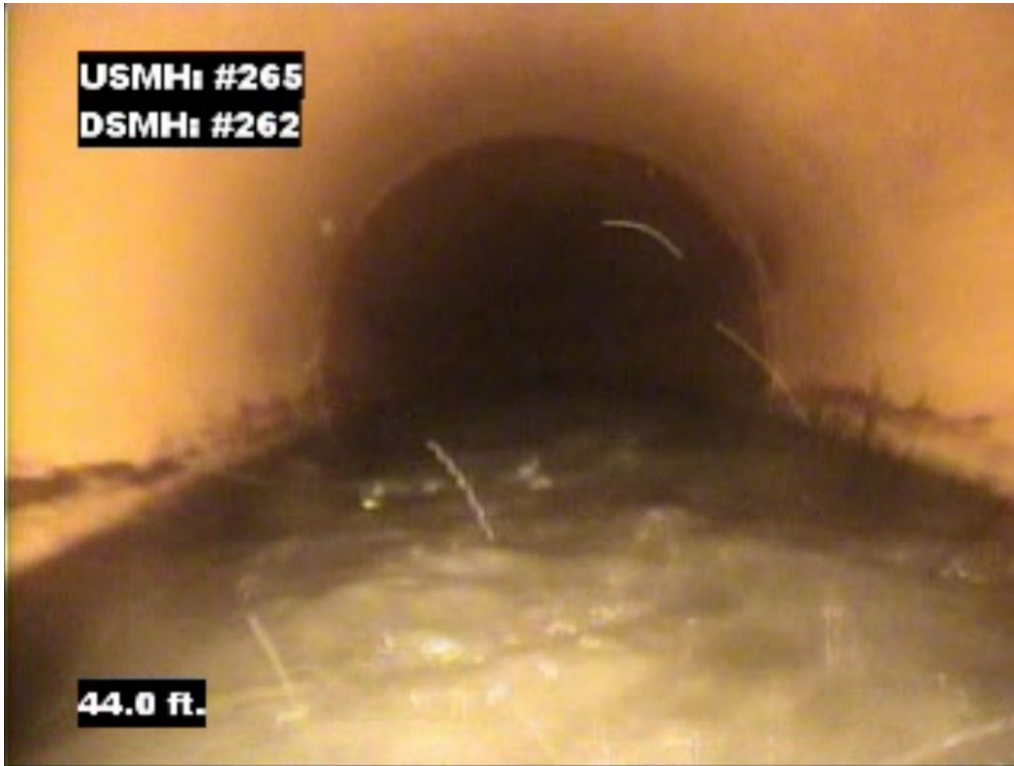
2023 OVERALL SYSTEM CONDITION MAP

SAMPLE OF FUTURE RECOMMENDED REPAIRS

Recommended Repairs – Point Repairs or Pipe Replacement

1. W. 32nd Avenue (Zone D) – Manhole 265 to Manhole 262. – Extensive sag throughout. Excavate and replace approximately 169 LF of 8" mainline. Full line replacement MH to MH.



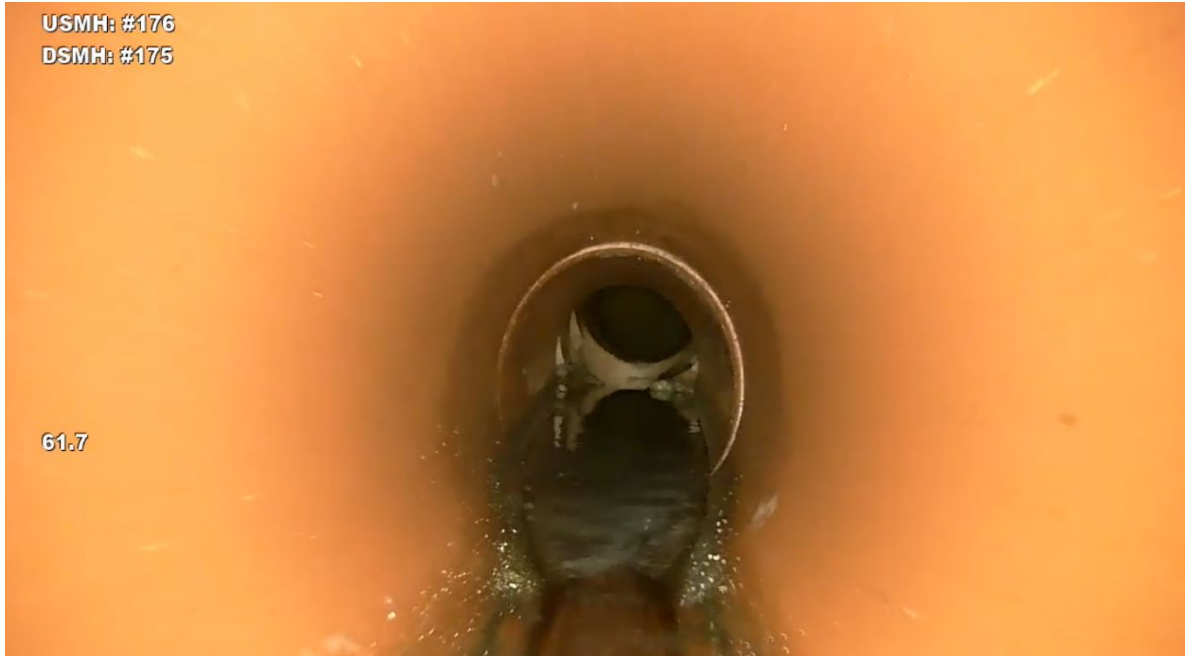


2. Alkire Court (Zone D) – Manhole 262 to Manhole 261 – Broken pipe, root intrusion throughout, moderate sag throughout. Excavate and replace approximately 337 LF of mainline.





- 3. Elderberry Rd (Zone A) – Manhole 176 to Manhole 175 – Extensive broken pipe at drop MH 175. Point Repair.



- 4. Crabapple Rd (Zone F) – Manhole 92 to Manhole 78- Broken pipe at service. Point Repair - 70 LF from MH 92. Replace 8' of pipe.



- 5. Crabapple Rd (Zone F) – Manhole 92 to Manhole 78- Broken pipe and offset joint at Drop MH 78. Point Repair. Replace 8' of pipe.



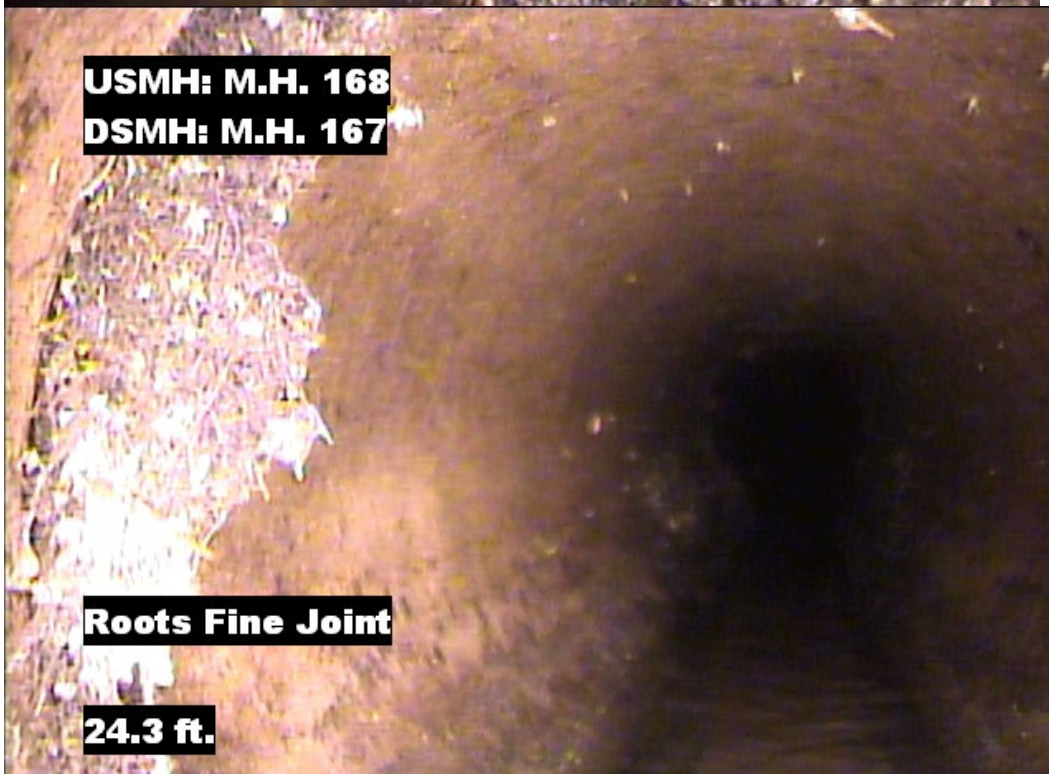
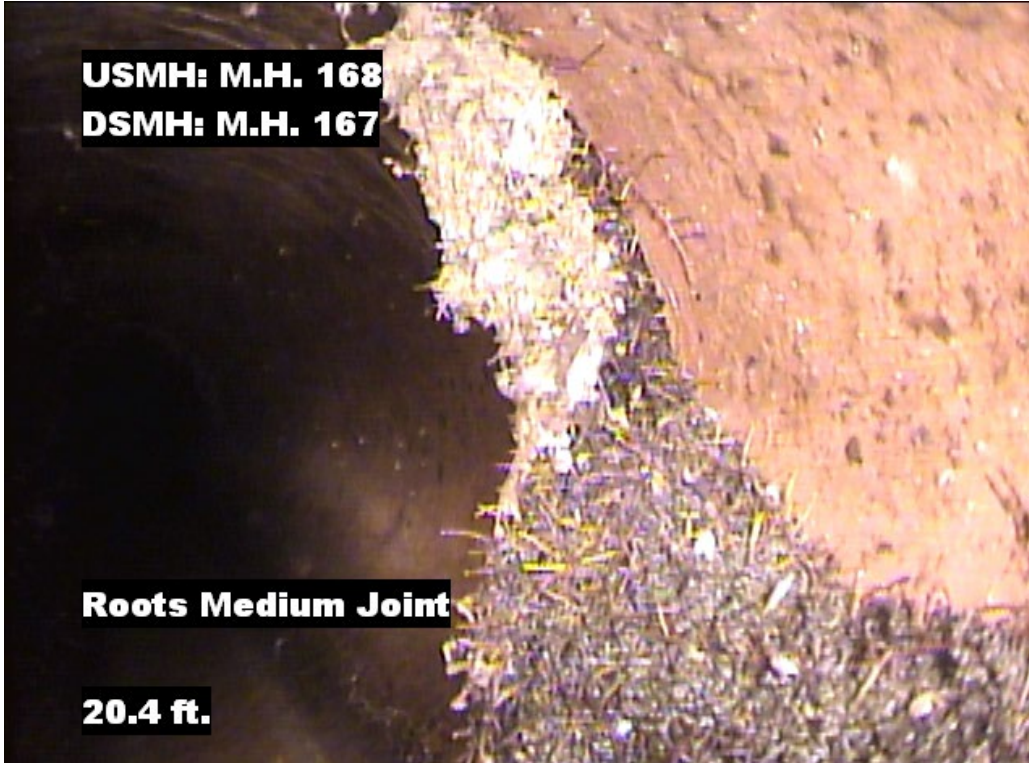


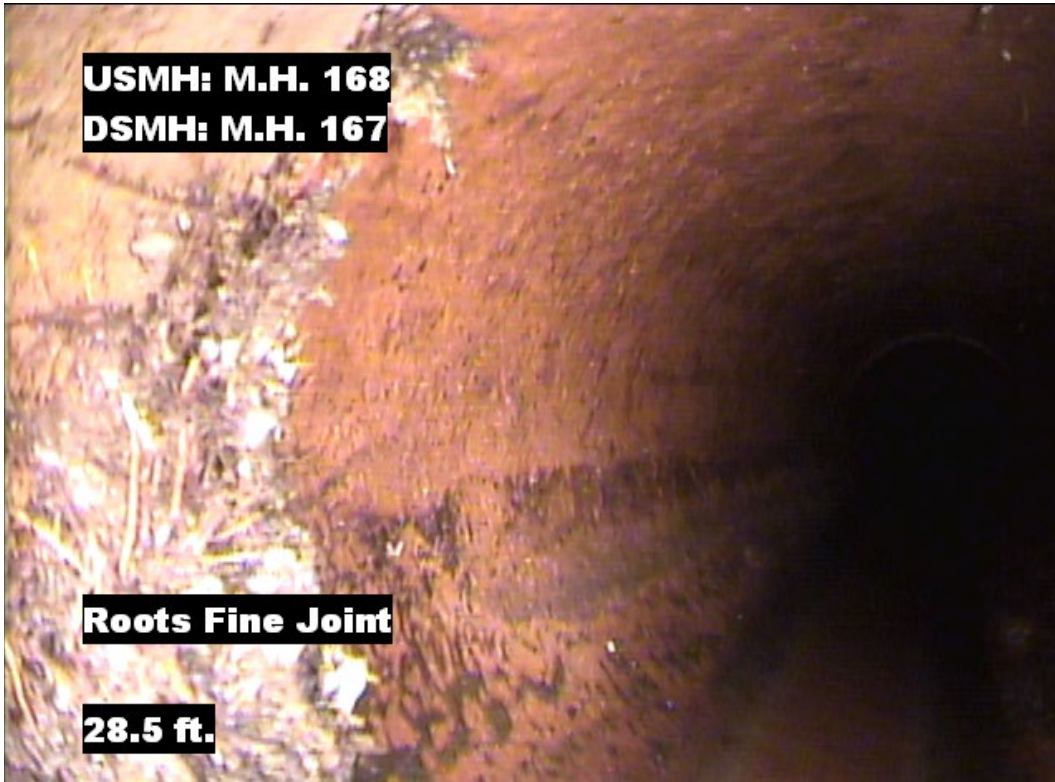
- 6. Zinnia Ct (Zone D) – Manhole 168 to Manhole 167 – Offset joint by MH 167 that prevents slip lining. Point Repair at MH 167



Recommended Repairs – Pipe Lining

1. Zinnia Court (Zone D) – Manhole 168 to Manhole 167 – Moderate root intrusion at joints, offset joints. Slip line 378 LF after offset joint point repair at PVC at MH 167. From 2023, offset joint issue.

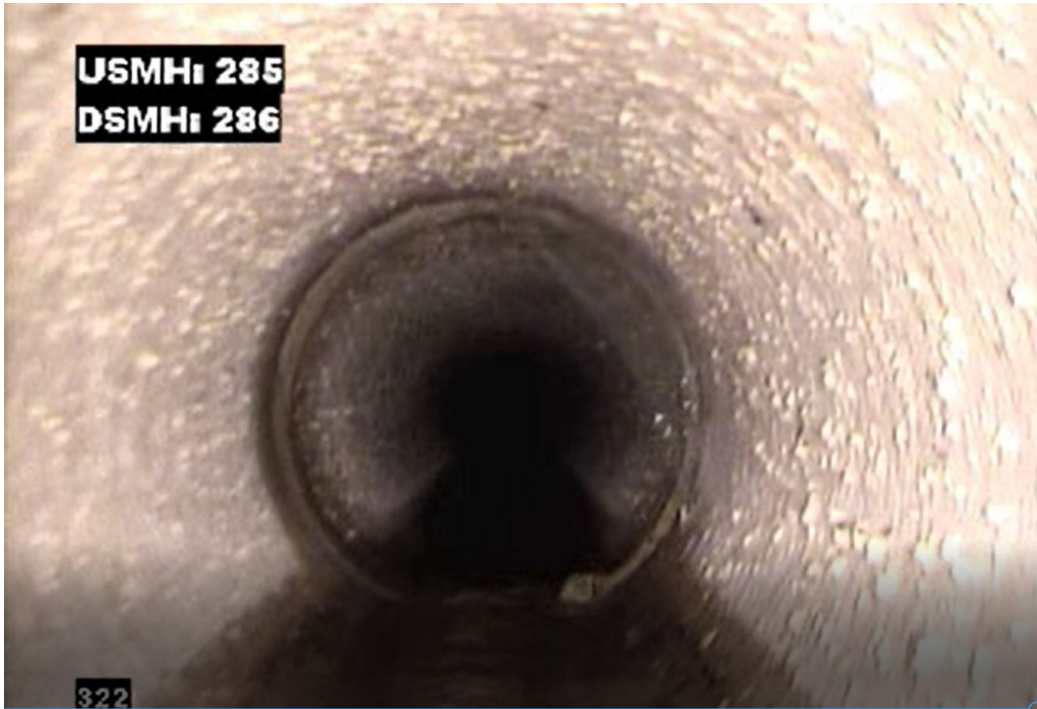




2. Kendrick Street Easement (Zone B)– Manhole 281 to Manhole 280 – Moderate cracks, broken pipe. Root intrusions throughout line. Slipline of 170 LF.



- 3. Joyce Way (Zone B) – Manhole 285 to Manhole 286 – Encrustation buildup throughout line, infiltration issues. Remove Encrustations and Slipline of 343 LF.



- 4. Applewood Ridge Road (Zone A) – Manhole 209 to Manhole 208 – Moderate cracks, light Off-sets. Slipline of 51 LF.



- 5. Echo Dr Easement (Zone B) – Manhole 228 to Manhole 229 – Moderate cracks, and roots, Missing MH 228. Slipline of 110 LF.



2023 MANHOLE CONDITION MAP

2023 MANHOLE CONDITION SPREADSHEETS

2023 VIDEO AND MANHOLE ZONE MAP

2023 LINE CLEANING ZONE MAP

2023 ANNUAL ROOT CUTTING MAP