

An aerial photograph showing a wide river or canal flowing through a landscape. To the right of the water is a multi-lane highway with several vehicles. On the left side of the river, there are some buildings and a parking area. The text is overlaid in red on the image.

Massillon Levee Pipe Inspection
Final Report
February 4, 2010

By

Pipeline and Drainage Consultants
Subsidiary of Spartan Construction

Arch Avenue Pump Station

Pump Station

Discharge Well/Outlet

Gravity Conduit Outlet



Sippo Creek Pump Station

This is an aerial photograph of the Sippo Creek Pump Station. The image shows a large body of water, Sippo Creek, which is crossed by a bridge in the upper portion. To the left of the creek, there are residential houses and trees. To the right, there is a parking lot with many cars and some commercial buildings. A railroad track runs parallel to the creek on the left side. Three red arrows point to specific features: one to the 'Outlet box' on the left bank, one to the 'Pump station' in the middle of the creek, and one to the 'Pump station inlet' on the right bank. The labels are in white boxes with black text.

Outlet box

Pump station

Pump station inlet



James Avenue Pump Station/ Opposite Gravity Culverts

Pump Station Discharge Well/outlet

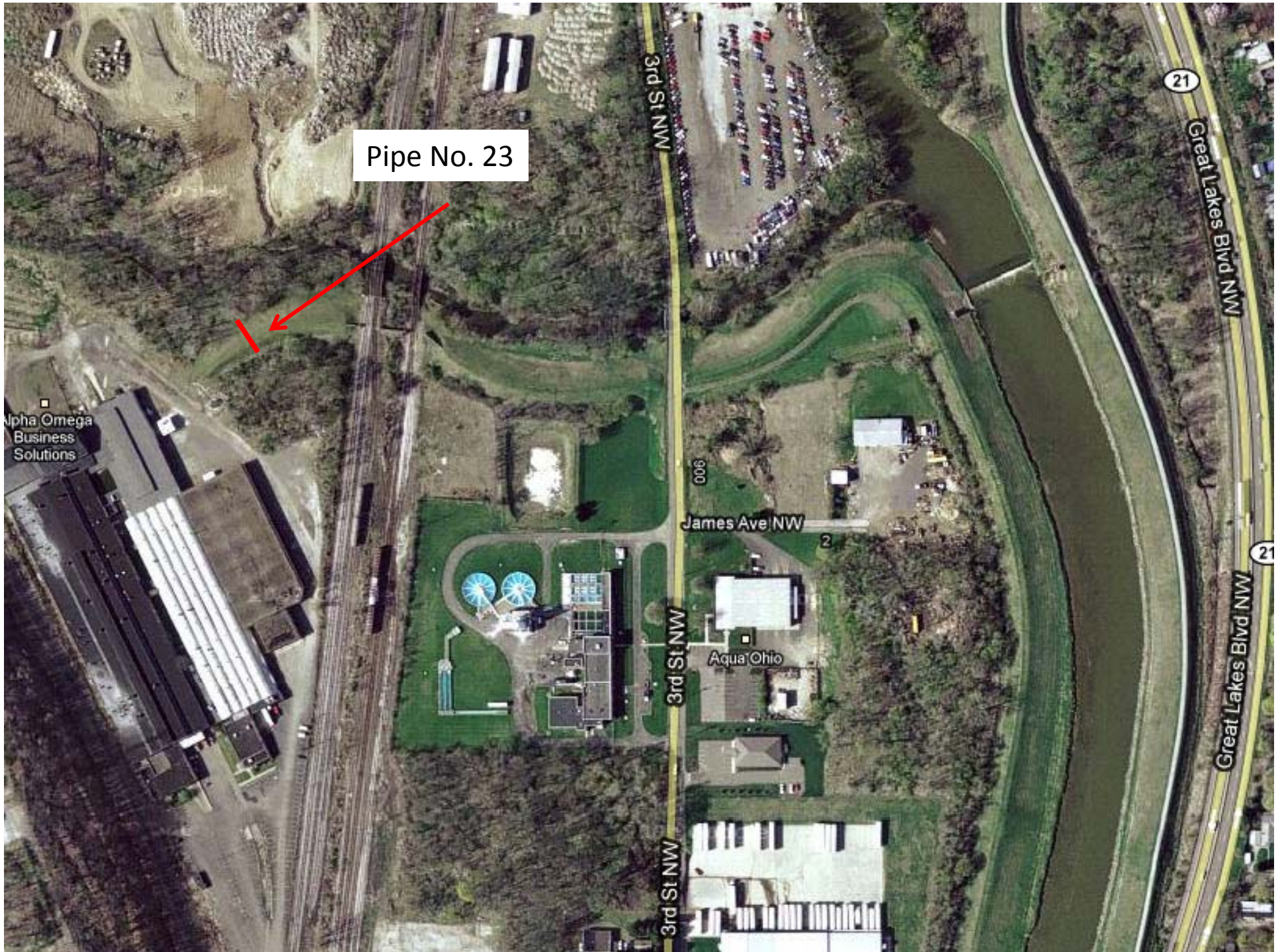
Pump Station

Pipe #26 Gatewell/outlet

Pipe #27 Inlet

Pipe #27

Pipe # 26 inlet



Pipe #25

On culvert thru West Bank Levee opposite Croose Avenue, 1000 ft
upstream of Cherry Road

inlet

Gatewell/outlet





Brookfield siphon inlet

Wooster siphon inlet

Brookfield siphon outlet

Wooster siphon outlet

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Image © 2009 DigitalGlobe

40°47'54.12" N 81°31'45.08" W elev. 283 m

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Imagery Date: Apr 18, 2006

Eye alt 648 m



Tuscarawas Siphon

inlet

outlet

©2009 Google

Imagery Date: Apr 18, 2006

Image © 2009 DigitalGlobe
40°47'34.00" N 81°31'35.28" W elev. 282 m

Eye alt 643 m

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue, 1000 ft upstream of Cherry Rd.
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCP	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

Army Corp of Engineers
Rating Guidelines for Levee Inspection

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
8. Monolith Joints	A	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
	M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
	U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
	N/A	There are no monolith joints in the interior drainage system.	
9. Culverts/Discharge Pipes ¹	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
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Interior Drainage System



Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
17. Intake and Discharge Pipelines	A	Intake and discharge pipelines have no corrosion and paint is intact, except for minor touch up required. Pipe couplings and anchors have no leakage or corrosion.	
	M	Intake and discharge pipelines have minor corrosion and repair and painting is required. Pipe coupling with anchors have minor leakage, corrosion and require bolts to be tightened.	
	U	Intake and discharge pipelines have major corrosion and replacement is required. Pipe coupling with anchors have major leakage and is heavily corroded and requires replacement.	
18. Sluice/ Slide Gates ¹	A	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
	M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
	U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
	N/A	There are no sluice/ slide gates.	
19. Flap Gates/ Flap Valves/ Pinch Valves ²	A	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
	M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
	U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
	N/A	There are no gates on discharge lines from pump station.	
20. Cranes ²	A	Cranes operational and have been inspected and load tested in accordance with applicable standards within the last year. Documentation is on hand.	
	M	Cranes have not been inspected or operationally tested within the past year, or there are visible signs of corrosion, oil leakage, etc, requiring maintenance.	
	U	Cranes are not operational, and this may prevent the pump station from functioning as required. No documentation available on cranes.	
	N/A	There are no cranes.	
21. Other Metallic Items (Equipment, Ladders, Platform, Anchors, etc)	A	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
	M	Corrosion seen on metallic parts appears to be maintainable.	
	U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
	N/A	There are no other significant metallic items.	

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¹ Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

² Proper operation of this item must be demonstrated during the inspection.

Grading of Defects

- All PACP defects assigned a grade from 1 to 5
 - 5 – Immediate Attention – Defect requires immediate attention
 - 4 – Poor – Severe defects that will become Grade 5 defects within the near future
 - 3 – Fair – Moderate defects that will continue to deteriorate
 - 2 – Good – Defects that have not begun to deteriorate
 - 1 – Excellent – Minor defects.

Defect Grades – Express Likelihood of Failure

- 5 – Pipe has failed or will likely fail within the next 5 years
- 4 – Pipe will probably fail in 5 to 10 years
- 3 – Pipe may fail in 10 to 20 years
- 2 – Pipe unlikely to fail for at least 20 years
- 1 – Failure unlikely in the foreseeable future

Pipe Inspection Summary

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location	Corp Rating	PACP Rating	Summary	Discussion/Recommendations
23	18	RCP	103	West of RR with Flap Gate	U	5	Outlet manhole severely deteriorated, partially collapsed during testing, significant amount of root intrusion, several joints offset throughout the structure.	Manhole severely deteriorated and needs to be replaced. Roots need to be removed and pipe needs to be sealed/grouted or lined.
24	12	RCP?	175	Could not locate/unknown/does not exist				
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue, 1000 ft upstream of Cherry Rd.	U	5	Inlet was completely buried and plugged. Significant joint leakage was occurring at the third joint from the inlet. Water continued to discharge from the joint for several weeks after cleaning.	Consideration should be given to adding a box and drop grate near at the inlet, or grated inlet. Joint should be sealed. Water source infiltrating into the structure should be located.
26	66	RCP	93	Culvert through East Bank Levee near control weir	M	5	Several joints offset throughout the structure, several joints broken, moisture present at several joints, pipe possibly starting show distress from water moving outside the structure.	Pipe joint should be sealed, damaged joint should be repaired. Structure may need to be lined.
27	42	DIP to RCP	360	At inlet to siphon control weir	U	5	DIP moderately corroded, several stained and leaking joints in RCP pipe. Heavy flow from joint at 173 feet. Radial and diagonal cracking noted in several areas along upstream side of the structure.	Manual entry was limited due to low oxygen levels in the pipe at the time of the inspection, unsure on voids at joints, Inlet grate severely corroded, no coating on the DIP, several stained in RCP. Inlet grate should be repaired, DIP should be recoated, and the joints in the RCP should be patched and sealed. Soundings should be conducted in areas of high infiltration.
28	48	RCP	97	James Avenue Pump Station Gravity Outlet	M	4	Sagging visible from inlet to gatewell, joint more open on bottom, several joint weeping water.	Pipe joints should be sealed.
29	30	CIP	100	Discharge from James Avenue Pump Station	M	4	All three pipes have moderate to severe corrosion at the joints. Missing protective coating was missing not only at the joints but in flat areas and sharp bends. It appears that point repairs of the protective coating have been made in sections.	Recommend air pressure testing to verify the integrity of the joints, areas of missing protective coating should be repaired prior to additional degradation.
30	30	CIP	100	Discharge from James Avenue Pump Station	M	4		
31	30	CIP	100	Discharge from James Avenue Pump Station	M	4		

Pipes	Size (Inches)	Material	Length (Feet)	Location	Corp Rating	PACP Rating	Summary	Discussion/Recommendations
32	60	RCP	135	Federal Avenue Pump Station Outlet	A-M	3 to 4	0-42 feet CMP, CMP bituminous coating missing in haunches, moderate corrosion, RCP 42 to gatewell appears to be in good condition, moisture present at some of the joints.	The CMP is starting to show signs of moderate to significant corrosion in areas, most of the paved invert is missing.
33	60	RCP	135	Federal Avenue Pump Station Outlet	A-M	3 to 4	0-42 feet CMP, CMP bituminous coating missing in haunches, moderate corrosion, RCP 42 to gatewell appears to be in good condition, moisture present at some of the joints.	
34	30	CIP	141	Discharge from Federal Avenue Pump Station	M	4	All three pipes have moderate to severe corrosion at the joints, missing protective coating also noted in flat areas and bends. It appears in some sections point repairs have been made on the protective coating.	Recommend air pressure testing to verify the integrity of the joints, areas of missing protective coating should be repaired prior to additional degradation.
35	30	CIP	141	Discharge from Federal Avenue Pump Station	M	4		
36	30	CIP	141	Discharge from Federal Avenue Pump Station	M	4		
37	15'X10'	RCB	120	Sippo Creek Pump Station	M	3 to 4	Most of the joints appear to have some weeping and/or signs of staining at the joints. Invert is rough in areas indicating moderate scouring. Rebar exposed and some spalling noticed in areas.	Recommend that the joints be repaired and sealed.
38	24	CIP	5	Discharge from Sippo Creek Pump Station	M	4	All three pipes have moderate to severe corrosion at the joints, missing protective coating also noted in the inverts and haunches of the pipes. Pipe #39 has a severe offset joint with potential leakage.	Recommend air pressure testing to verify the integrity of the joints, areas of missing protective coating should be repaired prior to additional degradation.
39	24	CIP	10	Discharge from Sippo Creek Pump Station	M	4		
40	24	CIP	20	Discharge from Sippo Creek Pump Station	M	4		

Pipes	Size (Inches)	Material	Length (Feet)	Location	Corp Rating	PACP Rating	Summary	Discussion/Recommendations
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station	M	3 to 4	Offset joint in crown of box at 23 ft, spalling in crown near gatewell, last section of pipe at (80 ft) outlet is offset and leaking, signs of potential soil movement.	All joints should be cleaned, resealed, and repaired if need. Offset joints should be evaluated for potential voids and pressure grouted if necessary.
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station	M	3 to 4	Water movement at entrance in crown and headwall, open joints between barrels, moisture present in some of the joints, offset joint in box at gatewell, last section of pipe at outlet is offset and leaking, signs of potential soil movement.	All joints should be cleaned, resealed, and repaired if need. Offset joints should be evaluated for potential voids and pressure grouted if necessary.
43	24	CIP	85	Discharge from Arch Avenue Pump Station	M	4	All three pipes have moderate to severe corrosion at the joints, missing protective coating also noted in the flat areas and flat bends.	Recommend air pressure testing to verify the integrity of the joints, areas of missing protective coating should be repaired prior to additional degradation.
44	24	CIP	85	Discharge from Arch Avenue Pump Station	M	4		
45	24	CIP	85	Discharge from Arch Avenue Pump Station	M	4		
46	48	RCP	90	Gravity Conduit through levee	A-M	3	Pipe is showing some signs of settlement could be due to movement of water under neath the structure caused by the up gradient CMP structure.	The CMP upstream line should be replaced or lined. Concern is that settlement is noticeable in the down stream line under the levee. Unsure if water moving outside the CMP may be flowing around the manhole and under the downstream structure potential causing the observed settlement.
46b	48	CMP	317	Gravity Conduit MH upstream of Levee	U	5	CMP structure is severely corroded, invert missing, pipe starting to deflect. Unsure how much water is moving outside/under the structure.	
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor	A-M	3	Minor corrosion at the joints, protective coating coming off in sheets in several areas. No gate valves/cut off valves were installed on the system.	All three pipes are showing minor to moderate loss of the protective coating, material coming off in sheets. System design did not allow for Sonar or entire pipe to be camera inspected. It is anticipated that additional heavy cleaning would degrade the life of the pipe through removal of the protective coating.
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor	A-M	3		
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor	A-M	3		
50	18	DIP	460	Siphon-Conduit-Wooster Trunk	M-U	4	Gate valves for Pipe No. 51 and 52 were frozen mid position, Gate valve for No. 50 difficult to turn. Pipe 51 and 52 could not be inspected. Pipe not 50 was severely corroded above the waterline.	Due to the limited inspection and the poor condition of the pipe that was inspected, and the difficulties of maintaining and inspecting the siphons consideration of replacing the siphon with a pump station should be weighed vs repairing several of the siphons.
51	10	DIP	460	Siphon-Conduit-Wooster Trunk	M-U	4		
52	15	DIP	460	Siphon-Conduit-Wooster Trunk	M-U	4		
53	8	VCP	450	Siphon-Conduit-Tuscarawas River	M-U	5	Gate valves were broken on both pipes, diversion board on inlet was rotted through. Metal pipe at gate valves severely corroded.	Due to the limited inspection and the poor condition of the pipe that was inspected, and the difficulties of maintaining and inspecting the siphons consideration of replacing the siphons with a pump station should be weighed vs repairing several of the siphons.
54	10	VCP	450	Siphon-Conduit-Tuscarawas River	M-U	4	Significant offset/and or debris build up at outlet of Pipe 53, several offset joints in Pipe No. 54.	

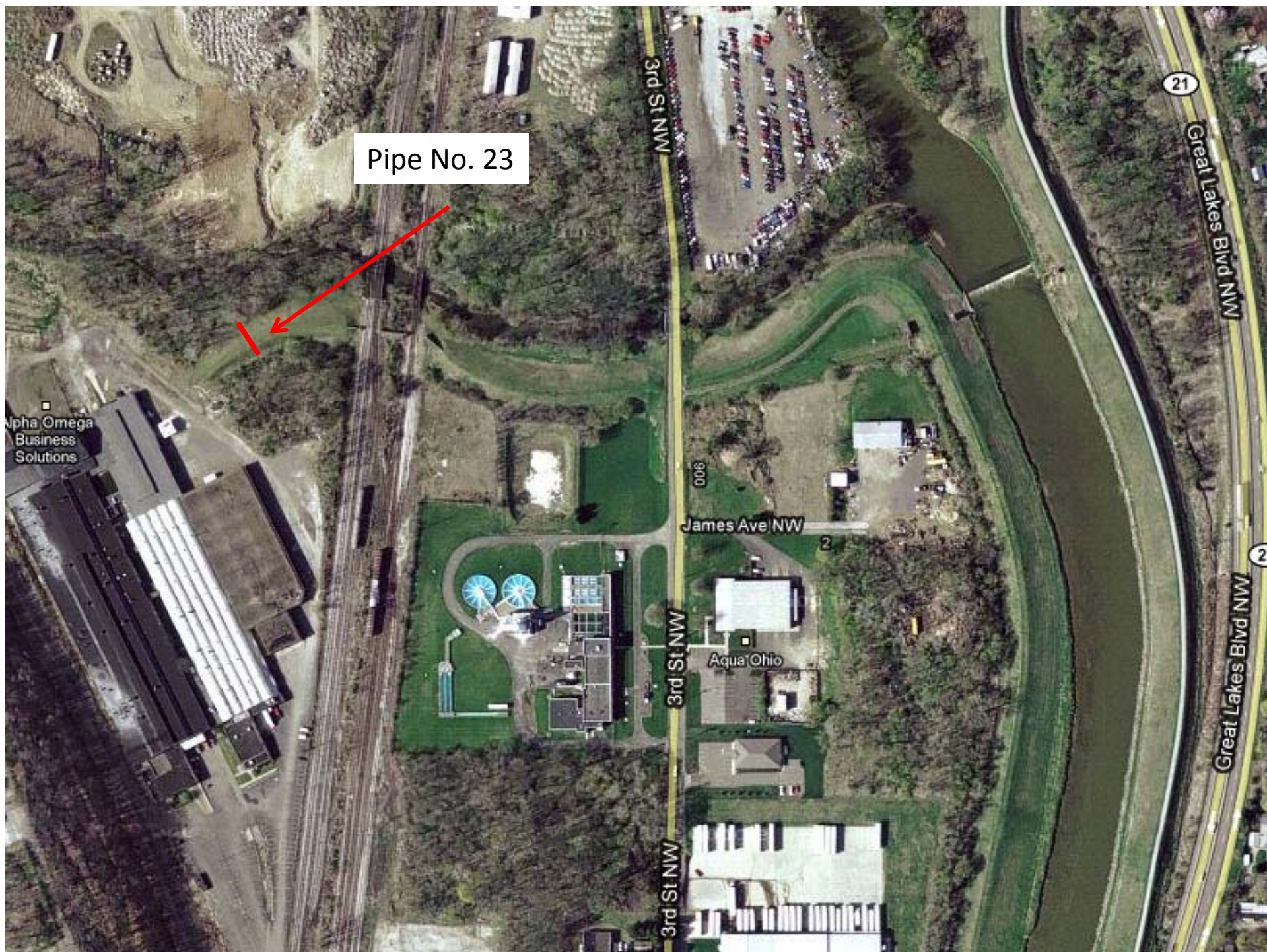
Pipe No. 23

18-Inch Storm Drain



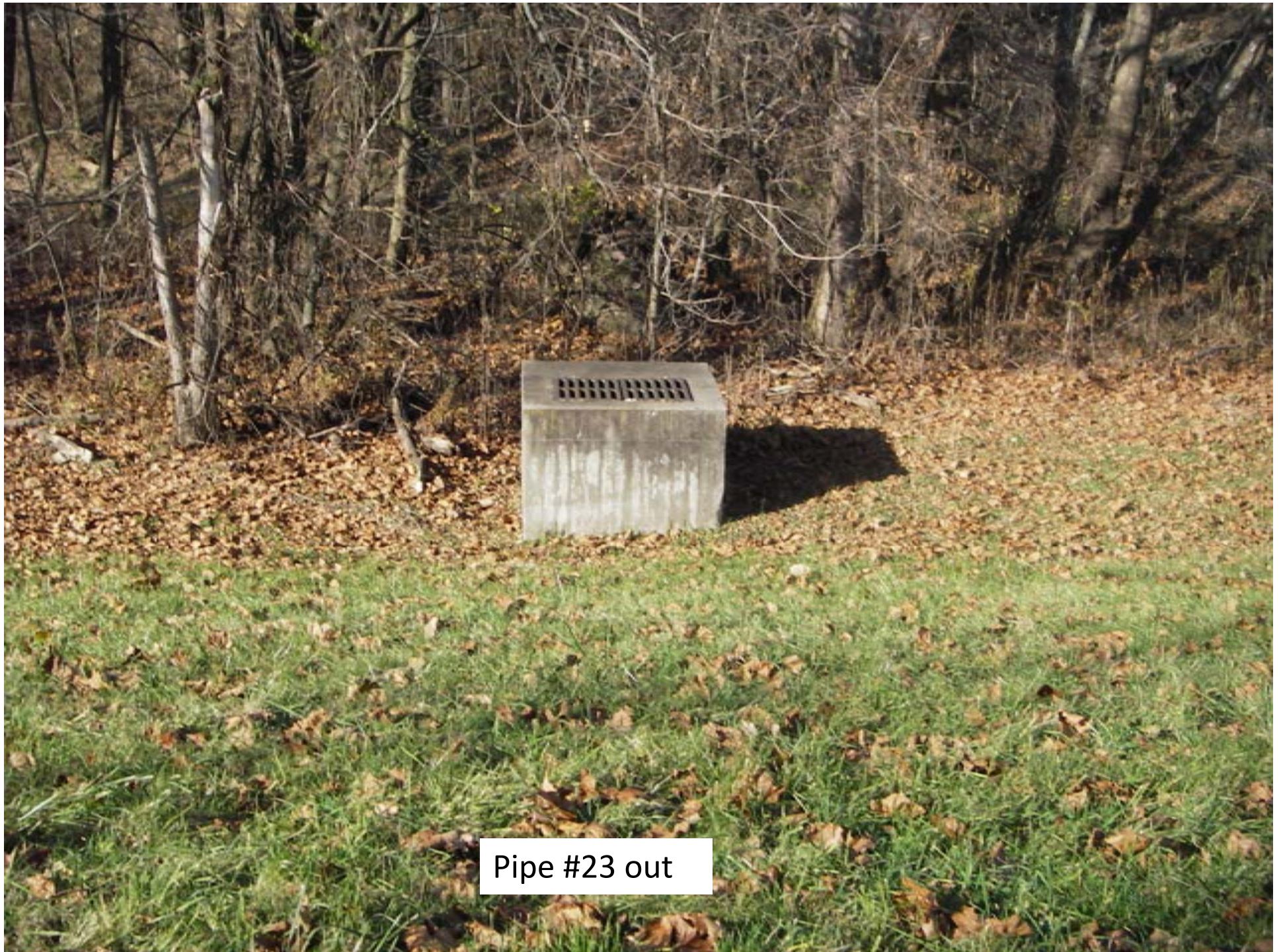
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53	8	VCP	450	Siphon-Conduit-Tuscarawas River
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Levee at pipe #23



Pipe #23 out

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133

CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

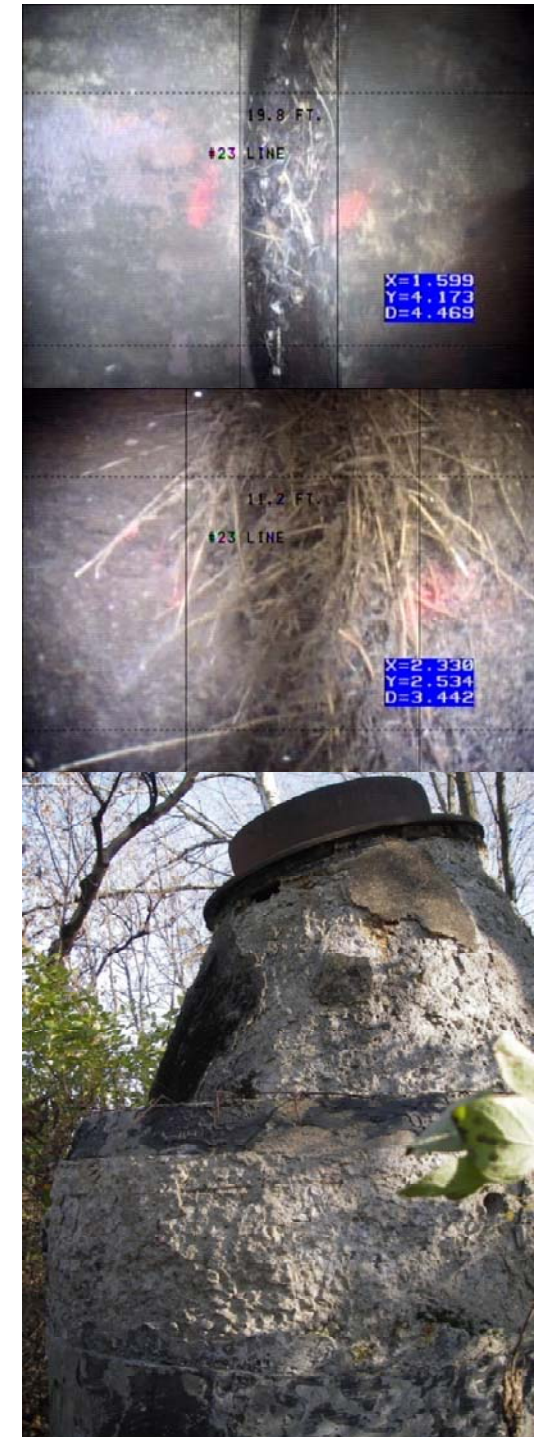
PIPE NO: 23 PIPE SIZE: 18" LENGTH INSPECTED: Approximately 103ft
PROJECT: Massillon Levee TYPE: RCP or Clay INSPECTION DATE: 9/16/09

OVERALL CONDITION: **NASSCO Grade 5: Manhole is currently failing/failed**

GENERAL INSPECTION FINDING: Manhole severely deteriorated. Manhole partially collapsed during testing. Significant amount of root intrusion towards the inlet end of the structure. Several joint throughout the structure offset.

MAJOR DEFECTS

Pipe #23 West of Rail Road	
Feet	Defect
2.2ft	Offset joint at invert
3.8ft	Roots coming through joints at invert
4.7ft	Roots coming through joint at approx. 9 o'clock
11.2ft	Roots completely covering joint at right haunch, approx. 2" joint separation at invert
19.8ft	1.5" joint separation at left haunch
76.5ft	2" joint separation at approx. 3 o'clock
80.8ft	Sediment covering invert
88.3ft	1.5" joint separation at approx. 3 o'clock
94.3ft	Approx. 2" joint separation right haunch
103 ft	Manhole, significant deterioration



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	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Other (Z)		DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connection (C)	RFC		1
	Roots (R) at a Joint		N/A	RF		1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connection (C)	RTC		2
	Roots (R) at a Joint		N/A	RT		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connection (C)	RMC		3
	Roots (R) at a Joint		N/A	RM		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connection (C)	RBC		4
	Roots (R) at a Joint		N/A	RB		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Protruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5



Pipe #23 Inlet



Manhole pipe #23 inlet

=== INSPECTION SETUP ===

SECTION: U91237-09-P-0133

09/16/09

ID: WEST OF RR TRACKS FLAP

MH START: OUTLET DNSTRM

MH STOP: INLET UPSTRM

LOCATION: 13+50

PIPE: 18" RCP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0+00

ONSCREEN:

#23 LINE ■

Line #23 start



2.2 FT.

#23 LINE

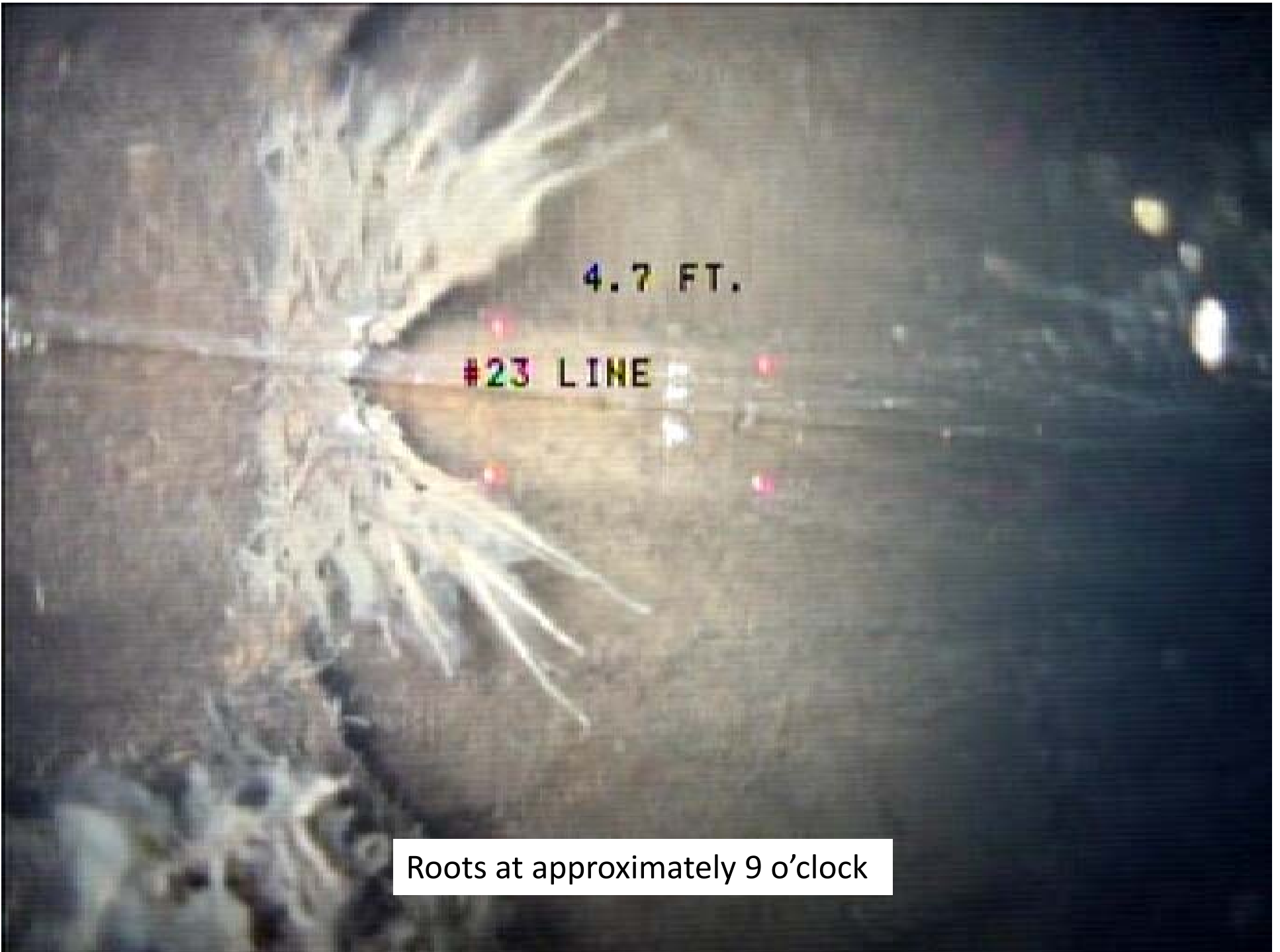
Offset joint at invert

3.8 FT.

#23 LINE

Roots coming in through joints at invert





4.7 FT.

#23 LINE

Roots at approximately 9 o'clock

11.2 FT.

#23 LINE

X=2.330
Y=2.534
D=3.442

Roots covering up joint at right haunch



Approx. 1" joint separation invert



11.2 FT.

This is an underwater photograph showing a tree trunk and its roots. The water is dark and murky. A red laser line is visible on the left side of the tree trunk. The text '11.2 FT.' is overlaid on the image.

#23 LINE

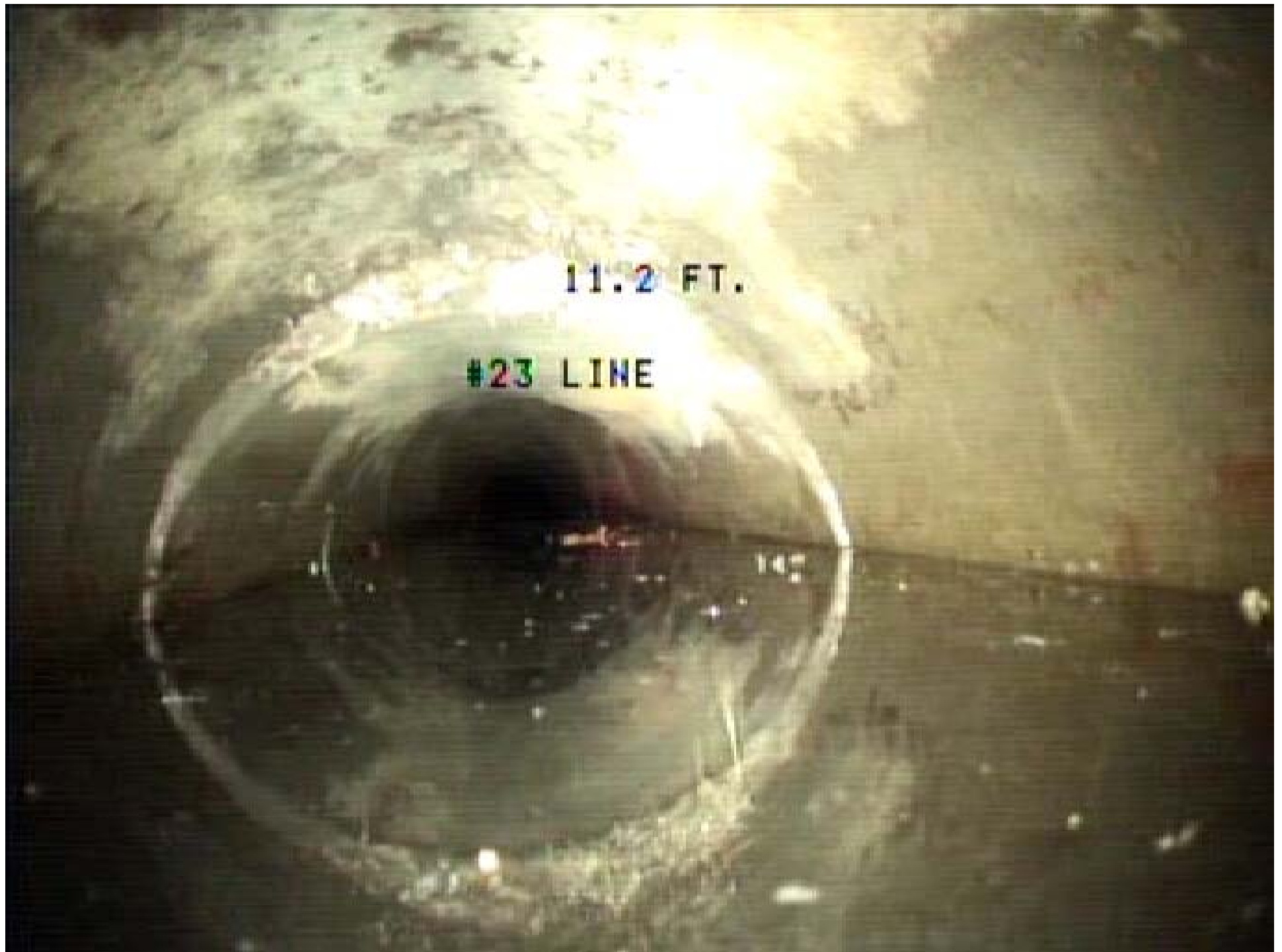
This is an underwater photograph showing a tree trunk and its roots. The water is dark and murky. A red laser line is visible on the left side of the tree trunk. The text '#23 LINE' is overlaid on the image.

Roots exposed at 9 o'clock-11.2ft

This is an underwater photograph showing a tree trunk and its roots. The water is dark and murky. A red laser line is visible on the left side of the tree trunk. The text 'Roots exposed at 9 o'clock-11.2ft' is overlaid on the image.

11.2 FT.

#23 LINE





Roots exposed left haunch-15.3ft

An underwater photograph showing a white starfish resting on a sandy, light-colored seabed. The starfish is positioned in the upper left quadrant of the frame. The surrounding water is dark blue, and the seabed is covered in fine sand and small, light-colored particles. Two text overlays are present: "17.3 FT." in blue and "#23 LINE" in green and blue.

17.3 FT.

#23 LINE

Roots exposed through right haunch

19.8 FT.

#23 LINE

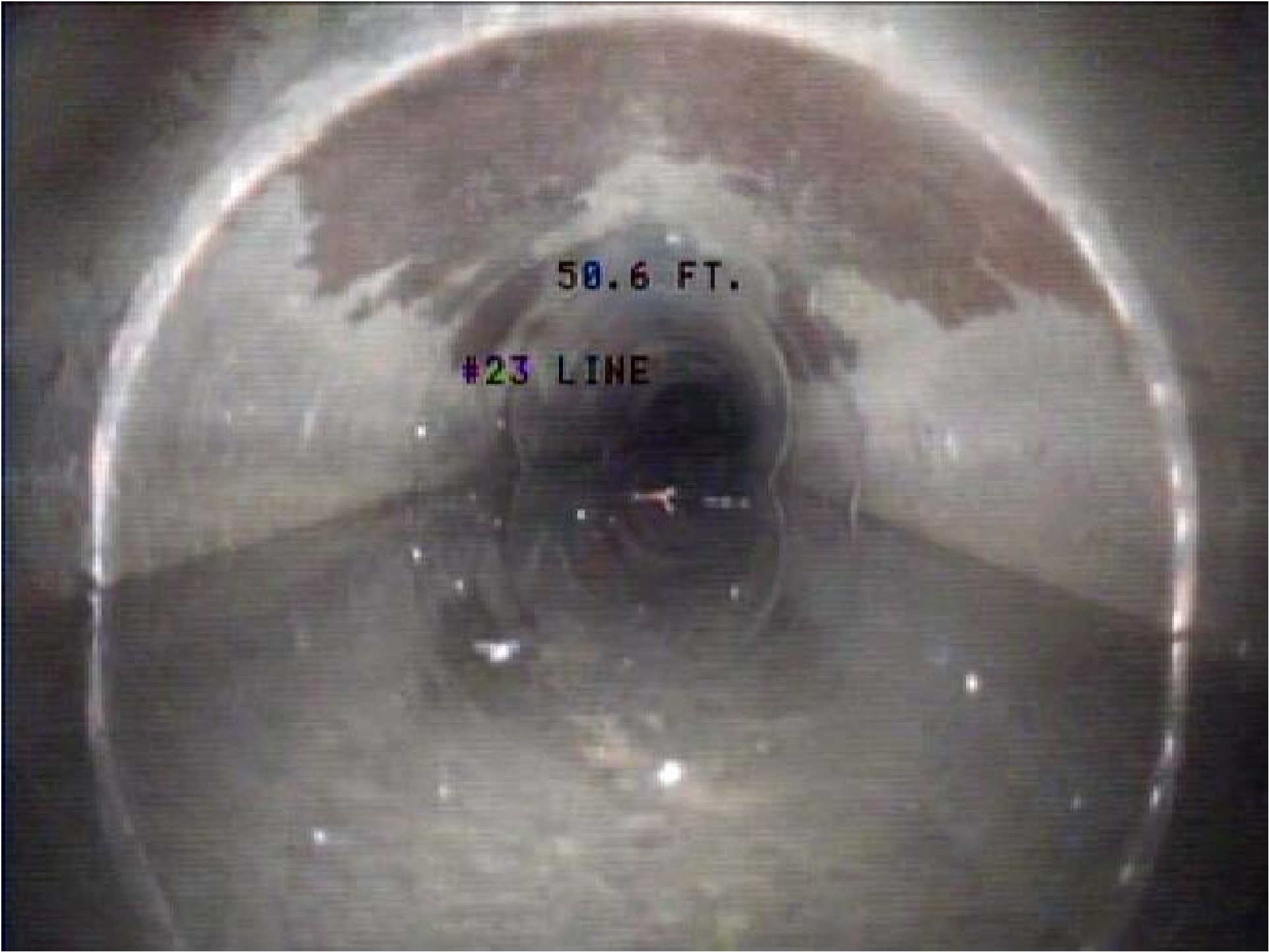
X=1.599
Y=4.173
D=4.469

1.5" joint separation

31.8 FT.

#23 LINE





50.6 FT.

#23 LINE



57.9 FT.

#23 LINE



67.8 FT.

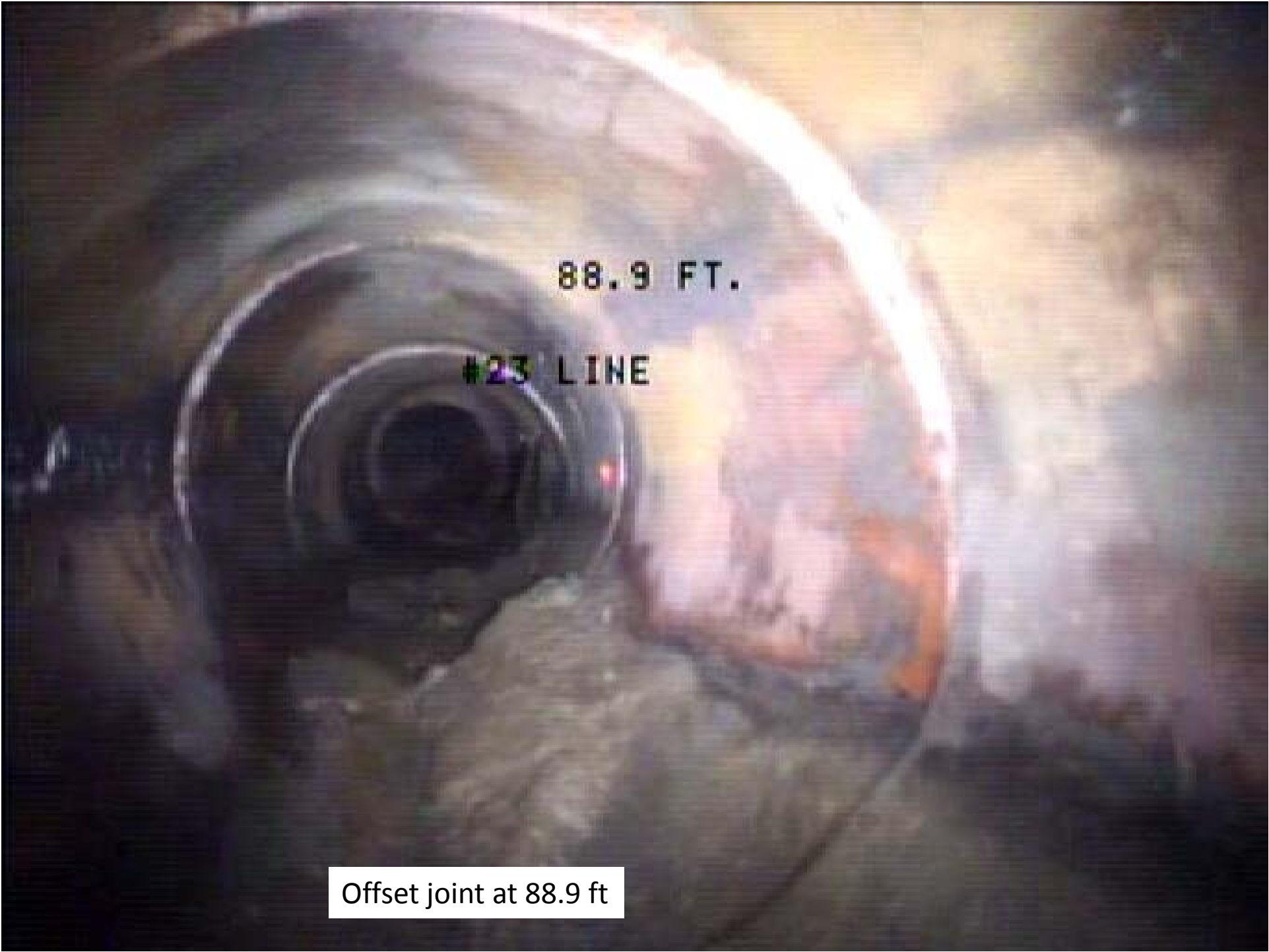
#23 LINE

76.5 FT.

#23 LINE

X=1.939
Y=3.443
D=3.952

Approx. 2" joint separation 3 o'clock



88.9 FT.

#23 LINE

Offset joint at 88.9 ft

80.8 FT.

#23 LINE



88.3 FT.

#23 LINE

X=1.434
Y=2.691
D=3.049

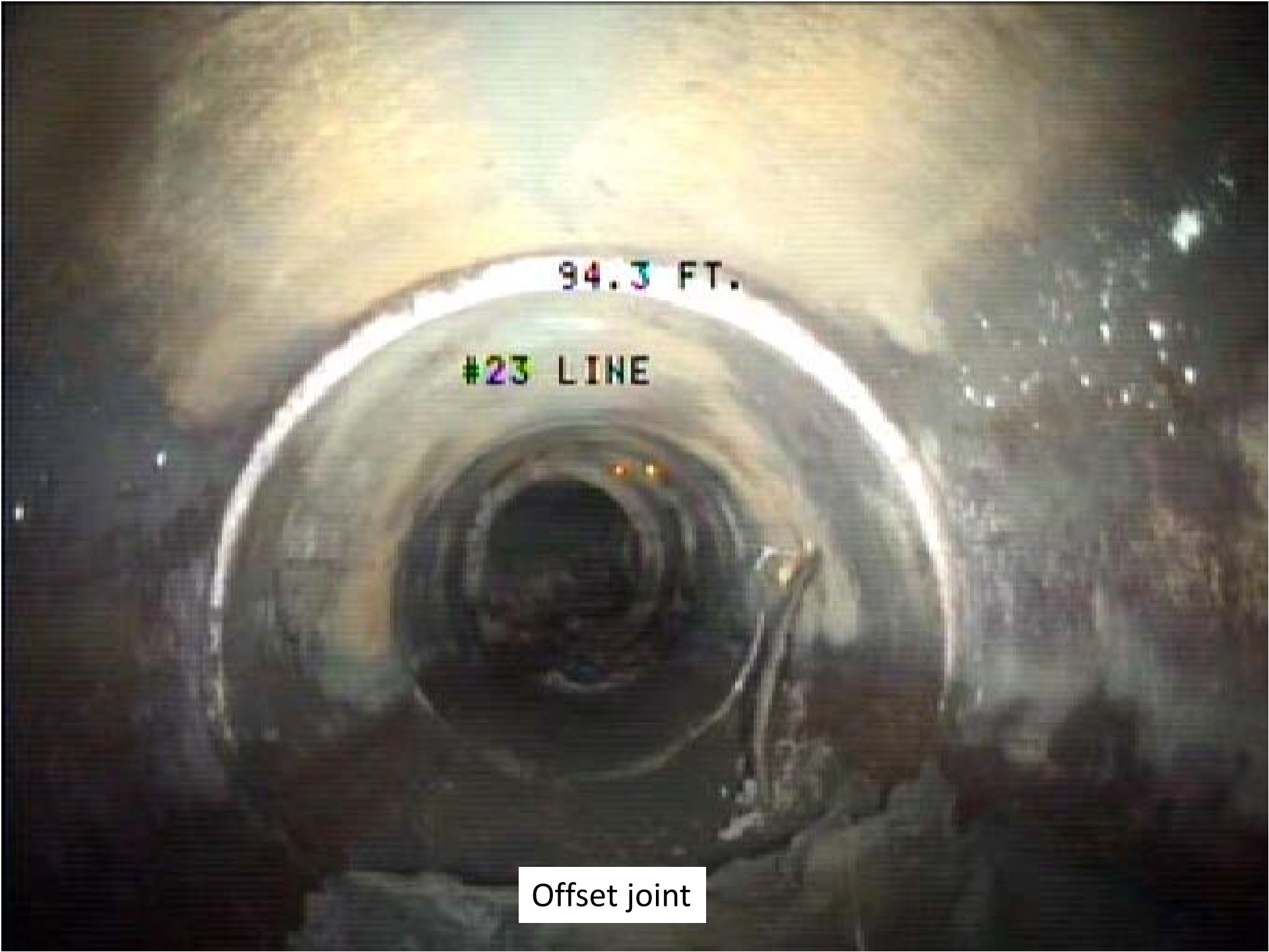
Approx. 1.5" joint separation 3 o'clock



94.3 FT.

#23 LINE

Approx. 2" joint separation right haunch



94.3 FT.

#23 LINE

Offset joint

97.2 FT.

#23 LINE

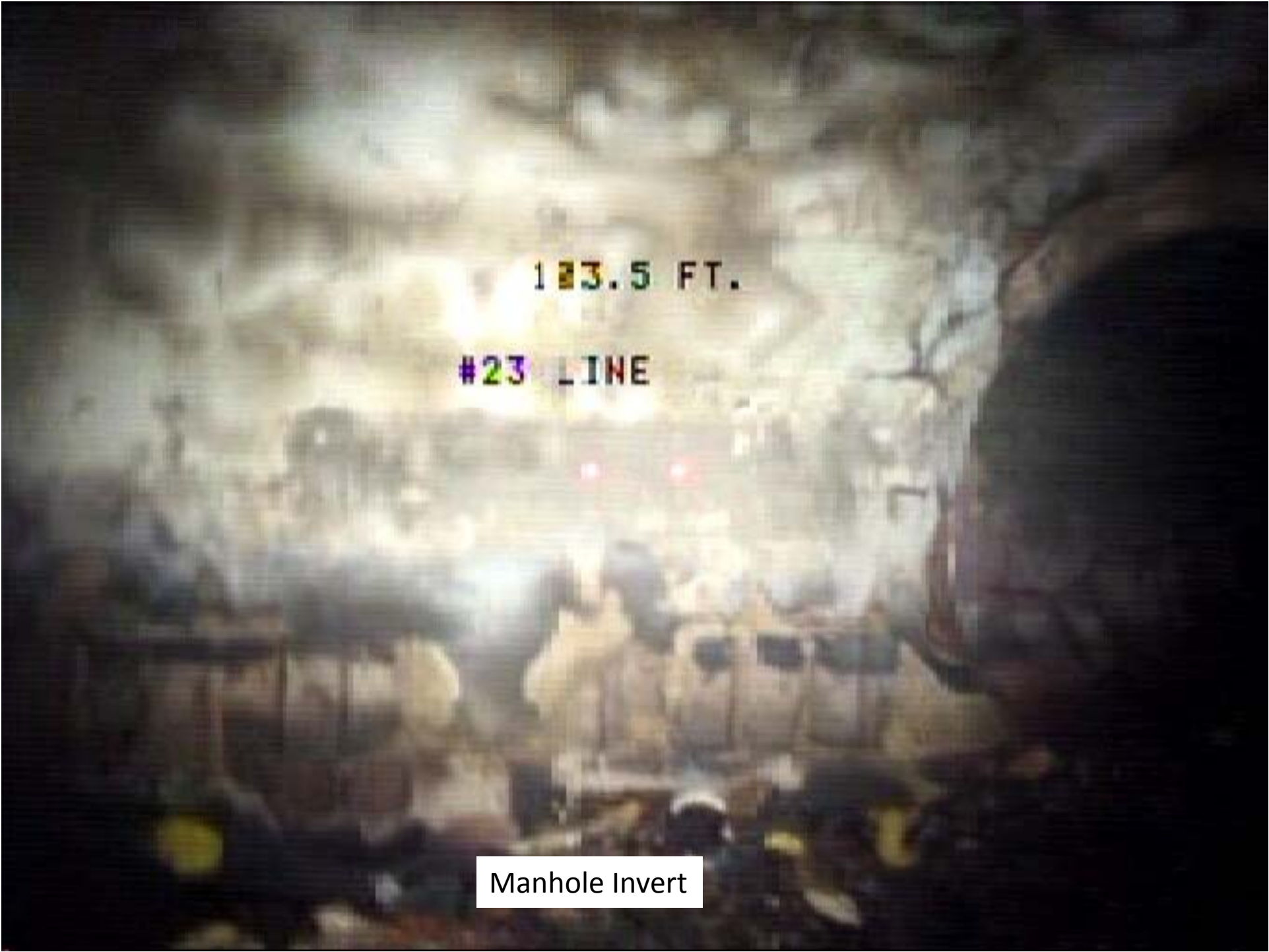




100.2 FT.

#23 LINE

Manhole Inlet End



123.5 FT.

#23 LINE

Manhole Invert



13.5 FT.

#23 LINE

Manhole Invert

A photograph taken from inside a dark tunnel. A bright, circular light source is visible at the top center, casting a strong glow. Below the light, the text "133.5 FT." is visible. Further down, the text "#23 LINE" is visible. A red arrow points from a text box at the bottom left to a bright, tilted cone of light on the right side of the tunnel.

133.5 FT.

#23 LINE

Cone tilted and offset



133.5 FT.

#23 LINE

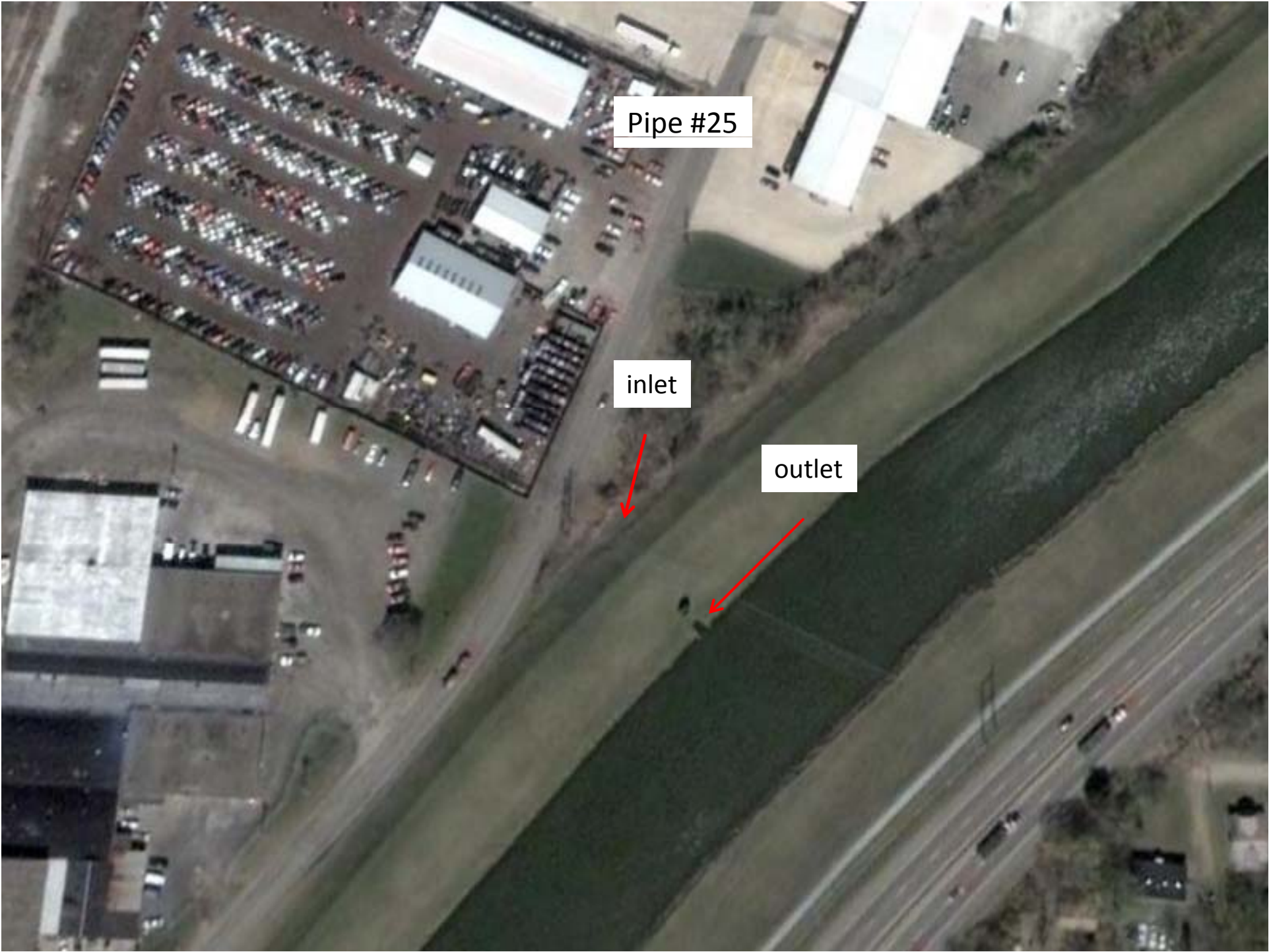
End of Pipe

Pipe No. 25

42-Inch RCP Storm Drain



Pipes Inspected, Massillon Levee				
Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Pipe #25

An aerial photograph showing an industrial facility. On the left is a large parking lot filled with cars. In the center are several large white industrial buildings. To the right is a wide river. A multi-lane highway runs along the bottom right of the image. Red arrows point from labels to specific locations in the river. The label 'Pipe #25' is positioned above the 'inlet' label.

inlet

outlet

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133

CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: 25 PIPE SIZE: 42" LENGTH INSPECTED: Approximately 95ft
PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 10/30/09

OVERALL CONDITION: **NASSCO Grade 5 – Defect requires immediate attention**

GENERAL INSPECTION FINDING: Inlet was completely buried and plugged. Significant joint leakage was occurring at the third joint from the inlet. **Water continued to discharge from the joint for several weeks**, Unsure of the water source. Joint material rolled from joint in several areas. Invert to springline appears to be grouted. Outlet end from gatewell to headwall could not be inspected.

MAJOR DEFECTS

Pipe #25	
Feet	Defect
3.7ft	Offset joint, gasket rolled
10.8ft	Significant leakage at joint, running for several weeks
15.1ft	Staining at joint
19.1ft	Diagonal crack in bell
22.4ft	Staining at joint
31ft	Staining at joint
46.9 ft	Gasket rolled
78.9ft	Crack through bell



NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Other (Z)		DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connection (C)	RFC		1
	Roots (R) at a Joint		N/A	RF		1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connection (C)	RTC		2
	Roots (R) at a Joint		N/A	RT		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connection (C)	RMC		3
	Roots (R) at a Joint		N/A	RM		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connection (C)	RBC		4
	Roots (R) at a Joint		N/A	RB		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Protruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

Buried Inlet



Buried Inlet, structure/pipe was completely covered and plugged

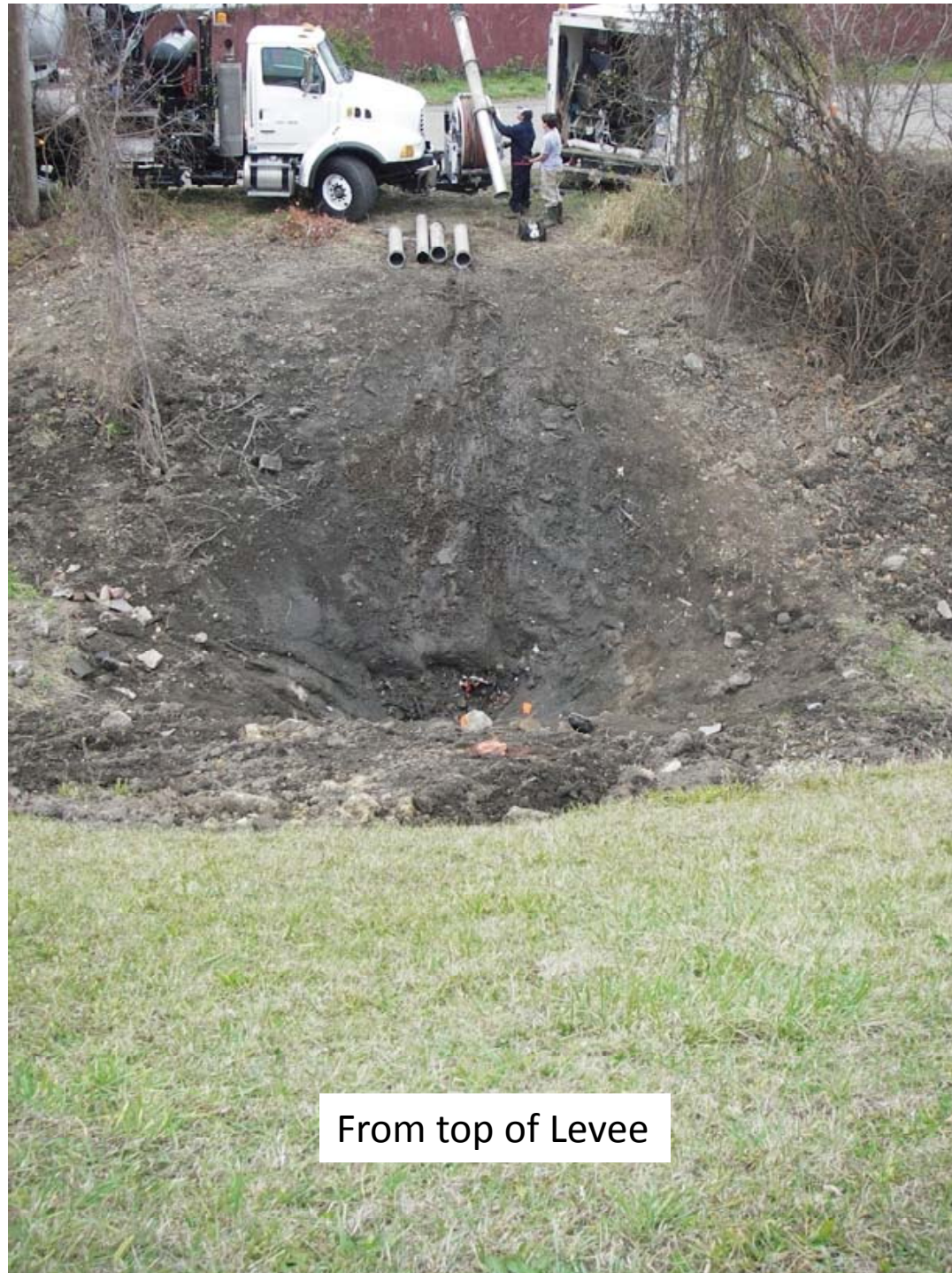


Buried Inlet



Buried Inlet





From top of Levee

Gate well from top of Levee





Headwall of Outlet

Headwall from top of gate well



From top of gate well looking across levee at inlet





General Cleaning and TV Photos,
Pipe was completely buried and
plugged, unsure how long water
was allowed to pond and seep
into the levee

General Cleaning and TV Photos



General Cleaning and TV Photos



General Cleaning and TV Photos



General Cleaning and TV Photos





Pipe after cleaning

=== INSPECTION SETUP ===

SECTION: PRO NO. W91237-09-P-0133

10/30/09

ID: MASSILLON OHIO

MH START: ROADSIDE

MH STOP: RIVERSIDE

LOCATION: 42" CULVERT THRU WEST BANK

PIPE: 42" STORM RCP

OPERATOR: KEVIN

TAPE ID: MASS. SIPHON

START: 0:00

:

ONSCREEN:

42" STORM WEST BANK

Pipe after 5 heavy cleaning passes



4.9 FT.

42" SOUTH WEST BANK LEVEE



2.0 FT.

42" STORMWATER BANK LEVEE

Leaking joint (3rd joint from inlet), camera zoomed from inlet.

2.0 FT.

42" STORM WEST BANK LEVEE



Joint Leaking



Location on levee where leaky joint was found

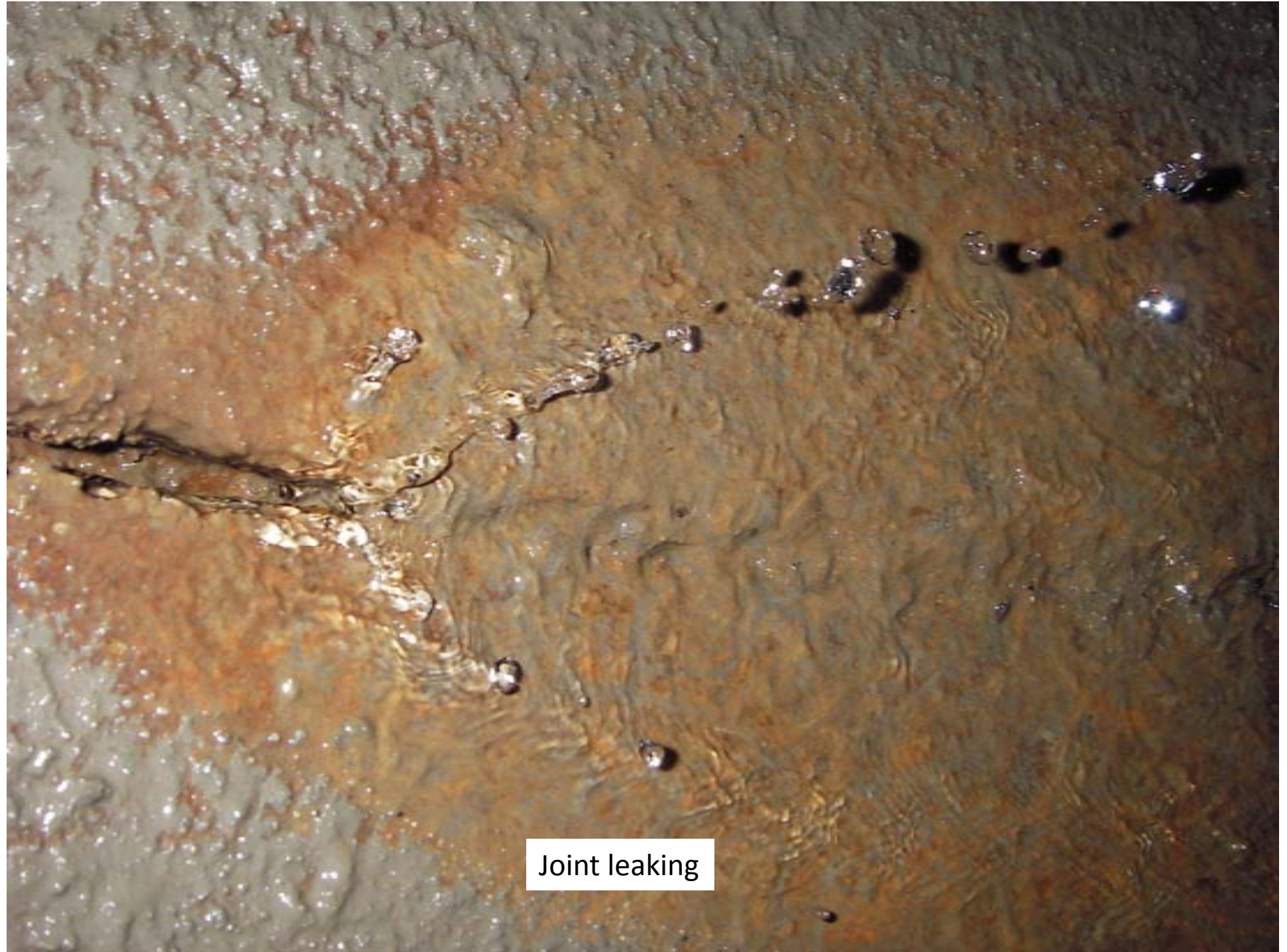




Offset joint at crown near inlet

A photograph of a concrete wall with a diagonal crack. The crack runs from the upper right towards the lower left. Water is leaking from the crack, creating a wet, brownish-orange stain on the concrete surface. The concrete has a rough, textured appearance with some small pits and bubbles. The lighting is dim, and the background is dark.

Joint leaking



Joint leaking



2.0 FT.

42" STORM WEST BANK LEVEE

Offset Joints



2.0 FT.

42" RCP #25 OPP. GROOSE AVE

Offset Joints

Gasket material visible

3.7 FT
42" RCP #25 OPP. GROOSE AVE

Joint leaking

3.7 FT.

42" RCP #25 OPP. GROOSE AVE



15.1 FT.

42" RCP #25 OPP. GROOSE AVE

Cracked bell

19.1 FT.

42" RCP #25 ORF. GROOSE AVE

Staining at joint in crown

22.4 FT.

42" RCP #25 OPP. GROOSE AVE

Staining at joint in crown

31.0 FT.

42" RCP #25

OPP. GROOSE AVE



31.0 FT.

42" RCP #25 OPP. GROOSE AVE

Pipe grouted to springline, photo inverted

38.8 FT.

42" RCP #25 OPP. GROOSE AVE

Joint/Gasket material exposed at joint

46.9 FT.

42" RCP #25 OPP. GROUSE AVE

A photograph of a dark, circular tunnel, likely a manhole or inspection shaft. The tunnel walls are dark and textured. In the center, a light source is visible, creating a bright glow and illuminating the surrounding area. The light source appears to be a small, rectangular object with a red light on the left and a white light on the right. The overall scene is dimly lit, with the primary light coming from the center.

63.1 FT.

42" RCP #25 OFF. GROOSE AVE



71.5 FT.

42" RCP #25 OPP. GROOSE AVE



78.9 FT.

42" RCP #25 OPP. GROOSE AVE

Cracked Bell

78.9 FT.

42" RCP #25 OPP. GROOSE AVE

Gate/Debris under gate

90.7 FT.

42" RCP #25 OPP. GROOSE AVE

Gate/Debris under gate

91.3 FT.

42" RCP #25 OPP. GROOSE AVE

Pipe No. 26

66-Inch RCP Storm Drain



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Pipe No. 26. Culvert through East Bank Levee near control weir

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: 26 PIPE SIZE: 5.5' LENGTH INSPECTED: Approximately 93ft
PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 9/16/09

OVERALL CONDITION: **NASSCO Grade 5 – Defects required immediate attention**

GENERAL INSPECTION FINDING: Several joints offset throughout the structure, several joints broken, moisture present at several joints, pipes starting to show possible distress from water moving outside the structure.

MAJOR DEFECTS

Pipe # 26	
Feet	Defect
Start-Outlet	Invert of headwall scoured/eroded and missing, 17" across. 4" depth of invert missing
6ft	Offset joint, cracked, spalled, scoured
12ft	Concrete missing from invert of pipe, entrance into gatewell
21ft	Busted, broken joint. Piece missing from joint/scouring/ 4" joint separation, offset joint , backfill visible
22ft	Spalling/ joint
35ft	Moisture/water flowing @haunch
42ft	Deterioration of joint at invert
46ft	Offset Joint
52ft	1" offset joint
57ft	Spalling at joint
62ft	Seal exposed and being pushed from joint
67ft	Joint seal deteriorating, moisture present at joint
67ft	Wet joint left haunch
73ft	1 ½" joint separation left haunch, moisture present
73ft	4" penetration left haunch
78ft	Scouring of joint at approx. 11 o'clock
83ft	Spalled/broken invert/moisture present
88ft	Spalled/broken invert/moisture present
93ft	Large piece of headwall missing at invert of inlet approx. 36" across



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Structural	Crack (C)	Circumferential (C)		CC	1	
		Longitudinal (L)		CL	2	
		Multiple (M)		CM	3	
		Spiral (S)		CS	2	
Structural	Fracture (F)	Circumferential (C)		FC	2	
		Longitudinal (L)		FL	3	
		Multiple (M)		FM	4	
		Spiral (S)		FS	3	
Structural	Pipe Failures (Silent)	Broken (B)		B	1 clock pos - 3, 2 clock pos - 4, >=3 clock pos - 5	
		Broken (B)	Soil Visible (SV)	BSV	5	
		Broken (B)	Void Visible (V V)	BVV	5	
		Hole (H)		H	1 clock pos - 3, 2 clock pos - 4, >= 3 clock pos - 5	
Structural	Collapse (X)	Hole (H)	Soil Visible (SV)	HSV	5	
		Hole (H)	Void Visible (V V)	HVV	5	
		Pipe (P)		XP	5	
		Brick (B)		XB	5	
Structural	Deformed (D)	(Pipe) (P)		D	<=10% - 4, >10% - 5	
		Brick (B)	Horizontally (H)	DH	5	
		Brick (B)	Vertically (V)	DV	5	
Structural	Joint (J)	Offset (displaced) (O)	Med (M)	JOM	1	
			Large (L)	JOL	2	
		Separated (open) (S)	Med (M)	JSM	1	
			Large (L)	JSL	2	
		Angular (A)	Med (M)	JAM	1	
			Large (L)	JAL	2	
		Surface Damage Chemical (S)				
		Roughness Increased (RI)	C	SRIC	1	
		Surface Spalling (SS)	C	SSSC	2	
		Aggregate Visible (AV)	C	SAVC	3	
		Aggregate Projecting (AP)	C	SAPC	3	
		Aggregate Missing (AM)	C	SAMC	4	
		Reinforcement Visible (RV)	C	SRVC	5	
		Reinforcement Corroded (RC)	C	SRCC	5	



=== INSPECTION SETUP ===

SECTION: 91235-99-P-8133

09/16/99

ID: CULVERT - EAST DRAIN LEE

MH START: OUTLET DRAIN

MH START: INLET DRAIN

LOCATION: 147

PIPE: 65 RCP

OPERATOR: JOHN

TAPE ID: NASSILON

START: 0+08

ONSCREEN:

26 LINE

5.9 FT.

#26 LINE



5.9 FT.

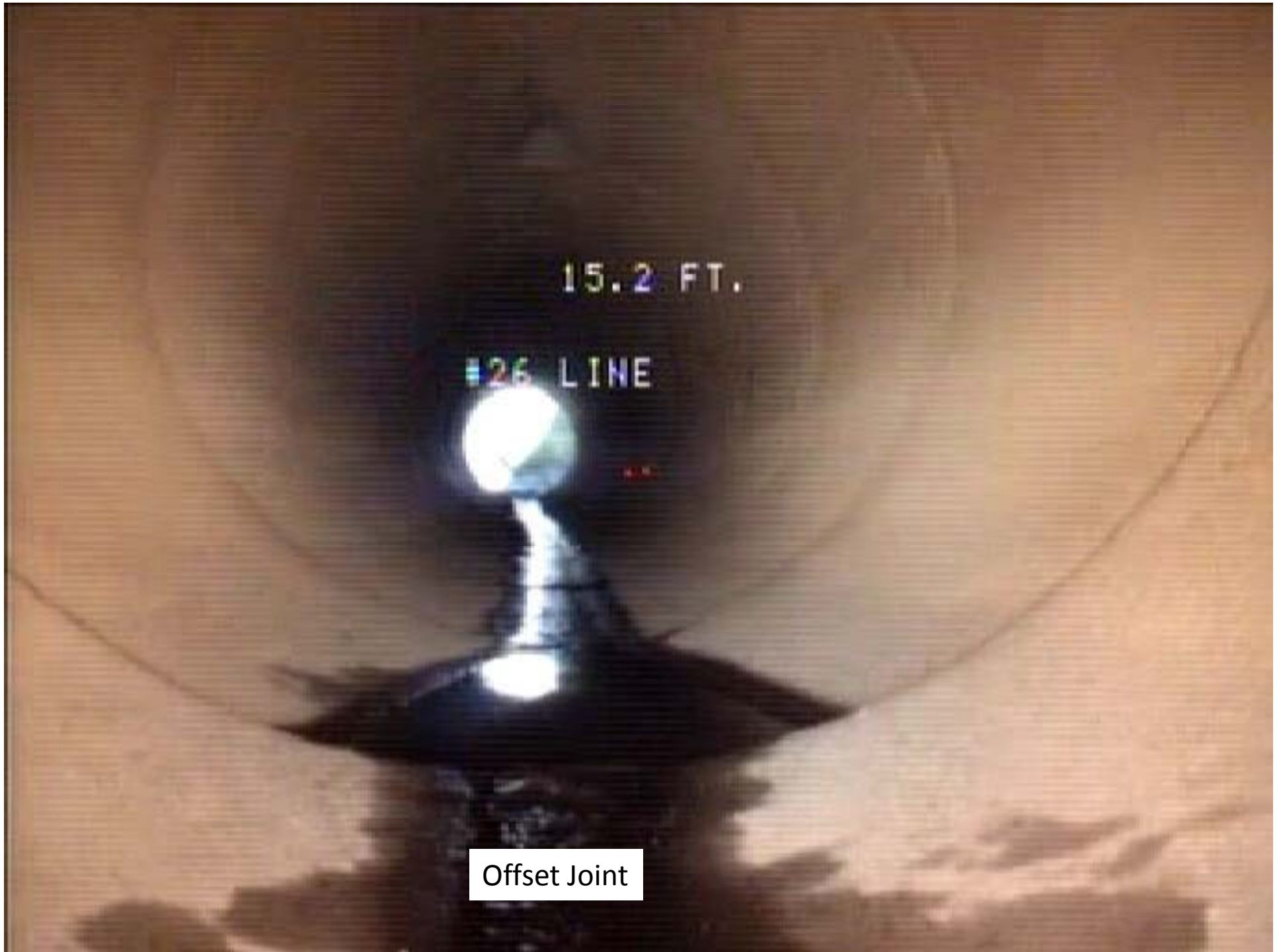
#26 LINE



15.2 FT.

#26 LINE

Offset Joint





Backfill visible 20.4 ft.



Busted Joint

20.4 FT.

#25 LINE



20.4 FT.

#26 LINE







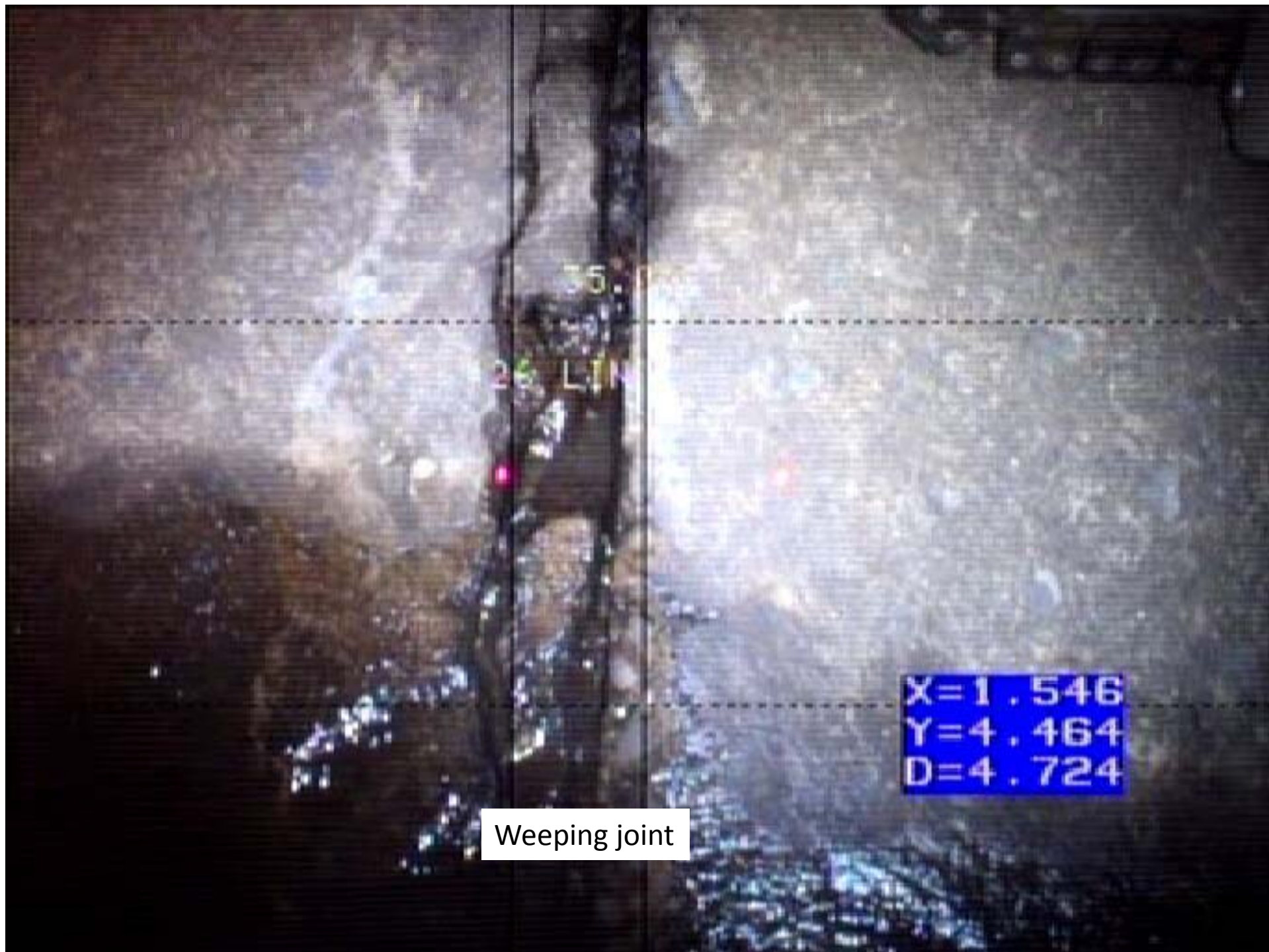
20.4 FT.

#26 LINE

25.7 FT.

#26 LINE





Weeping joint

46.3 FT.

#26 LINE

Offset Joint

85.8 FT.

#26 LINE



35.8 FT.

#26 LINE

Entrance spalled, cracked , and missing

Pipe #26, walk through photos
from gatewell going up stream,
Photos looking at gate/outlet



Spalled and missing



2-inch joint offset in crown- 22ft



Joint separated and scoured 7:00- 27ft



Cracking along joint 2:00- 27ft



Joint separated/ 2-inch penetration at
bell 7:00- 32ft



Void in joint 9:00- 37ft



Deterioration of joint, crown- 42ft



Rebar exposed and rusting 2:00- 48ft



Deterioration of joint in crown- 48ft



Downstream from 52ft



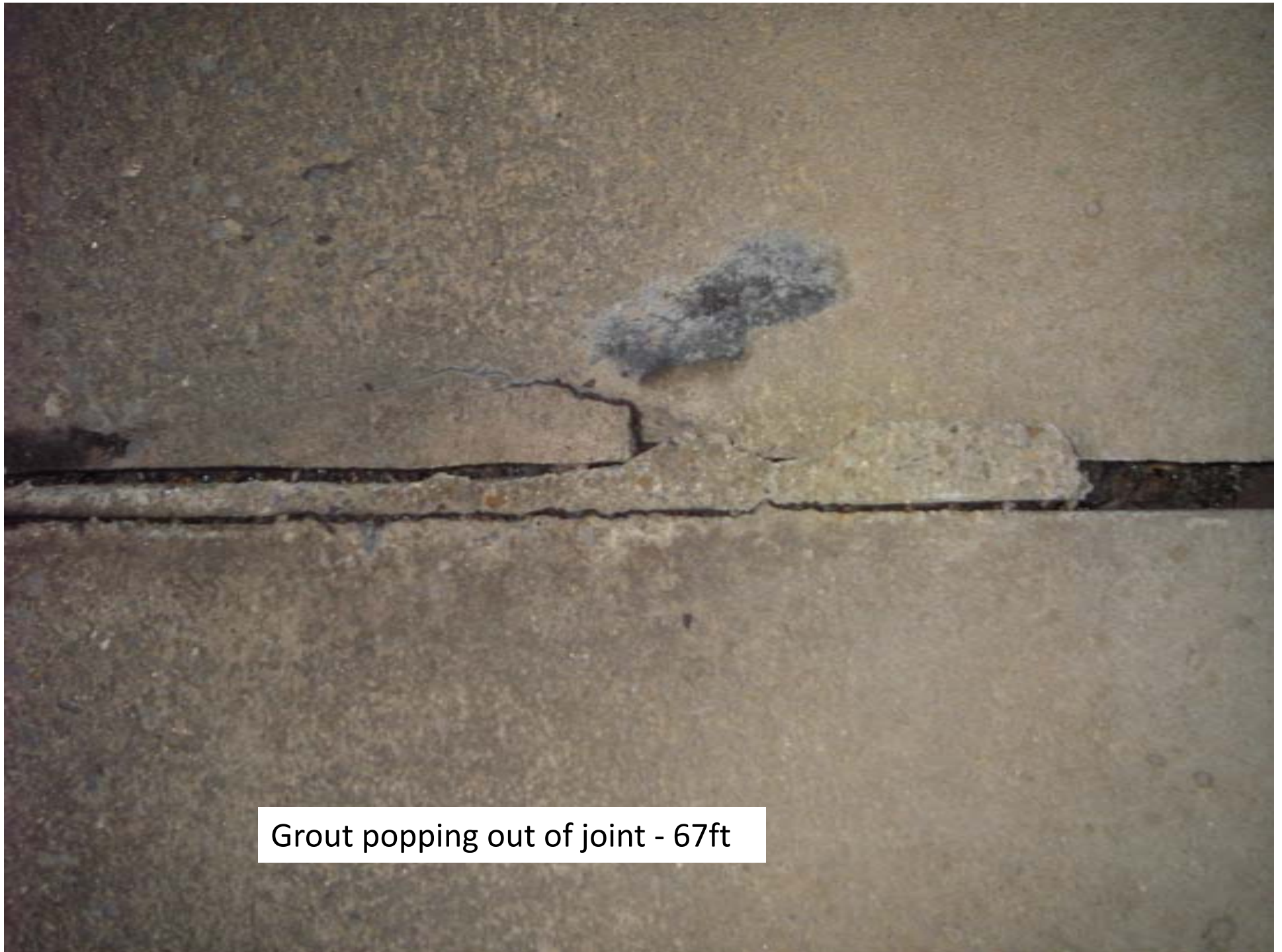
1-inch offset joint at crown- 52ft



Deterioration of joint 3:00- 57 ft



Grout falling out in crown- 52ft



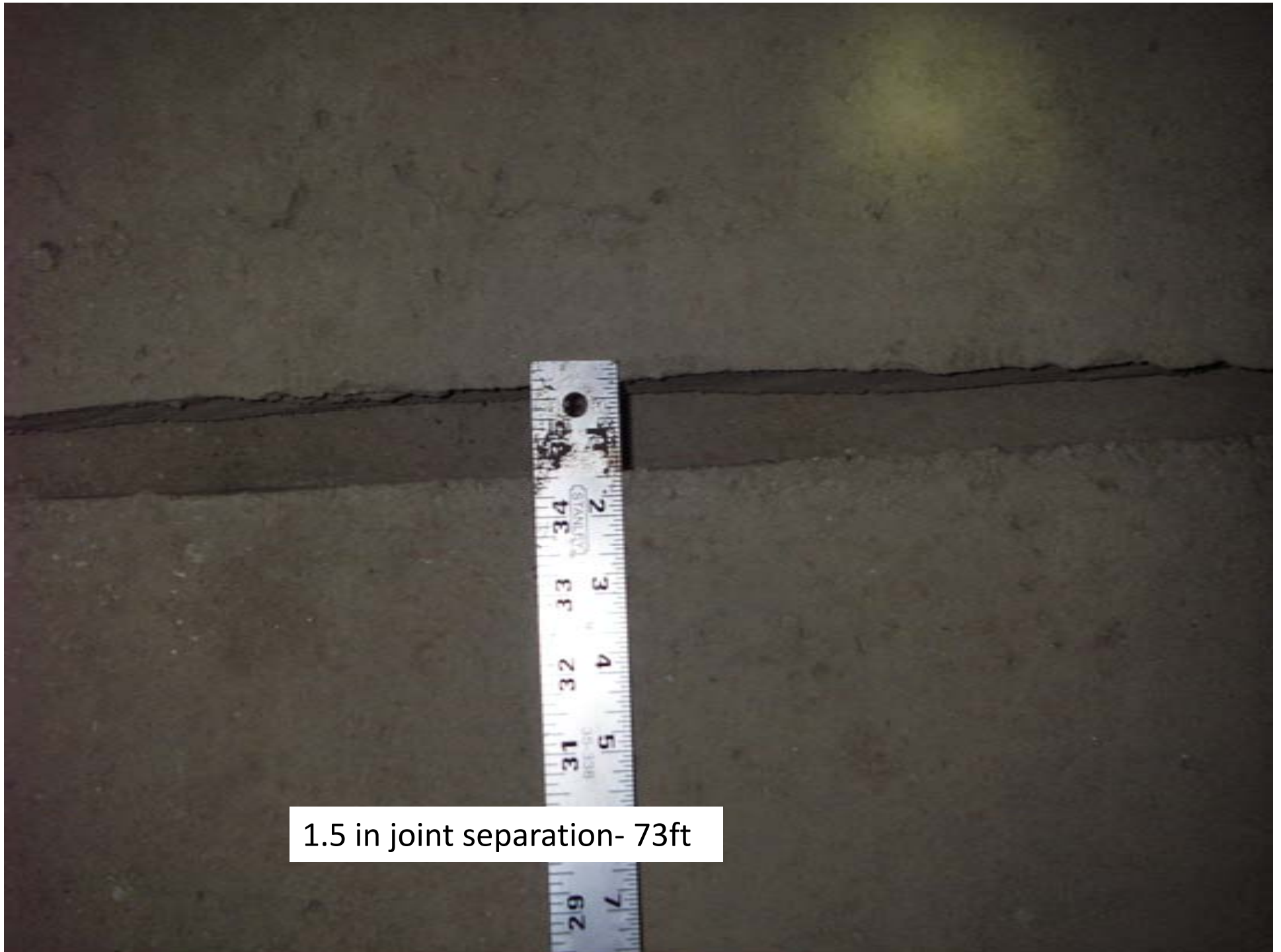
Grout popping out of joint - 67ft



Wet joint left haunch- 67ft



Offset joint- 73ft, moisture
coming from joint



1.5 in joint separation- 73ft



1.5 in joint separation, 73ft

Spalled/Scouring at joint in invert- 83ft





Joint separation, void in joint 2:00- 83ft



Separation of joint in invert- 83ft



Severe scouring/spalling in joint right haunch- 88ft
Moisture at joint



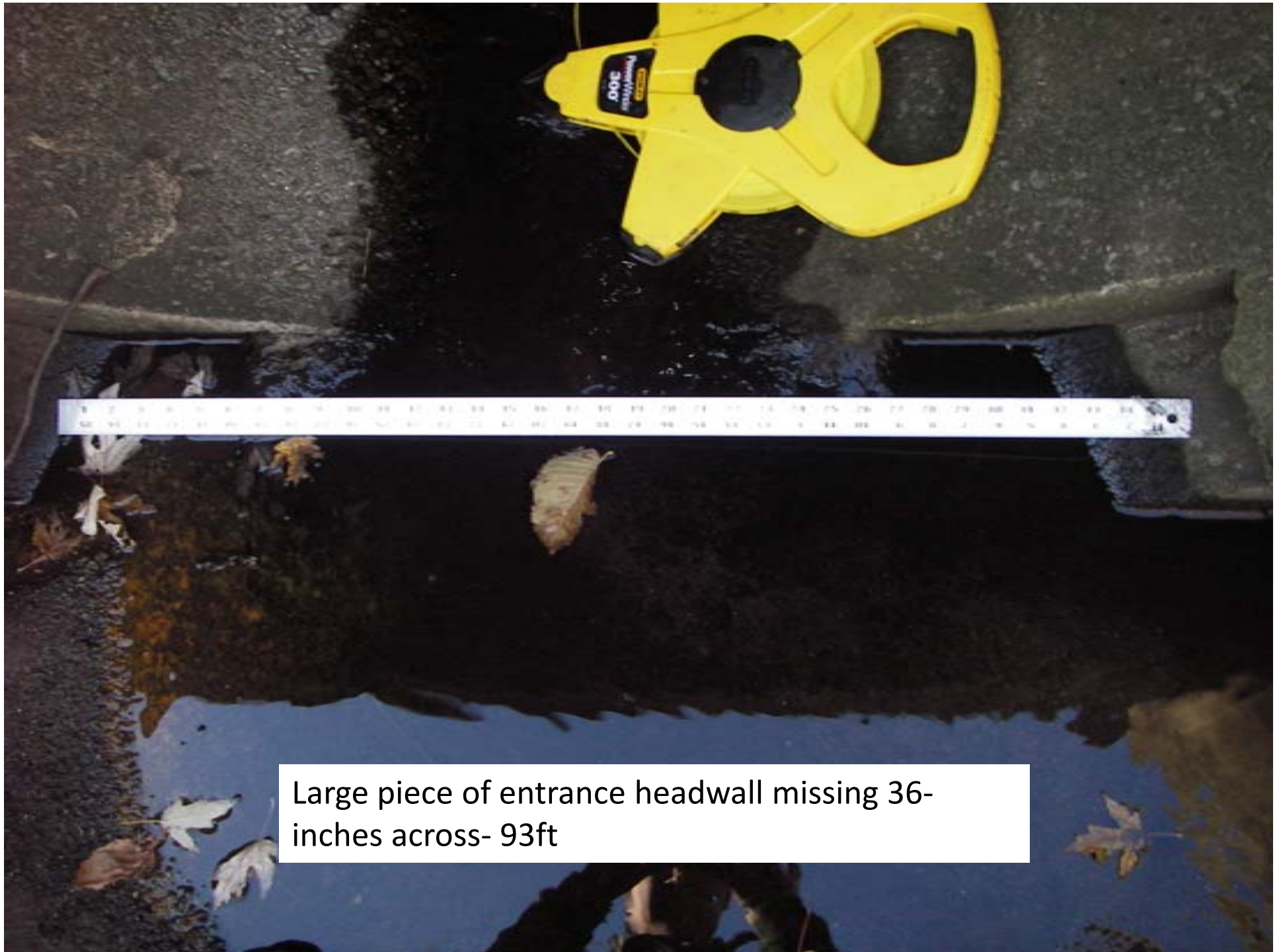
Scouring in joint left haunch- 88ft



Separation of pipe in crown- 88ft



Separation of pipe in crown 3in- 88ft



Large piece of entrance headwall missing 36-
inches across- 93ft

Walk through from outlet to gatewell



Outlet



Invert of headwall missing, 17in across, outlet



Invert of headwall missing, 17in across, outlet



Looking towards river from box, pipe #26



Scouring in box, right side/haunch



Severe scouring in joint- 6ft



Severe cracking/ void in joint 4:00- 6ft



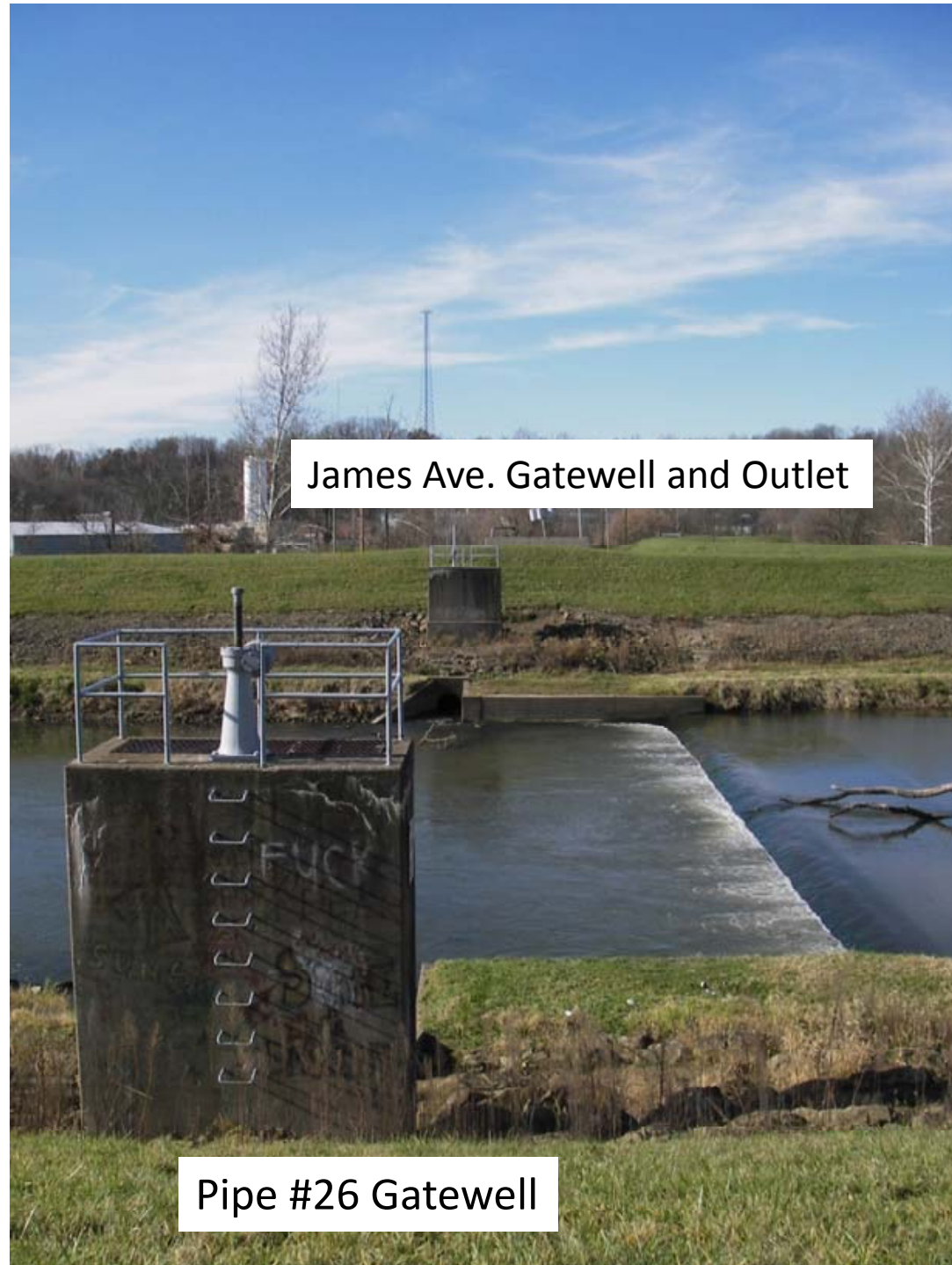
Offset joint in crown, 4 penetration into bell at crown- 6ft from outlet

Piece missing from haunch of pipe- entrance to gatewell





Looking upstream through gate from box



James Ave. Gatewell and Outlet

Pipe #26 Gatewell

Pipe No. 27

42-Inch RCP Storm Drain/Siphon



Pipes Inspected, Massillon Levee				
Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



James Avenue Pump station

Pipe # 27

Pipe # 27 inlet

Pipe No. 27. Storm Drain/Siphon

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

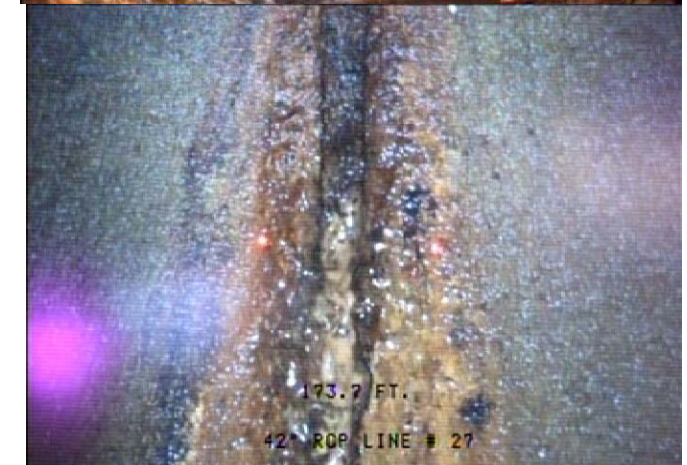
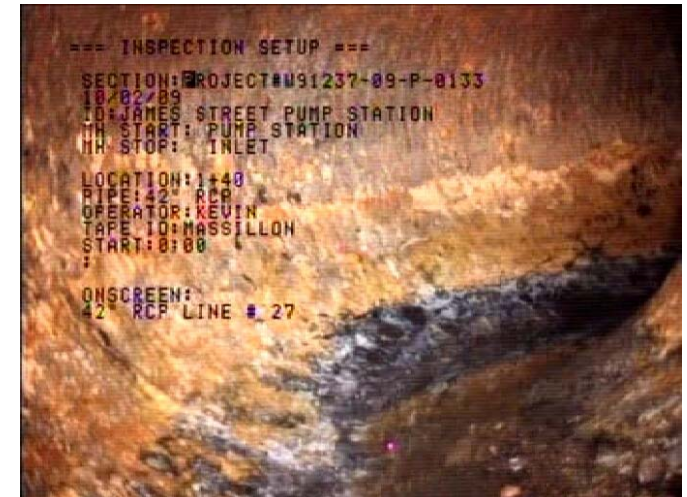
PIPE NO: 27 PIPE SIZE: 42" LENGTH INSPECTED: Approximately 376 ft
PROJECT: Massillon Levee TYPE: DIP/RCP/DIP INSPECTION DATE: 10/2/09

OVERALL CONDITION: **NASSCO Grade 5 – Defects required immediate attention**

GENERAL INSPECTION FINDING: DIP moderately corroded, several stained and leaking joints in RCP pipe.
Heavy flow from joint at 173 feet. Radial and diagonal cracking noted in several areas along upstream side of the structure.

MAJOR DEFECTS

Pipe # 27	
Feet	Defect
Start	DIP Pipe, moderately corroded
2ft-123ft	DIP
123ft	DIP to RCP
127ft	Weeping joint
141ft	Diagonal/Radial Cracking
155ft	Radial Cracking
169ft	Offset Joint
173ft	Leaking Joint/Gushing/flowing
175ft	Radial Cracking
177ft	Staining at joint
193ft	Diagonal/Radial Cracking
200ft	Staining/moisture at joint
251ft	Staining/moisture at joint
262ft	Diagonal cracking at joint
266ft	RCP to DIP
376ft	Gatewell



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

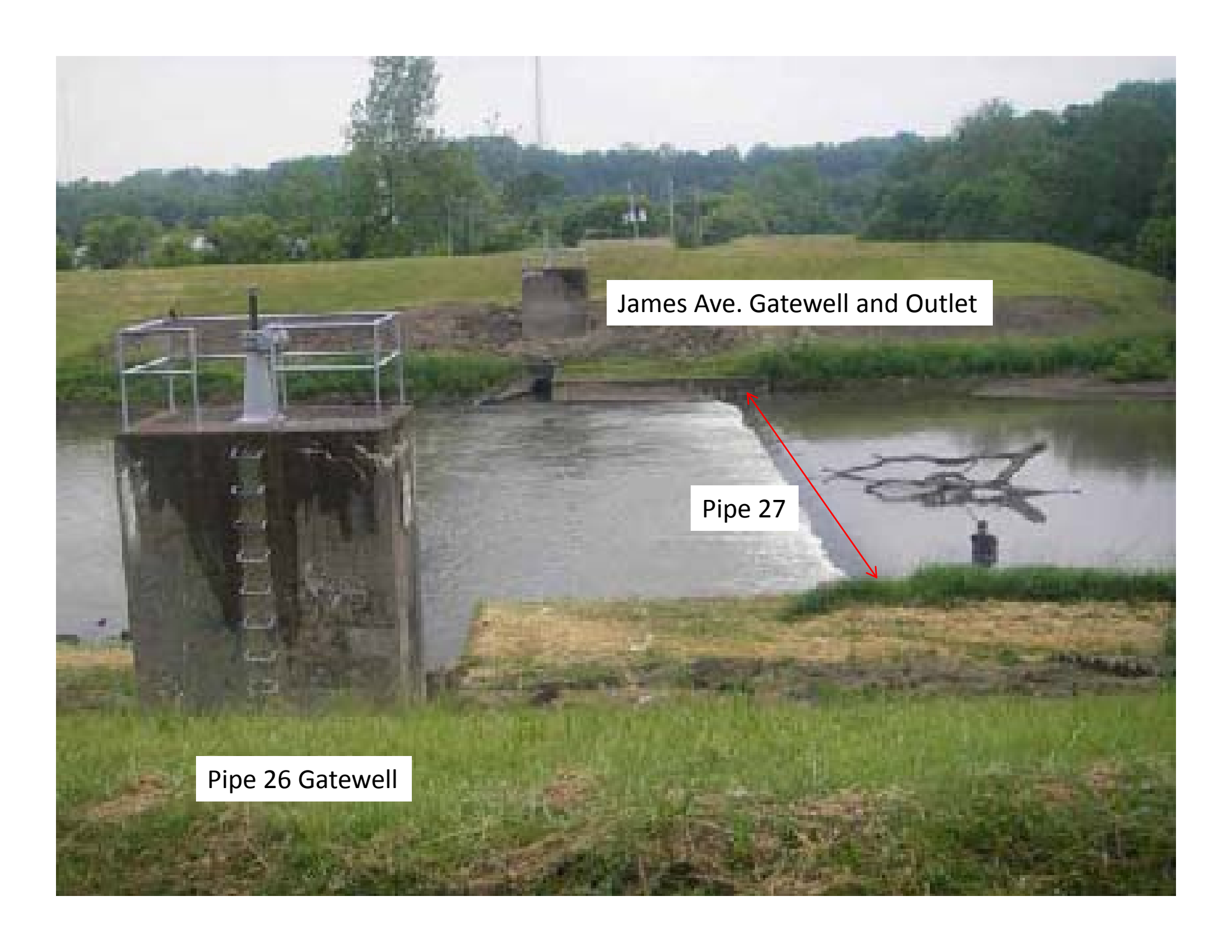
¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Other (Z)		DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connection (C)	RFC		1
	Roots (R) at a Joint	Tap (T)	N/A	RF		1
			Barrel (B)	RTB		3
			Lateral (L)	RTL		2
	Roots (R) at a Joint	Medium (M)	Connection (C)	RTC		2
			N/A	RT		2
			Barrel (B)	RMB		4
	Roots (R) at a Joint	Ball (B)	Lateral (L)	RML		3
			Connection (C)	RMC		3
			N/A	RM		3
	Roots (R) at a Joint	Infiltration (I)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connection (C)	RBC		4
	Roots (R) at a Joint	Weeper (W)	N/A	RB		4
				IW		2
				ID		3
	Roots (R) at a Joint	Dripper (D)		IR		4
				IG		5
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Protruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5



Inlet/Gatewell



James Ave. Gatewell and Outlet

Pipe 27

Pipe 26 Gatewell







Pipe 26 Inlet and Gatewell



=== INSPECTION SETUP ===

SECTION: PROJECT#U91237-09-P-0133

10/02/09

ID: JAMES STREET PUMP STATION

NH START: PUMP STATION

NH STOP: INLET

LOCATION: 1+40

PIPE: 42" RCP

OPERATOR: KEVIN

TAPE ID: MASSILLON

START: 0:00

:

ONSCREEN:

42" RCP LINE # 27

James Ave. Pipe #27 Outlet



10.5 FT.

42" RCP LINE • 27



Rusting of pipe wall at joint-10.5ft





117.9 FT.

42" RCP LINE ■ 27

Metal Pipe Meets Reinforced Concrete Pipe



127.0 FT.

42" RCP LINE # 27

Weeping joint 127.0ft 3o'clock

Diagonal /Radial cracking right side

141.3 FT.

42" RCP LINE ● 27

Down barrel

141.3 FT.

42" RCP LINE # 27

Chip out of joint right haunch

146.7 FT.

42" RCP LINE • 27

Vertical cracking left side-155.9ft

155.9 FT.

42" RCP LINE ● 27



155.9 FT.

42" RCP LINE ■ 27

Radial cracking right side-155.9ft

An underwater photograph showing a vertical pipe or structure. Two red circular markers are visible on the pipe. The background is dark and murky. Overlaid text at the bottom indicates a depth of 169.7 feet and identifies the pipe as a 42-inch RCP line, marker number 27.

169.7 FT.

42" RCP LINE # 27



Offset joint left side



169.7 FT.

42" RCP LINE ● 27



171.7 FT.

42" RCP LINE # 27

Leaking joint left side-171.7ft

Diagonal cracking left side-173.7ft

173.7 FT.

42" RCP LINE # 27

Vertical cracking right side-173.8ft

173.8 FT.

42" RCP LINE ■ 27



173.8 FT.

42" RCP LINE • 27

Leaking joint left side 173.7ft

173.7 FT.

42" ROP LINE # 27



173.7 FT.

42" RCP LINE # 27

Staining at joint 177 ft



189.4 FT.

42" RCP LINE ■ 27



193.1 FT.

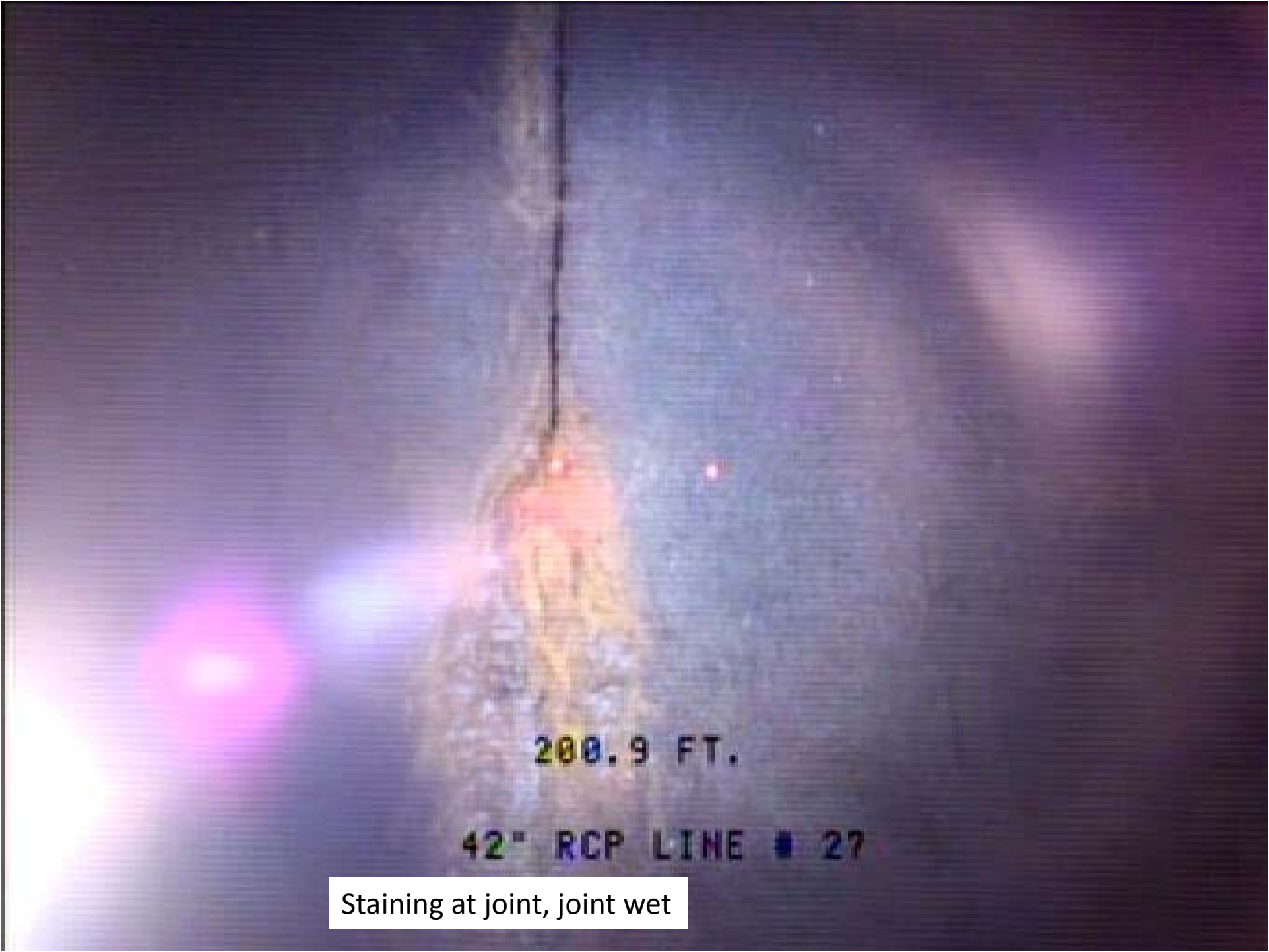
42" RCP LINE # 27

Diagonal and radial cracking along left side-193.1ft

137.5 FT.

42" RCP LINE ■ 27

Significant staining and moisture at joint



200.9 FT.

42" RCP LINE # 27

Staining at joint, joint wet

Going from concrete back to metal pipe

258.1 FT.

42" RCP LINE ■ 27



252.6 FT.

42" RCP LINE ■ 27

Diagonal Crack at Joint





292.3 FT.

42" RCP LINE ■ 27



381.8 FT.

42" RCP LINE # 27



Looking at Inlet/Gate

328.9 FT.

42" RCP LINE ● 27



365.9 FT.

42" RCP LINE ● 27



Gatewell



Gatewell, pipe #27



Pipe #27,
Inlet/gatewell



Pipe #27, gate



Grate rusted out at entrance of gatewell

Pipe No. 28

James Avenue Pump Station

48-inch RCP Gravity Outlet



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

James Avenue Pump Station

Pump station

Pump Stat. outlet

Pipe #26 outlet

Pipe # 26 inlet

Pipe #27

Pipe #28



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: 28 PIPE SIZE: 48"
PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 9/17/09

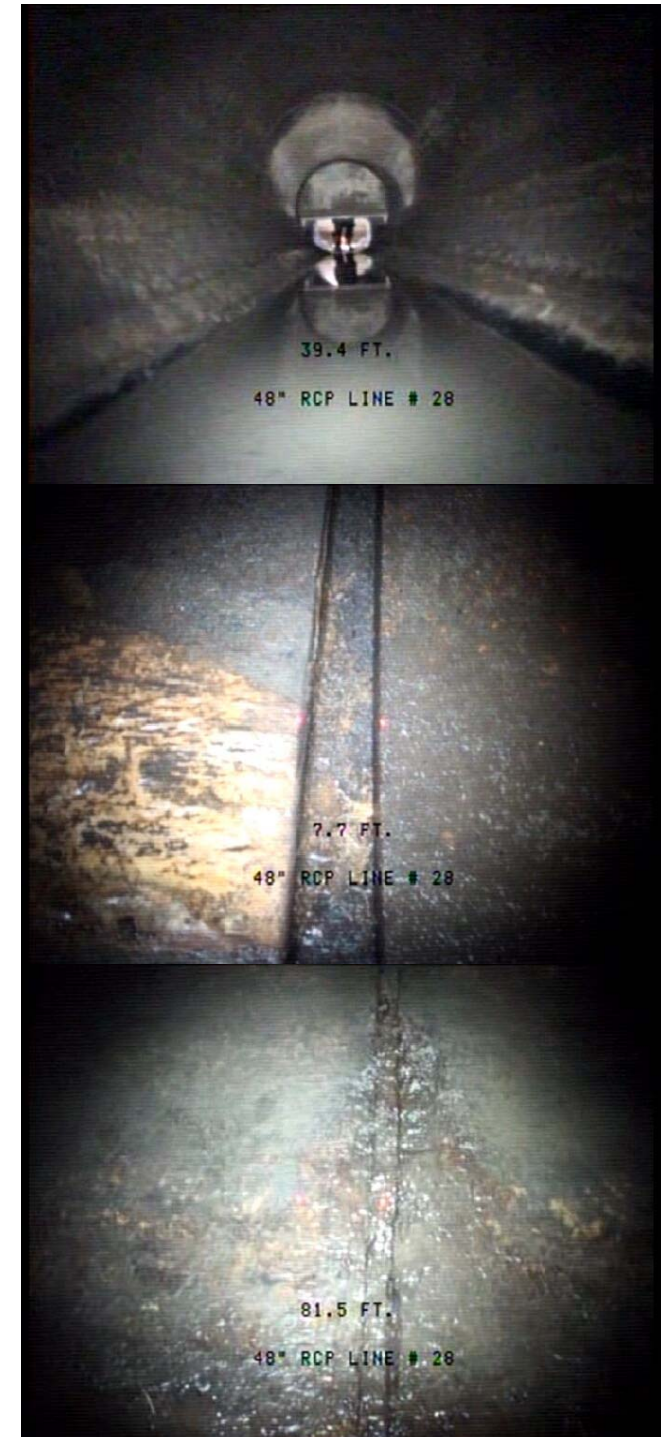
OVERALL CONDITION: **NASSCO Grade 4 – Severe defects that will become Grade 5 in near future**

GENERAL INSPECTION FINDING: Sagging was visible from inlet to gatewell. Joints more open on the bottom. Several joints were weeping water.

MAJOR DEFECTS

Pipe # 28	
Feet	Defect
7.7ft	Pipe sagging, approx. 2"+ joint separation at 4 o'clock
23.5ft	Pipe sagging, approx. 1 1/2" joint separation right haunch
39.4ft	Pipe sagging, 1.3" joint separation at approx. 3 o'clock
70ft	Weeping joint at approx. 9 o'clock, near gatewell
76.6ft	Gatewell
81.5ft	Weeping joint at approx. 3 o'clock
86.6ft	Weeping joint at approx. 3 o'clock
91.2ft	Weeping joint
96.1ft	Inlet tight

*Inspected inlet to out



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
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	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Other (Z)		DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connection (C)	RFC		1
	Roots (R) at a Joint		N/A	RF		1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connection (C)	RTC		2
	Roots (R) at a Joint		N/A	RT		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connection (C)	RMC		3
	Roots (R) at a Joint		N/A	RM		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connection (C)	RBC		4
	Roots (R) at a Joint		N/A	RB		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Protruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5



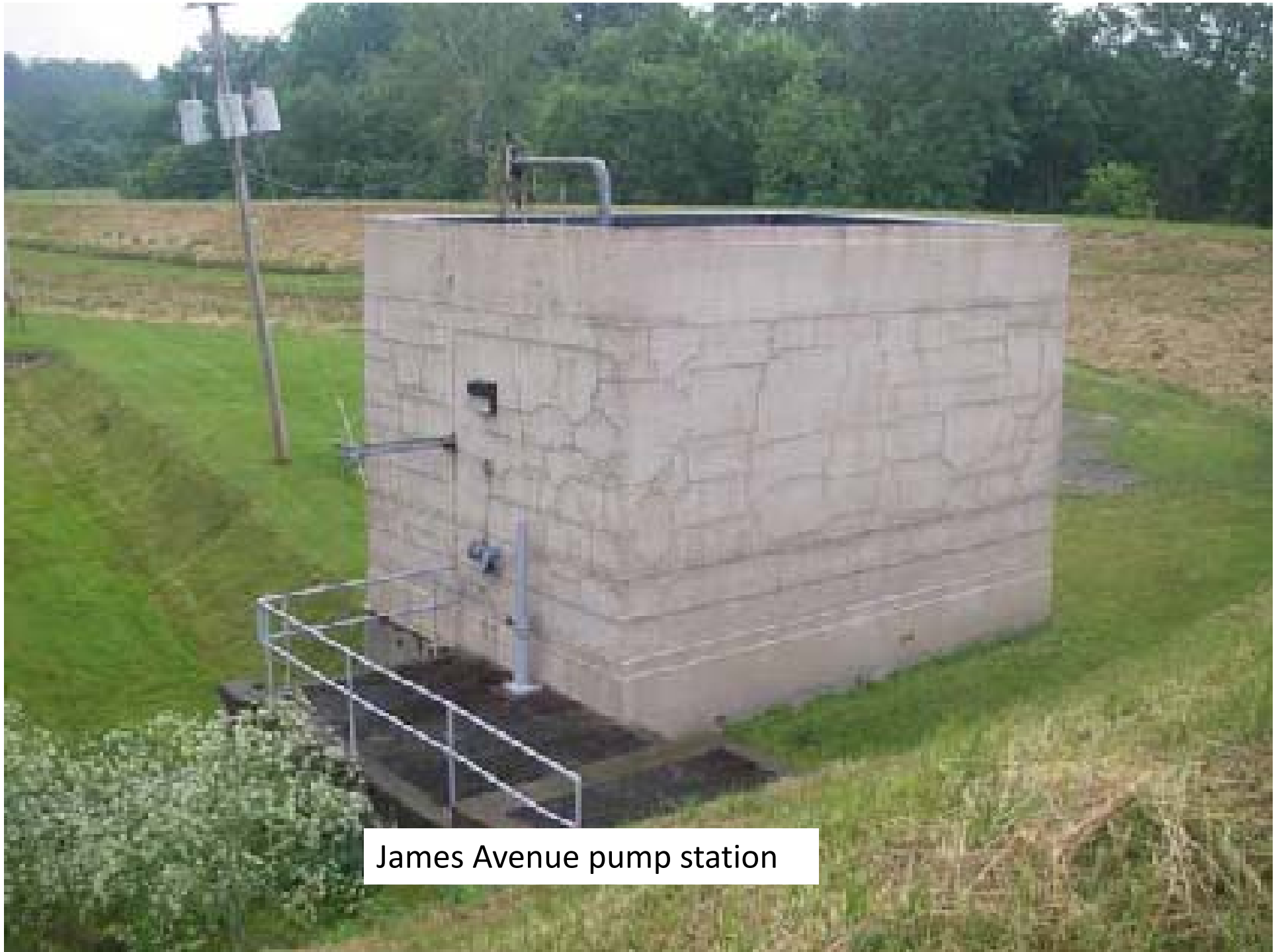
James Avenue pump station



James Avenue pump station



James Avenue pump station from levee



James Avenue pump station



Looking at James Avenue pump station from levee



James Avenue Pump Station discharge well



James Avenue pump station, looking at gate



Outlet

2.0 FT.

48" RCP LINE # 28

Pipe #28- James Avenue- start



Approx. 2"+ joint separation at 4o'clock

Approx 1.5" joint separation right haunch

23.5 FT.

48" RCP LINE # 28

1.3" joint separation 3o'clock

39.4 FT.

48" ROP LINE # 28

X=1.358
Y=3.861
D=4.093

Looking at gate from 39.4ft

39.4 FT.

48" RCP LINE # 28

Wet joint 9o'clock at 70ft

70.0 FT.

48" RCP LINE # 28

76.6ft looking at outlet

76.6 FT.

48" RCP LINE # 28



Weeping joint 3o'clock-81.5ft

81.5 FT.

48" RCP LINE # 28

Weeping joint 9o'clock-81.5ft

81.5 FT.

48" RCP LINE # 28

Weeping joint-3o'clock 86.6ft

86.6 FT.

48" RCP LINE # 28

An aerial photograph of a road surface. A red laser point is visible on the road, indicating a specific location. The road surface is dark and textured, with some lighter patches. A white line runs vertically through the center of the road. The text "91.2 FT," is overlaid on the image, indicating the distance to the weeping joint.

91.2 FT,

48" RCP LINE # 28

Weeping joint at 91.2ft



96.1 FT.

48" RCP LINE # 28

Joint tight at 96.1ft



Looking from pipe #26 towards James Avenue





James Avenue outlet headwall from river



James Avenue Pump Station
discharge well

Pipe No. 29, 30, 31

30-Inch DIP Discharge Pipes



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: James Avenue, Pump Pipes (29, 30, 31) PIPE SIZE: 30" LENGTH INSPECTED: 100 ft.

PROJECT: Massillon Levee TYPE: Coated DIP INSPECTION DATE: 9/17/09

OVERALL CONDITION: NASSCO Grade 4: Pipe will probably fail in 5 to 10 years. Pipe rated at a more serious condition due to that it is a pump line going through a levee.

GENERAL INSPECTION FINDING: GENERAL INSPECTION FINDINGS: All three pipes have moderate to severe corrosion at the joints. Bellies have formed in the flat areas of the pipe at the beginning and the end of the runs toward the pump station. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints.

*Note: Pipe #29 has severe loss of lining from air-release valve to pump station on the downward grade

MAJOR DEFECTS

Feet	Defect
0-100 ft	All three pipes have moderate to severe corrosion at the joints. Bellies have formed in the flat areas of the pipe at the beginning and the end of the runs toward the pump station. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



Siphon Breakerss on Levee, James Avenue
Pump Station

Massillon, Ohio
James Avenue Pump Station
Pipe #29, North Discharge Pipe

== INSPECTION SETUP ==

SECTION: 91237-09-P-0133

09/12/09

ID: JAMES AVE PUMP ST.

MH START: OUTLET DNSTRA

MH STOP: INLET PUMP

LOCATION: 1+80

PIPE: 38" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0:00

ONSCREEN:

29 LINE NORTH PIPE

Start inspection line 29



#29 L1









Moderate corrosion at joint

A photograph of a large, dark, circular pipe opening. A bright light source is visible at the center of the opening, creating a strong glare. The interior of the pipe shows concentric rings and some debris. Text is overlaid on the image.

13.9 FT.

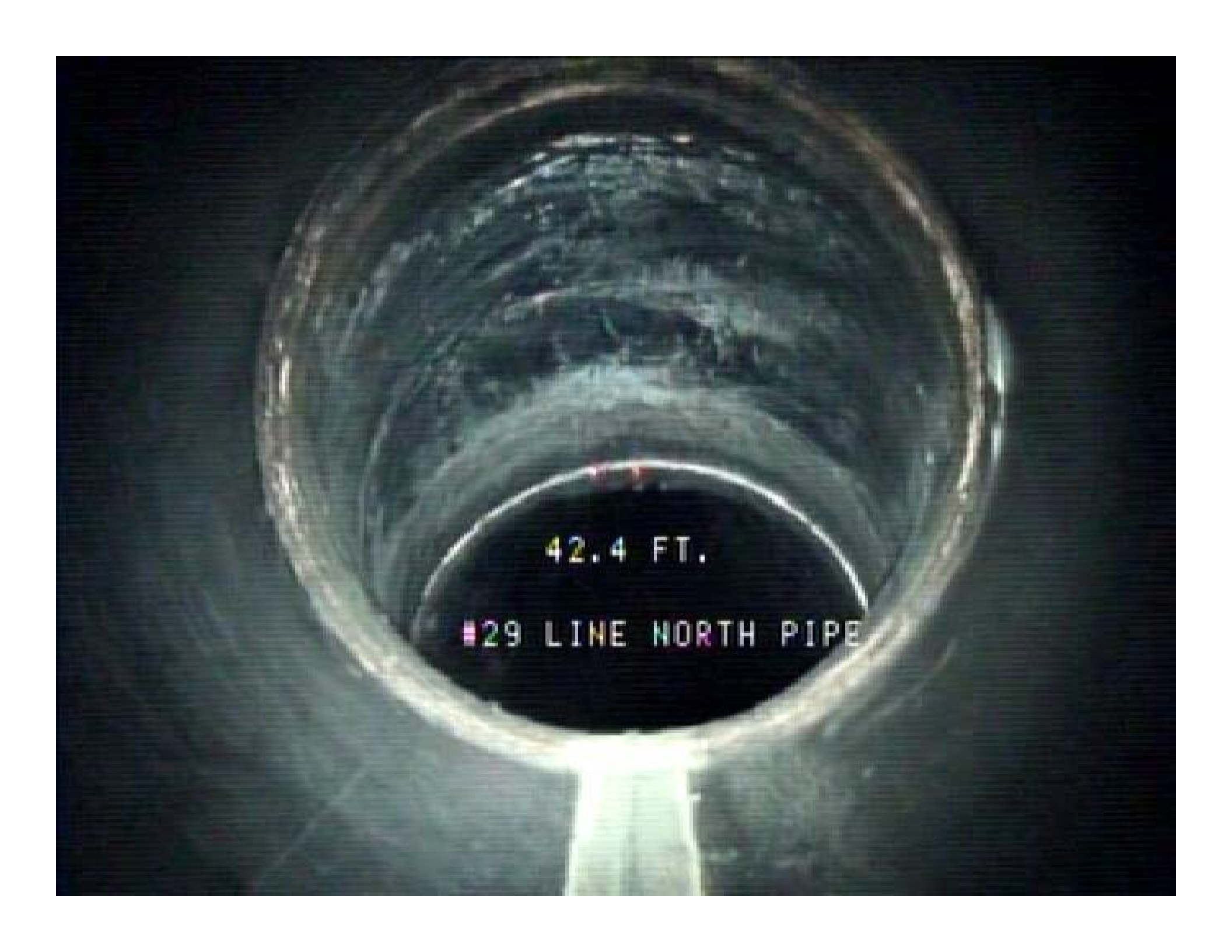
#29 LINE NORTH PIPE



24.5 T.

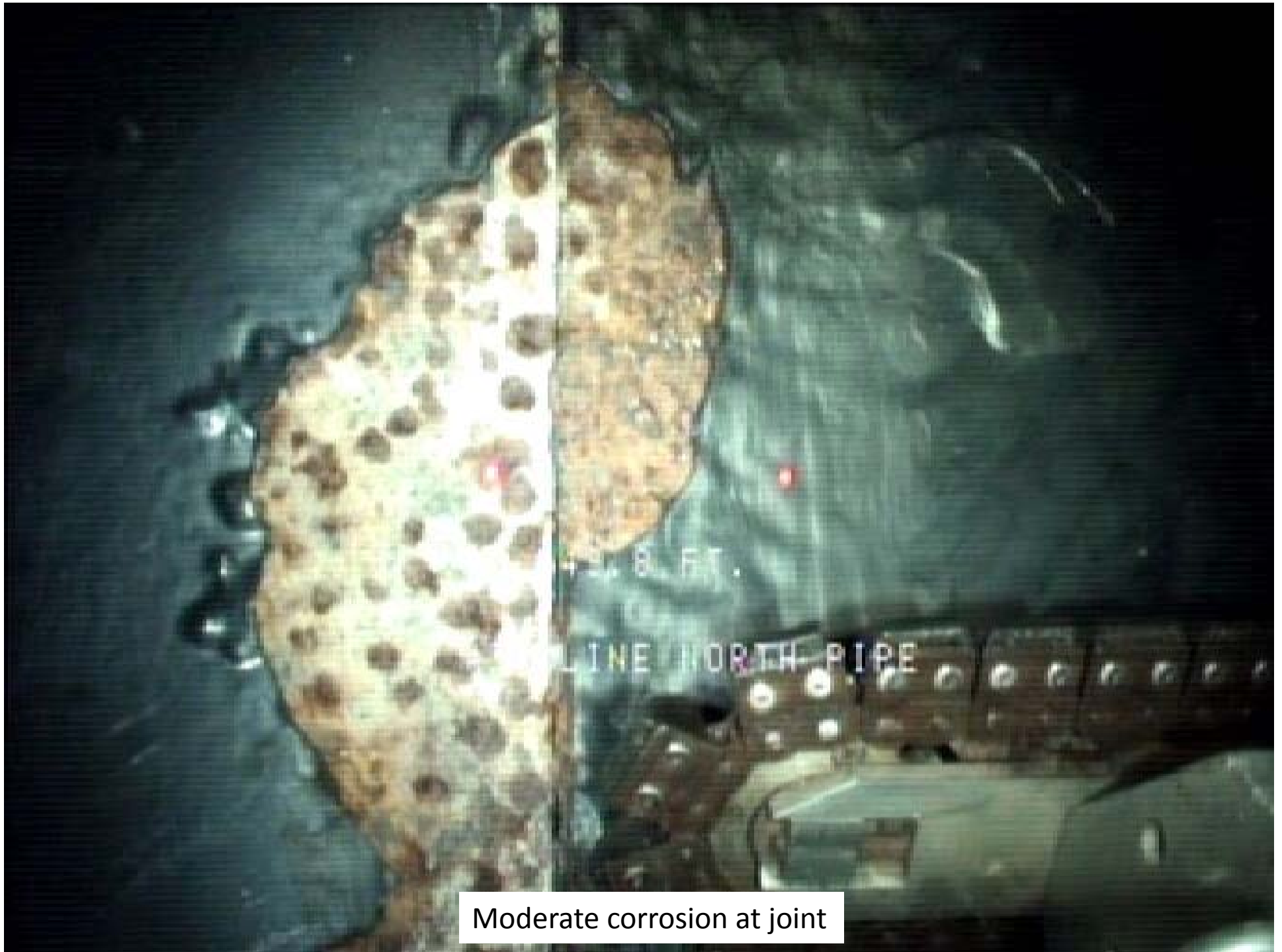
#29 LINE NORTH PIPE





42.4 FT.

#29 LINE NORTH PIPE



Moderate corrosion at joint

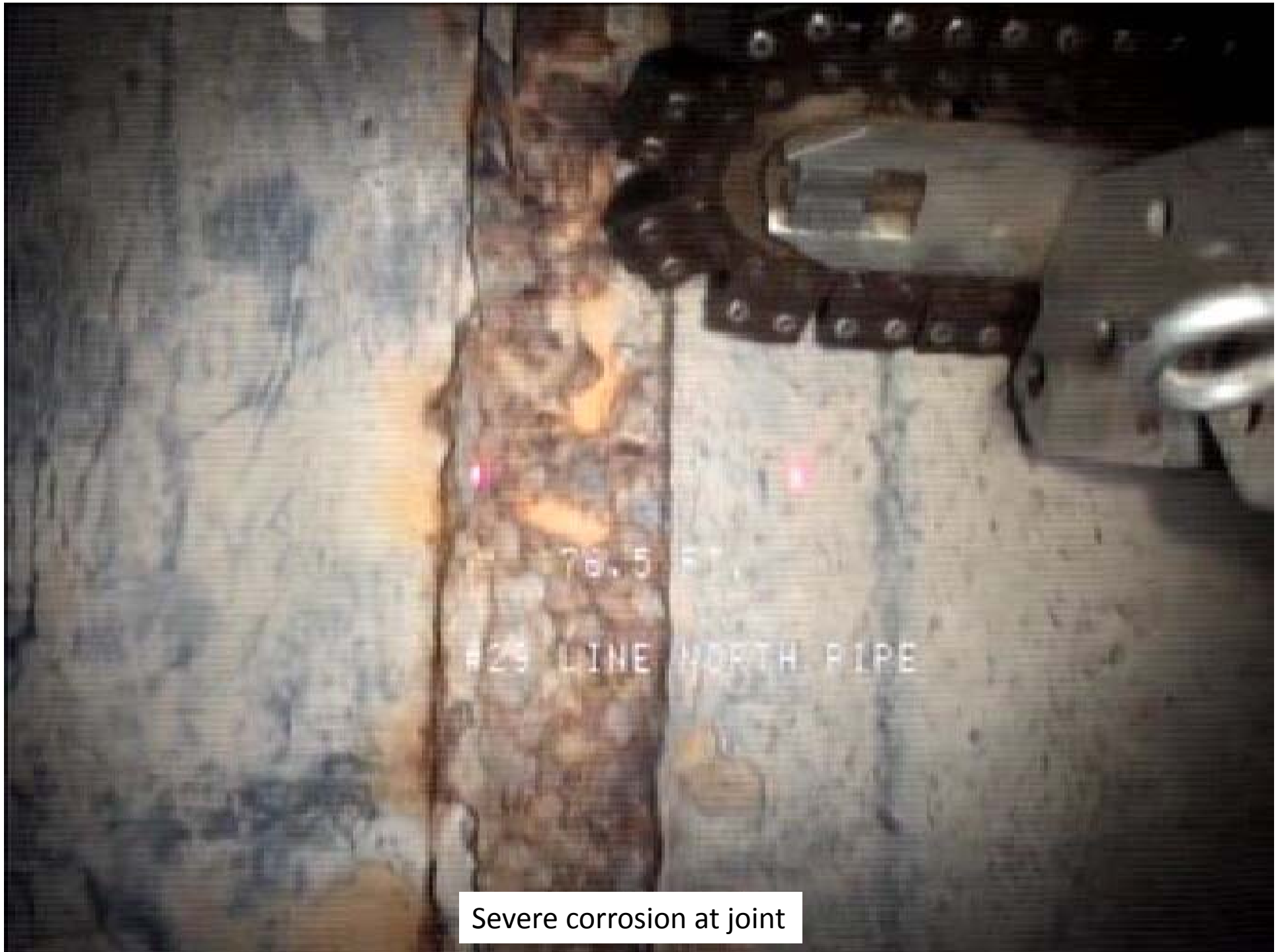
A circular view through a pipe, showing concentric rings and a central light source. The image is dark with a bright, circular light source in the center, creating a series of concentric rings. The rings are slightly blurred, suggesting motion or a shallow depth of field. The overall tone is dark, with the light source providing the primary illumination.

49.8 FT.

#29 LINE NORTH PIPE







Severe corrosion at joint

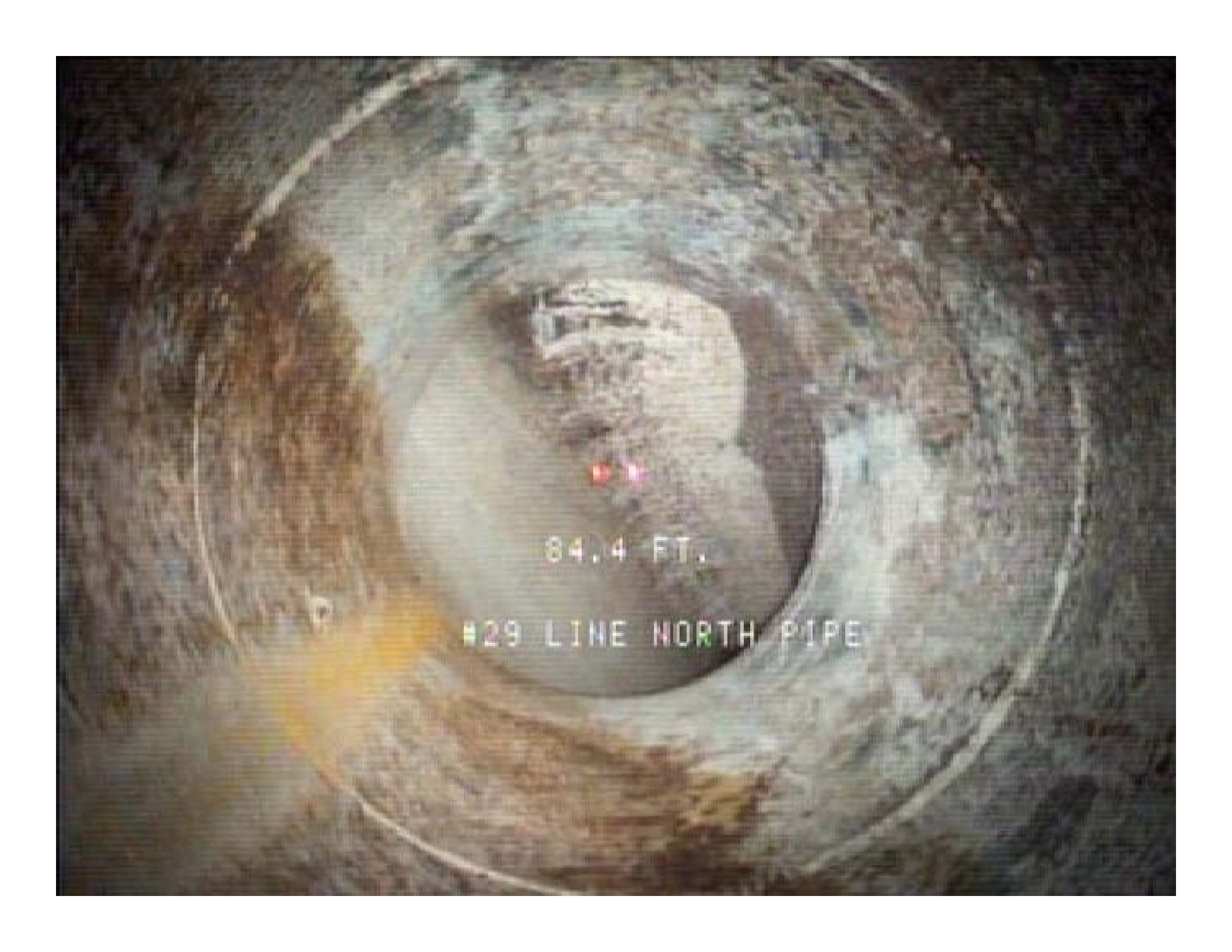


Severe corrosion at joint



0.4 FT.

#2 SLOPE NORTH PIPE

An aerial photograph showing a circular feature, possibly a crater or a large well, with a textured, brownish interior. In the center of the circle is a smaller, lighter-colored area containing a small, dark, rectangular structure. Two small red dots are visible just below this central structure. The surrounding area is dark and textured. Overlaid on the image is the text "84.4 FT." and "#29 LINE NORTH PIPE".

84.4 FT.

#29 LINE NORTH PIPE



Pipe 29, North pipe, Pump



A photograph of a ship's hull, likely taken from an elevated position. A white line is drawn along the side of the hull, and two red dots are placed on it. The text "95.9 FT." is overlaid on the image, indicating the distance between the dots. The text "#29 LINE MOUTH RISE" is also overlaid, indicating the location of the line. The hull is dark and appears to be made of metal or wood. The background is dark and indistinct.

95.9 FT.

#29 LINE MOUTH RISE



Joint between pump and pipe

Massillon, Ohio
James Avenue Pump Station
Pipe #30, Center Discharge Pipe

== INSPECTION SETUP ==

SECTION: U91237-09-P-0103

09/17/89

ID: JAMES AVE PUMP ST.

NH START: OUTLET DNSTRM

NH STOP: INLET PUMP

LOCATION: 1+80

PIPE: 38" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0:00

ONSCREEN:

#38 LINE CENTER PIPE

== INSPECTION SETUP ==

SECTION: U91237-09-P-0103

09/17/89

ID: JAMES AVE PUMP ST.

NH START: OUTLET DNSTRM

NH STOP: INLET PUMP

LOCATION: 1+80

PIPE: 38" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0:00

ONSCREEN:

#38 LINE CENTER PIPE



2.8 FT.

#30 LINE CENTER PIPE



Up slope to Siphon Breaker, Rope used to pull camera to top of Levee





25.6 FT.

#30 LINE CENTER PIPE



29.0 FT.

#30 LINE CENTER PIPE





39.3 FT.

#30 LINE CENTER PIPE

Siphon Breaker





51.0 FT.

#30 LINE CENTER PIPE

Coating missing



68.4 FT.

#30 LINE CENTER PIPE



68.4 FT.

#30 LINE CENTER PIPE

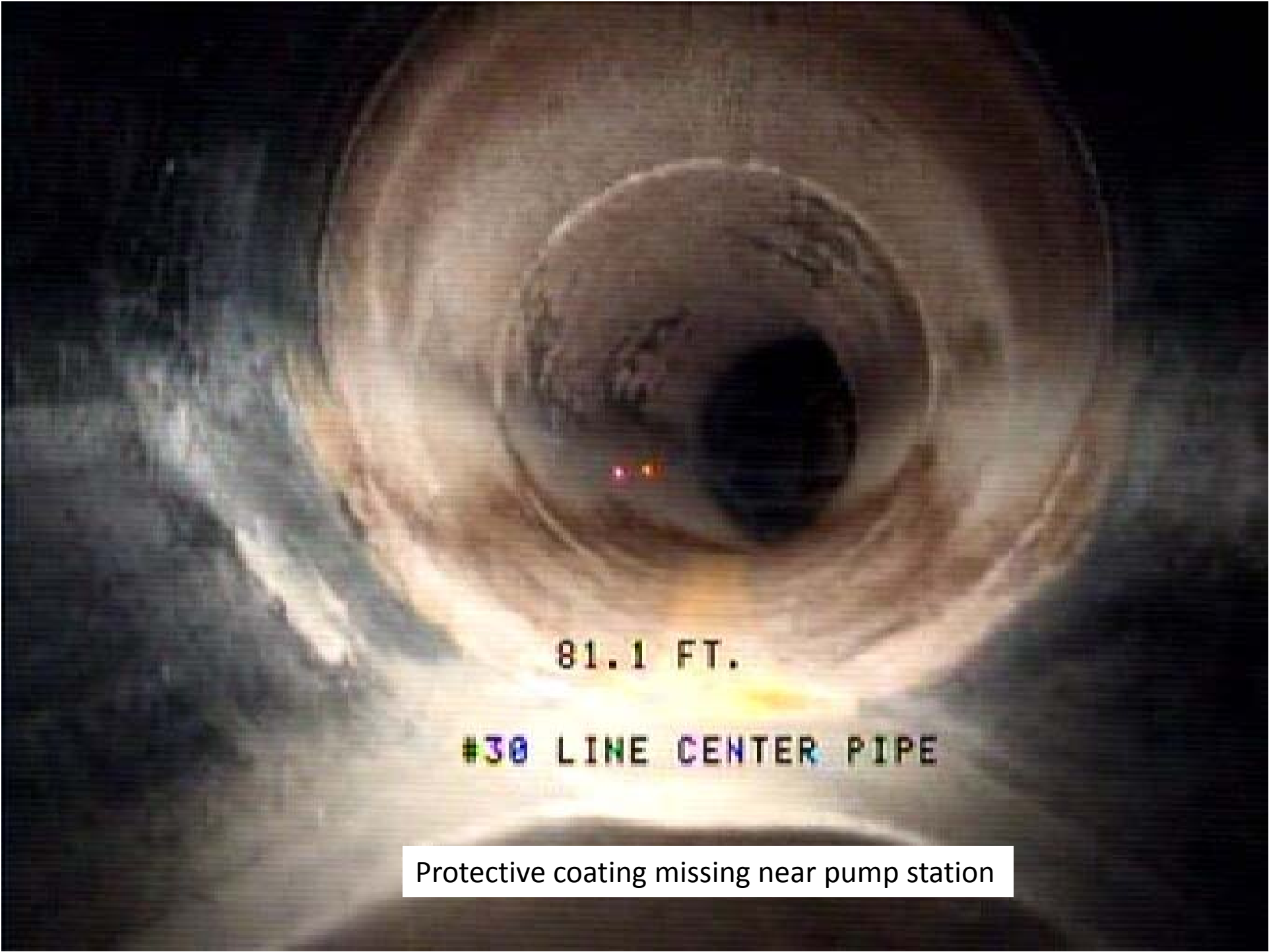


77.4 FT.

This is an underwater photograph showing a large, dark, cylindrical object, likely a pipe, at the base of a levee. The surrounding water is murky and brownish, with some sediment visible. The pipe is illuminated by a bright light source, possibly a flashlight, creating a strong glare. The background shows the rough, textured surface of the levee structure.

#30 LINE CENTER PIPE

Significant corrosion in haunch at base of levee



81.1 FT.

#30 LINE CENTER PIPE

Protective coating missing near pump station



83.0 FT.

#30 LINE CENTER PIPE

Protective coating completely missing



91.1 FT.

#30 LINE CENTER PIPE



91.1 FT.

This is an underwater photograph showing a section of a pipe. The pipe is heavily corroded, with a rough, brownish, and pitted surface. Two red laser pointers are visible, projecting red dots onto the pipe's surface. The background is a dark, murky underwater environment.

#30 LINE CENTER PIPE

Severe corrosion/pitting



91.1 FT.

#30 LINE CENTER PIPE

Nearing Pump Station

95.5 FT.

#38 LINE CENTER PIPE

Severe corrosion at joint, between pump and pipe



93.6 FT

#30 LINE CENTER PIPE



Massillon, Ohio
James Avenue Pump Station
Pipe #31, South Pipe

=== INSPECTION SETUP ===

SECTION: M91237-09-P-0133

09/17/09

ID: JAMES AVE PUMP ST.

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP

LOCATION: 1+80

PIPE: 36" CIP

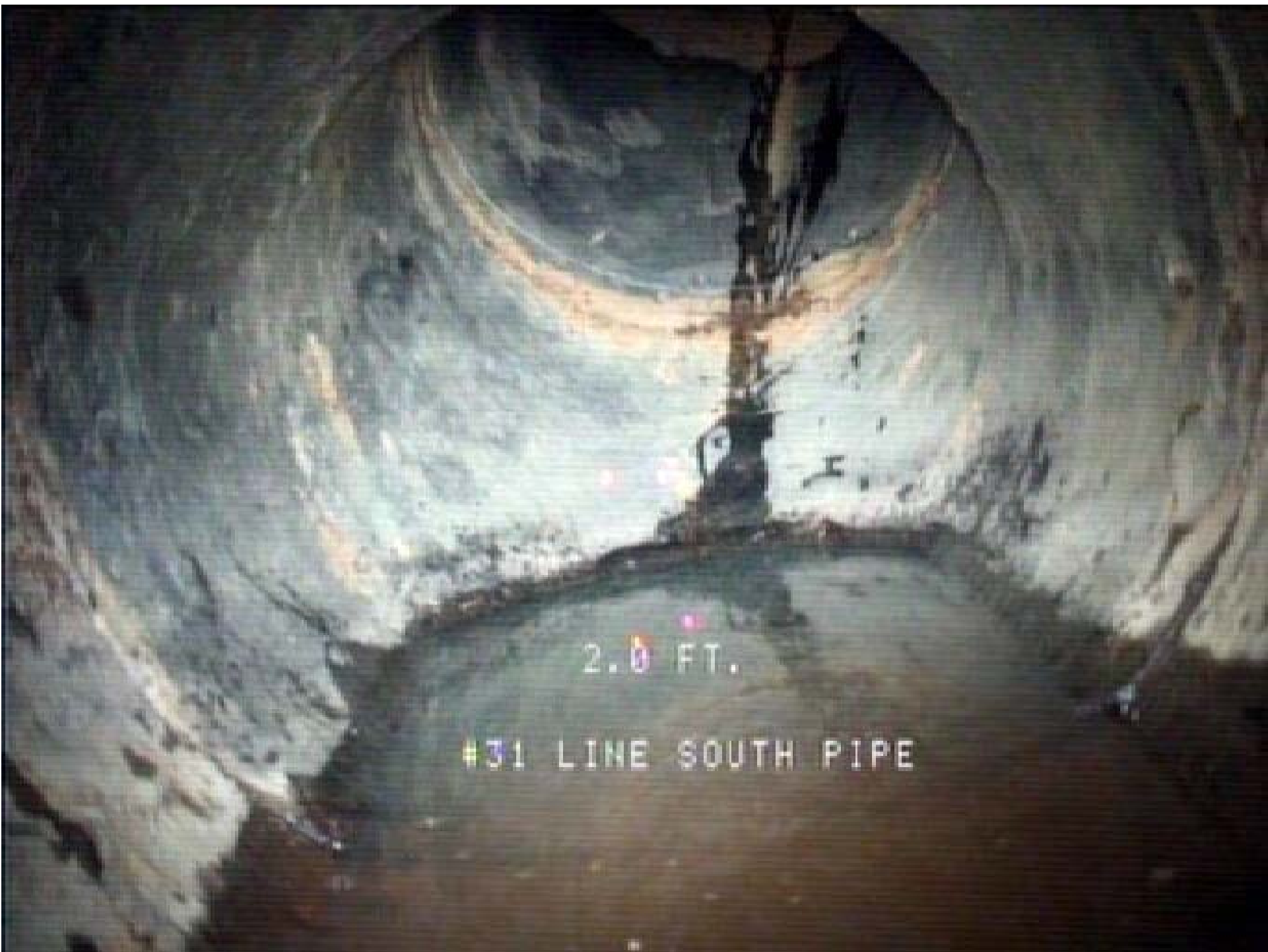
OPERATOR: JOHN

TAPE ID: TAP 31 LON

START: 0100

ONSCREEN:

#31 LINE SOUTH PIPE ■



2.0 FT.

#31 LINE SOUTH PIPE



Moderate/severe corrosion at joint



Going upgrade to Siphon Breaker



Moderate/severe corrosion at joint



Moderate to Severe Corrosion at joint





Longitudinal crease or crack in liner



100 FT,

#33 LINE SOUTH PIPE





#31 LINE - 420' PIPE

Siphon Breaker



#31 LINE WITH PIPE



45.1 FT.

#31 LINE SOUTH PIPE

Corrosion behind coating

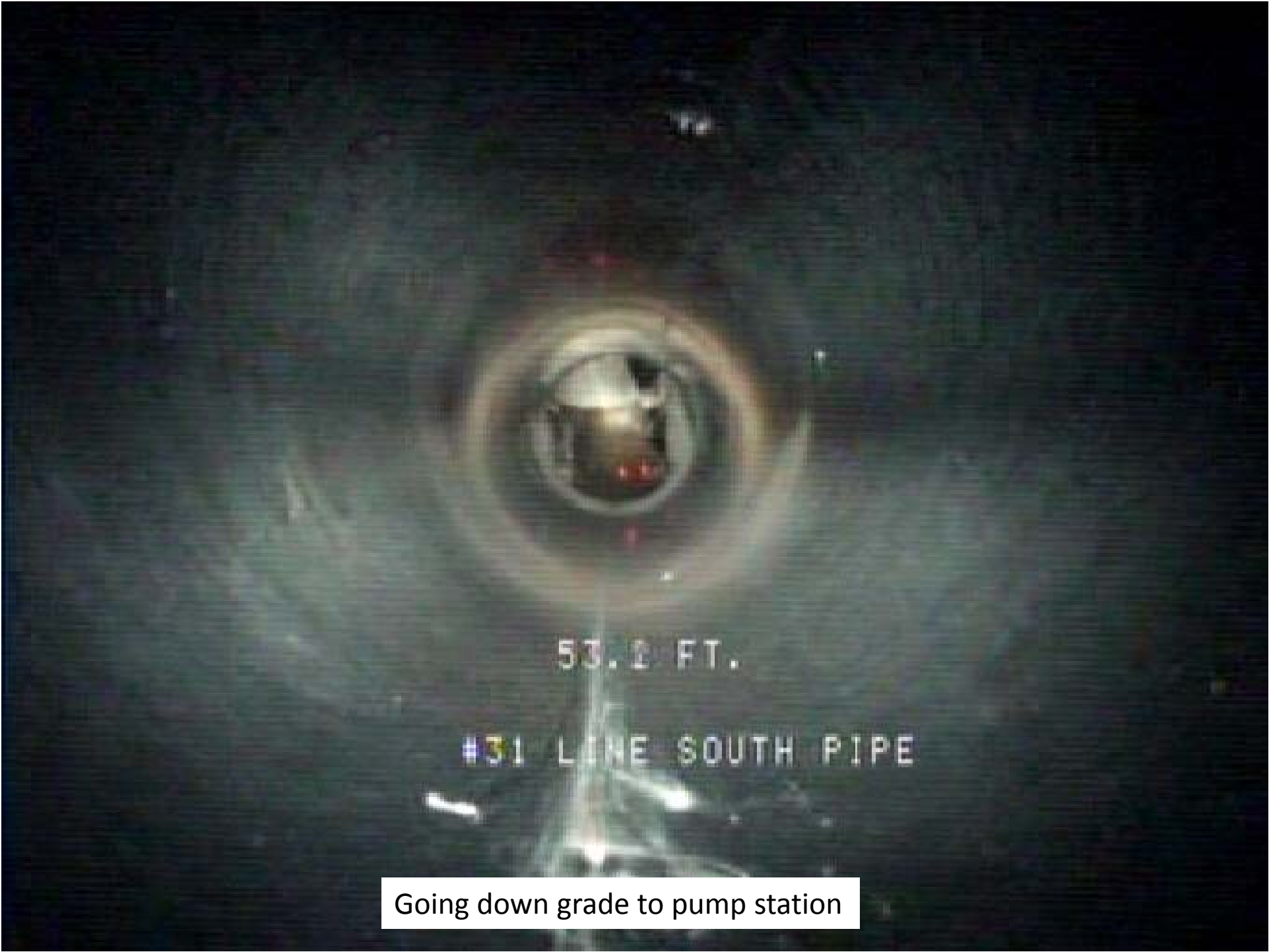






45.1 FT.

#31 LINE SOUTH PIPE



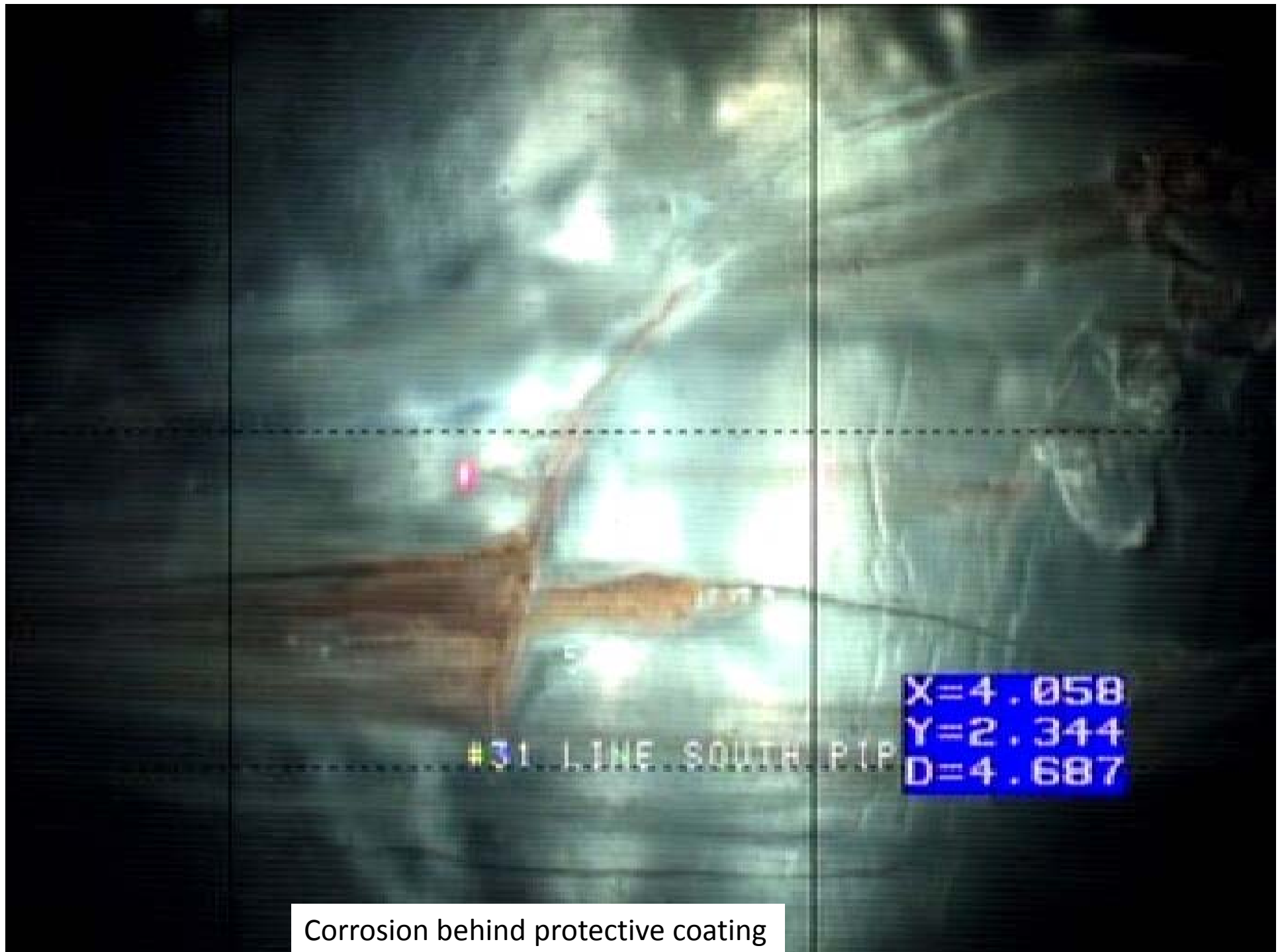
53.2 FT.

#31 LINE SOUTH PIPE

Going down grade to pump station



Severe corrosion at joints, base of levee



Corrosion behind protective coating



Base of levee



Severe corrosion at joints





Severe corrosion at joint



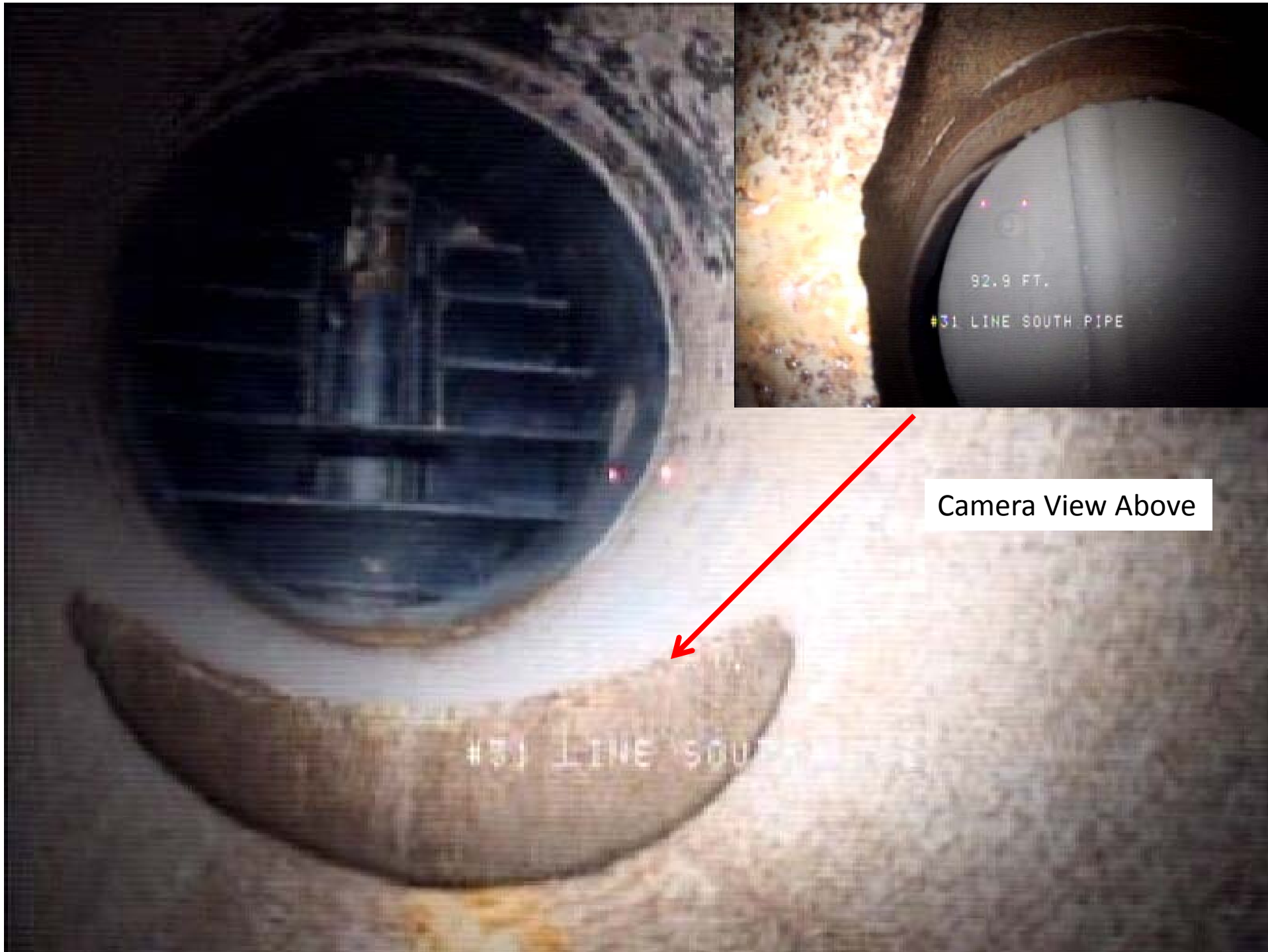


81.5 FT.

431 LINE SOUTH PIPE

Protective coating completely missing





Camera View Above



Joint between pump and pipe



9 FT.

OUTH PIPE





92.9 FT.

#31 LINE SOUTH PIPE





90.0 FT.

#31 LINE SOUTH PIPE



Federal Avenue Pump Station

This is an aerial photograph showing a large, rectangular industrial building with a light-colored roof, identified as the Federal Avenue Pump Station. To its right is a multi-lane highway with several vehicles. Further right is a large, circular storm drain structure. A body of water is visible between the pump station and the highway. Two red arrows point from text labels to specific features: one points to a small structure in the water labeled 'outlet', and the other points to the circular storm drain labeled 'Pump station/Storm Drains'. The surrounding area includes some residential buildings and parking lots.

Pump station/Storm Drains

outlet

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Federal Avenue Pump Station

Federal Ave. Gravity/Storm Drains

Pipe 32 (South)

Pipe 33 (North)



Federal Avenue



Federal Avenue



View of Federal Avenue Pump Station from levee side



Storm drain coming into pump station



Storm drain coming into pump station

Massillon, Ohio
Federal Avenue 60-Inch RCP
Gravity Outlet
Pipe #32 (South Pipe)



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
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30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
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36	30	CIP	141	Discharge from Federal Avenue Pump Station
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39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
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43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
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48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Federal Avenue Pump Station

This is an aerial photograph showing a large body of water, likely a reservoir or pond, situated between a residential area on the left and a multi-lane highway on the right. The residential area includes several houses and a large, light-colored building. The highway has multiple lanes with visible traffic. The water body is dark green and occupies the central portion of the image. Two red arrows point to specific features: one points to a small structure in the water labeled 'outlet', and the other points to a circular structure on the grassy bank labeled 'Pump station/Storm Drains'.

Pump station/Storm Drains

outlet

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: 32 PIPE SIZE: 60"
PROJECT: Massillon Levee TYPE: CMP to RCP INSPECTION DATE: 10/1/09

OVERALL CONDITION: NASSCO Grade 3 – Moderate defects that will continue to deteriorate

GENERAL INSPECTION FINDING: 0 to 42 feet CMP, CMP bituminous coating missing in haunches, moderately corroded. RCP 42 ft to gatewell appears to be in good condition. Moisture present at some of the joints.

MAJOR DEFECTS

Pipe # 32, Federal Avenue South Gravity	
Feet	Defect
2.0	Bituminous coating missing in haunch, moderately corroded
16.5	Bituminous coating missing in haunch, moderately corroded
19.7	Moisture at joint, 4 O'clock
22.0	Moisture at joint, 1.75" joint separation
42ft	Offset joint where CMP meets concrete, approx. 3" right side. Severely separated joint at crown.
53ft	Wet joint at approx. 3 o'clock
67ft	Staining at joint in crown
68ft	Rock in invert, could not move
79ft	Wet joint at approx. 3 o'clock
92ft	Staining at joint in crown
111ft	Wet joint at 9 o'clock
127ft	Approx. 1" joint separation, staining at 1:00
135ft	Gatewell



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)		A There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Failure (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ		
Structural	Weld Failure (WF)	Circumferential (C)		WFC	2	
		Longitudinal (L)		WFL	2	
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Lining (L)		RPL		
		Localized Lining (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		



View of entrance at Federal Avenue south pipe

=== INSPECTION SETUP ===

SECTION: PROJECT # 17-89-P-0133

10/01/09

ID: FEDERAL AVE. STATION

MH START: UPSTREAM

MH STOP: DOWNSTREAM

LOCATION: SE-01

PIPE: 60" RCP

OPERATOR: KEUTY

TAPE ID: MASSILLON

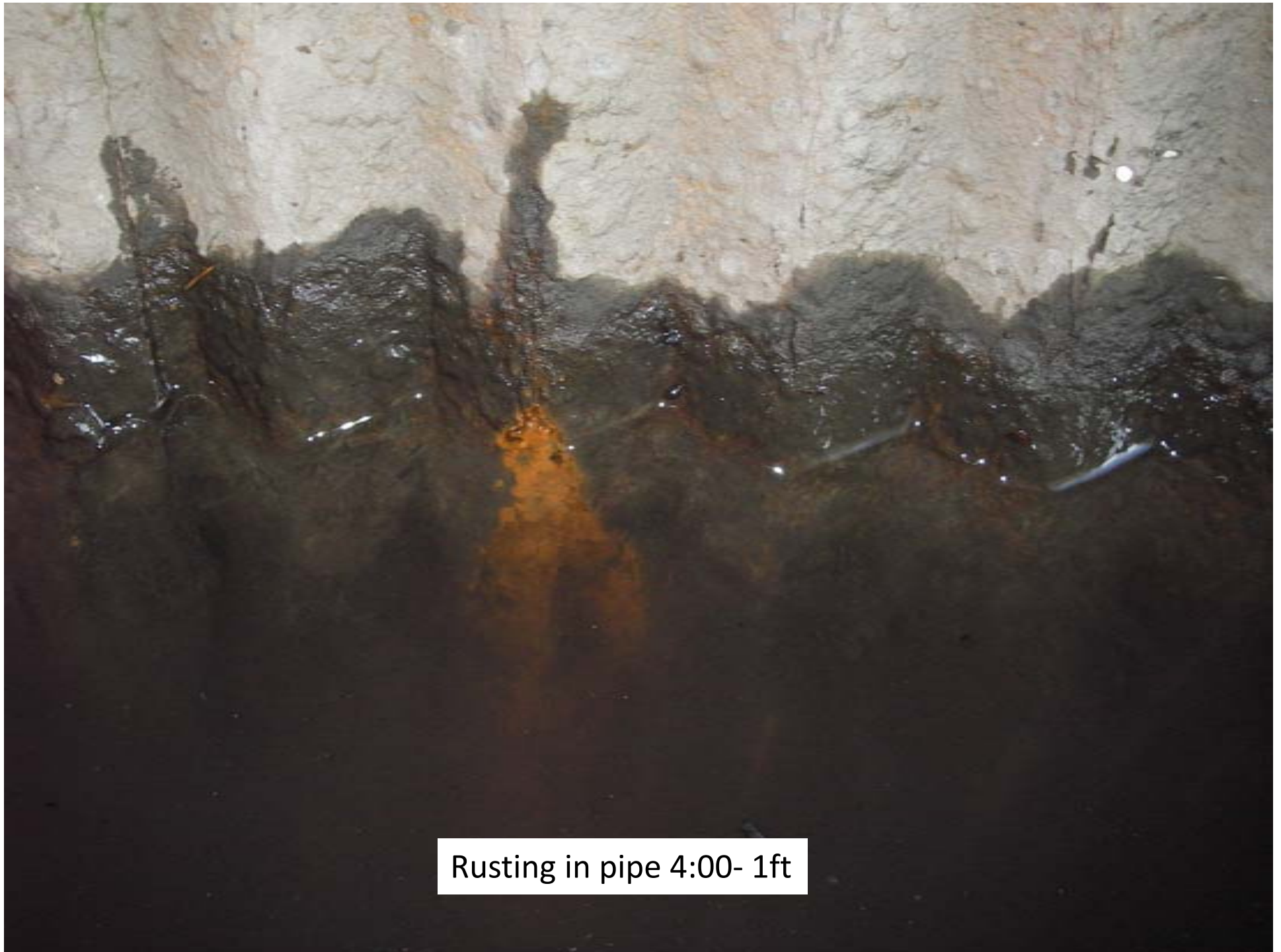
START: 0:00

:

ONSCREEN:

60" RCP LINE # 32 SOUTH LINE





Rusting in pipe 4:00- 1ft



Moisture at joint 4:00- 22ft

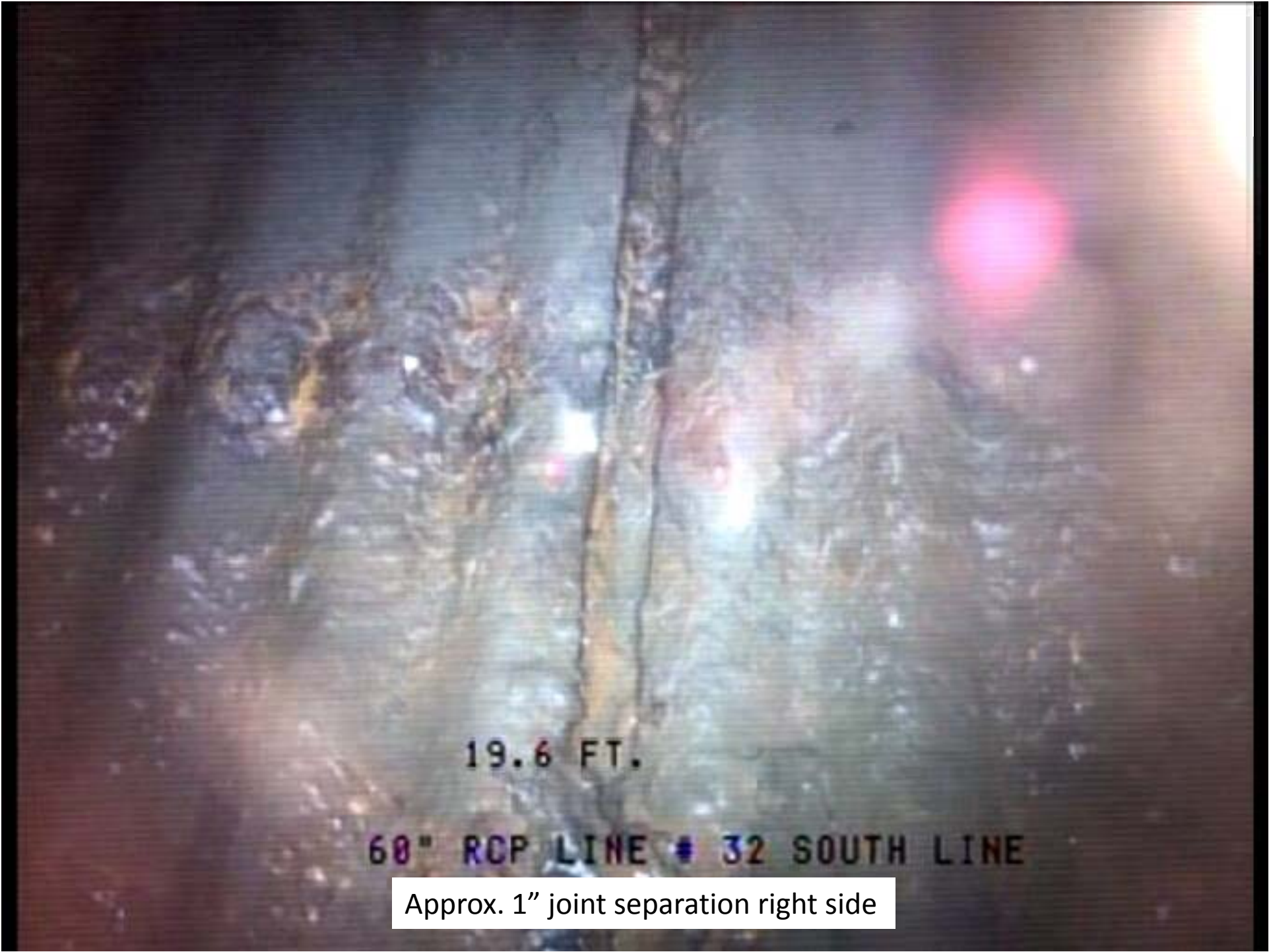


16.5 FT.

60" RCP LINE # 32 SOUTH LINE

Lining at invert of CMP deteriorating/missing

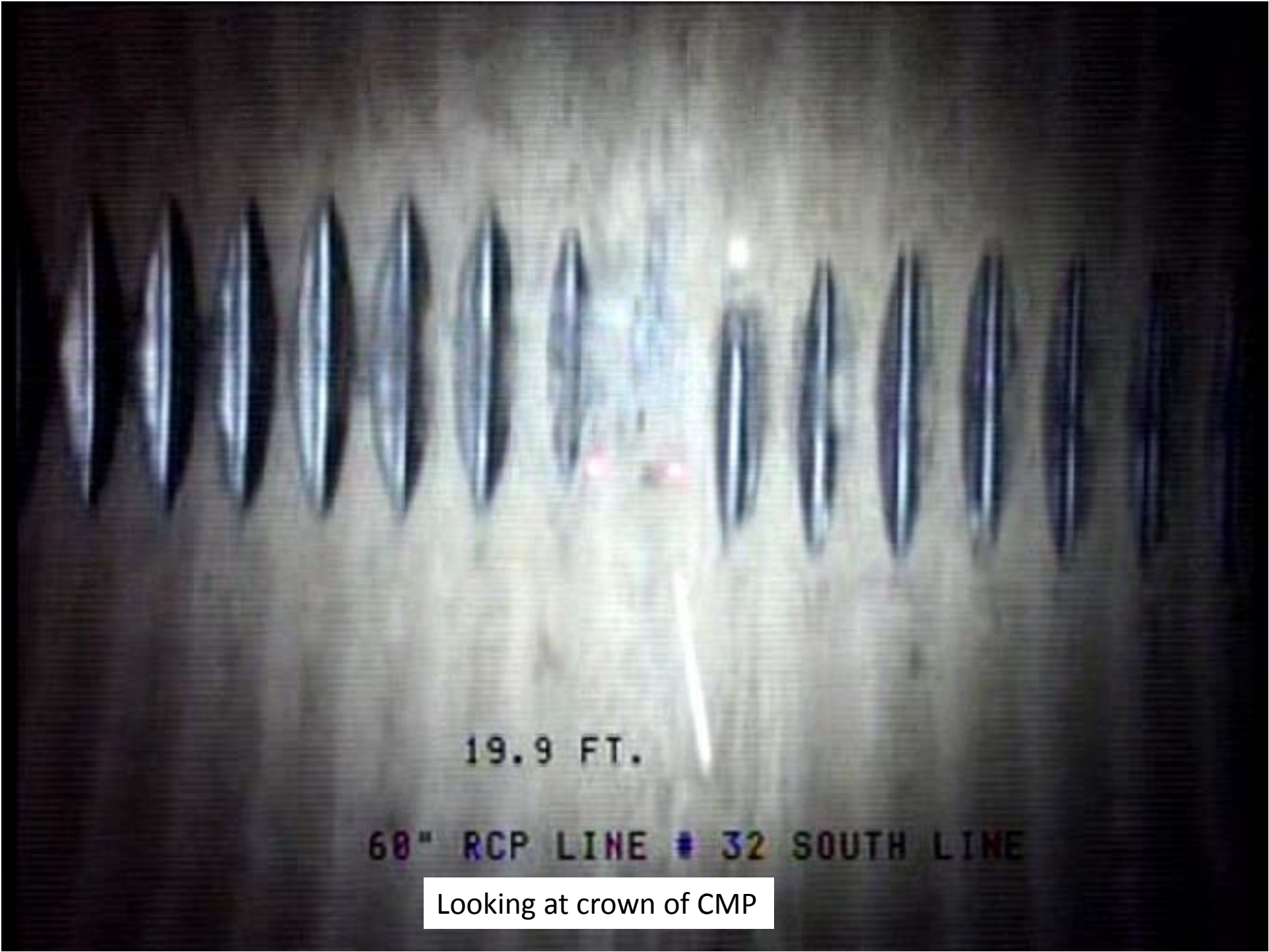




19.6 FT.

60" RCP LINE # 32 SOUTH LINE

Approx. 1" joint separation right side



19.9 FT.

68" RCP LINE # 32 SOUTH LINE

Looking at crown of CMP



19.7 FT.

68" RCP LINE # 32 SOUTH LINE

Moisture at joint



19.9 FT.

This is an underwater video frame showing a concrete structure. The surface is covered in a greyish material that is peeling away, particularly on the right side. Two bright red laser points are visible on the structure. The background is dark and murky.

60" RCP LINE # 32 SOUTH LINE

Lining peeling away from right haunch



19.9 FT.

60" RCP LINE # 32 SOUTH LINE

Lining detaching from left haunch





Approaching offset joint where CMP meets RCP



33.8 FT.

60" RCP LINE # 32 SOUTH LINE

Offset joint right haunch where CMP meets RCP



Offset joint where CMP meets Conc. Pipe- 42 ft



Separated joint in crown- 42ft



Weeping joint 3:00- 53ft



Immovable rock in invert approx. 60ft



Staining at joint in crown - 67ft

Weeping joint 3:00- 79ft



An underwater photograph showing a dark, textured pipe wall. The surface is covered in orange and white corrosion products. Two red laser pointers are visible, projecting lines onto the pipe wall. Overlaid text in the center reads "88.4 FT." and "60\"/>

88.4 FT.

60" RCP LINE # 32 SOUTH LINE

Corrosion of pipe wall left side



Staining in joint at crown- 92ft



Weeping joint 9:00- 102ft



Joint separated, 1-inch, staining at 8:00- 127ft



123.0 FT.

60" RCP LINE # 32 SOUTH LINE

X=1.139
Y=4.932
D=5.062

1" + joint separation at approx. 2 o'clock

SPKR-
ALKE

MUTED

126.4 FT.

60" RCP LINE # 32 SOUTH LINE

Approaching gate well



Looking down pipe from gate, total distance 140ft

The image shows a dark, heavily textured surface, likely a gate or a wall. The texture is rough and uneven, with many small, light-colored specks and streaks scattered across a dark background. The lighting is somewhat uneven, with a brighter area towards the top center. At the bottom center, there is a white rectangular label with the text "Gate at 140ft" in black font.

Gate at 140ft

Massillon, Ohio
Federal Avenue 60-Inch RCP
Gravity Outlet
Pipe #33 (North Pipe)



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: 33 PIPE SIZE: 60"
PROJECT: Massillon Levee TYPE: CMP to RCP INSPECTION DATE: 10/1/09

OVERALL CONDITION: NASSCO Grade 3 – Moderate defects that will continue to deteriorate

GENERAL INSPECTION FINDING: 0 to 42 feet CMP, CMP bituminous coating missing in haunches, moderately corroded. RCP 42 ft to gatewell appears to be in good condition. Moisture present at some of the joints.

MAJOR DEFECTS

Pipe # 33, Federal Avenue North Gravity	
Feet	Defect
2.0ft	Bituminous coating missing along haunch
23ft	Offset joint, moisture and corrosion at joint, moderate corrosion left haunch
23ft	Rust coming from joint at 4 o'clock
39.4ft	Offset joint CMP to RCP
128ft	Joint separation 1-inch
134.4ft	Joint separation 2.2-inches
135.0ft	Gatewell



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

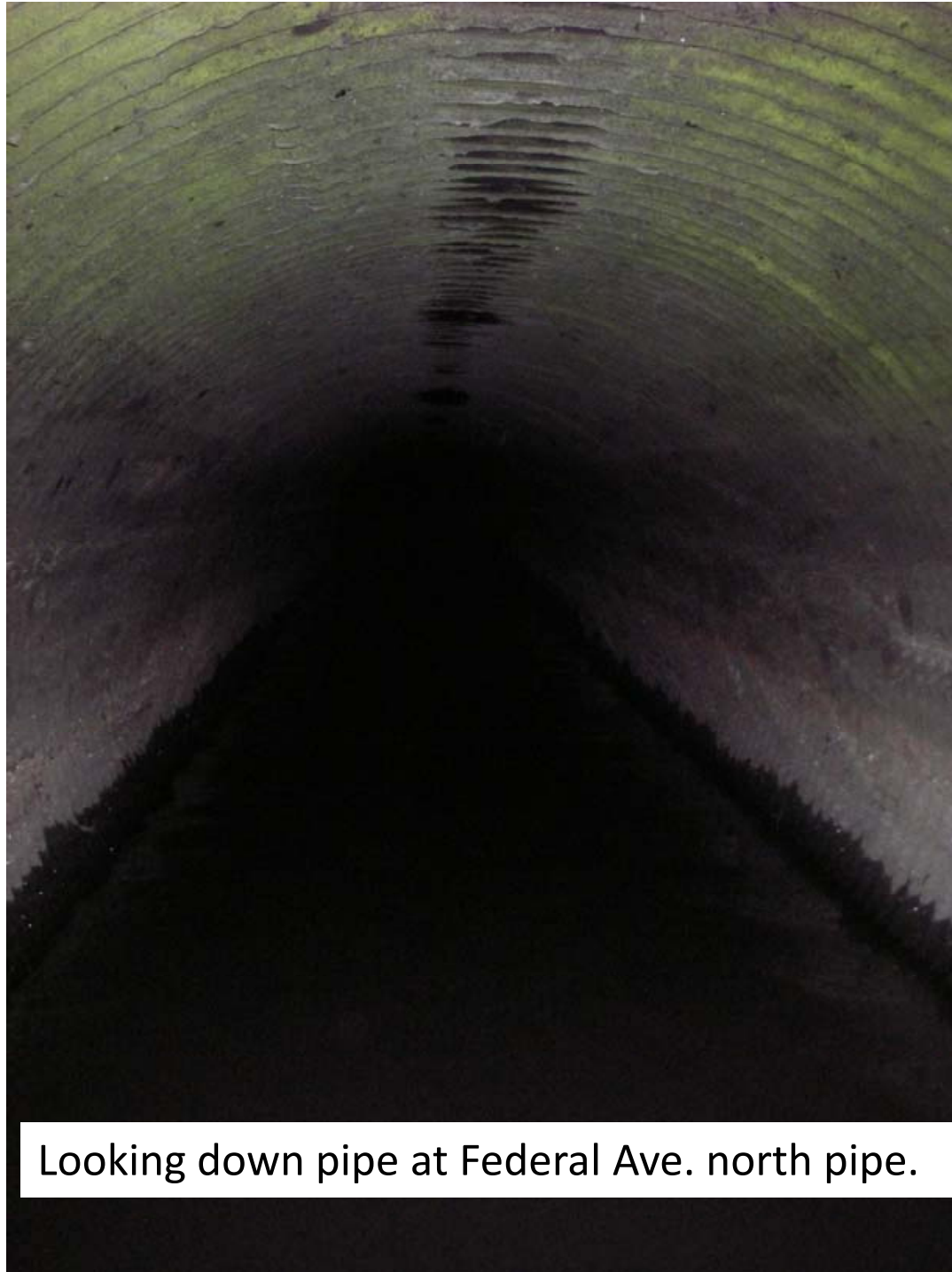
Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)		A There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Failure (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ		
Structural	Weld Failure (WF)	Circumferential (C)		WFC	2	
		Longitudinal (L)		WFL	2	
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Lining (L)		RPL		
		Localized Lining (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		



Looking down pipe at Federal Ave. north pipe.

=== INSPECTION SETUP ===

SECTION: PROJECT # M91237-89-P-0133

10/01/89

ID: FEDERAL AVE. PUMP STATION

MH START: UPSTREAM INLET

MH STOP: DOWNSTREAM OUTLET

LOCATION: 50+00

PIPE: 60" RCP

OPERATOR: KEVIN

TAPE ID: MASSILLON

START: 0:00

:

ONSCREEN:

60" RCP LINE # 33 NORTH LINE





2.0 FT.

60" RCP LINE # 33 NORTH LINE

Coating missing from pipe wall



17.8 FT.

60" RCP LINE # 33 NORTH LINE

Moderate corrosion right haunch



28.9 FT.

60" RCP LINE # 33 NORTH LINE

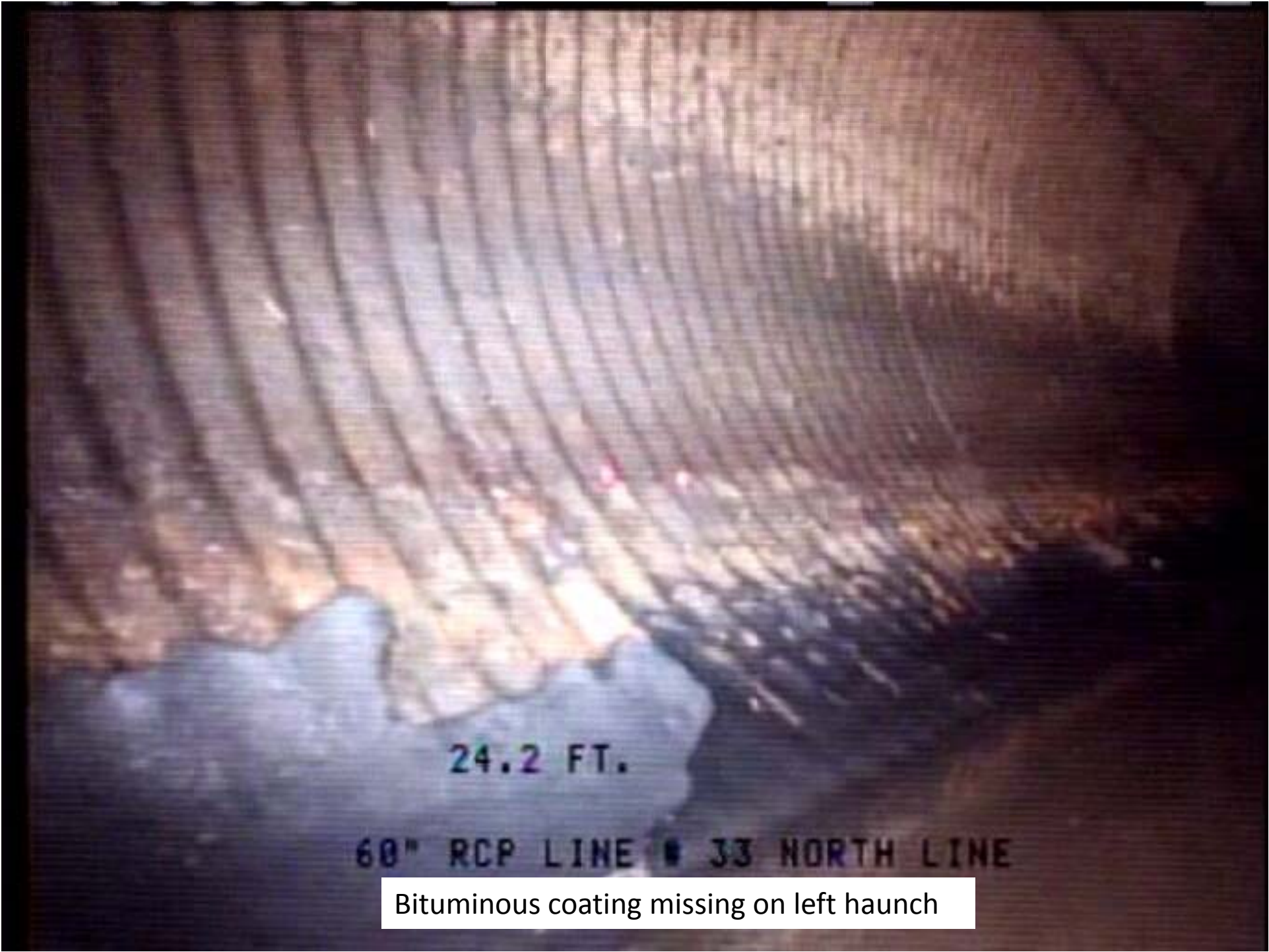
Coating missing from right haunch



Offset/Separation at joint 9:00- 23
feet



Moisture/corrosion in
joint at 4:00- 23ft



24.2 FT.

60" RCP LINE • 33 NORTH LINE

Bituminous coating missing on left haunch



23.0 FT.

60" RCP LINE # 33 NORTH LINE

Moderate corrosion at left haunch



26.8 FT.

60" RCP LINE # 33 NORTH LINE

Approaching offset joint where CMP meets RCP

SPKR-
NINE

MUTED

30.7 FT.

60" RCP LINE # 33 NORTH LINE

Approaching offset joint where CMP meets RCP



Offset joint at 4:00 where CMP meets RCP (approx. 2")



Offset joint at 4:00 where CMP meets RCP



39.4 FT.

60" RCP LINE # 33 NORTH LINE

Crown where CMP meets RCP



39.4 FT.

60" RCP LINE # 33 NORTH LINE

Moderate joint separation where CMP meets RCP



Looking down pipe at inlet- 44ft



58.3 FT.

60" RCP LINE # 33 NORTH LINE



62.9 FT.

60" RCP LINE # 33 NORTH LINE



Slight separation of joint at 10:00- 92ft
Slight staining present



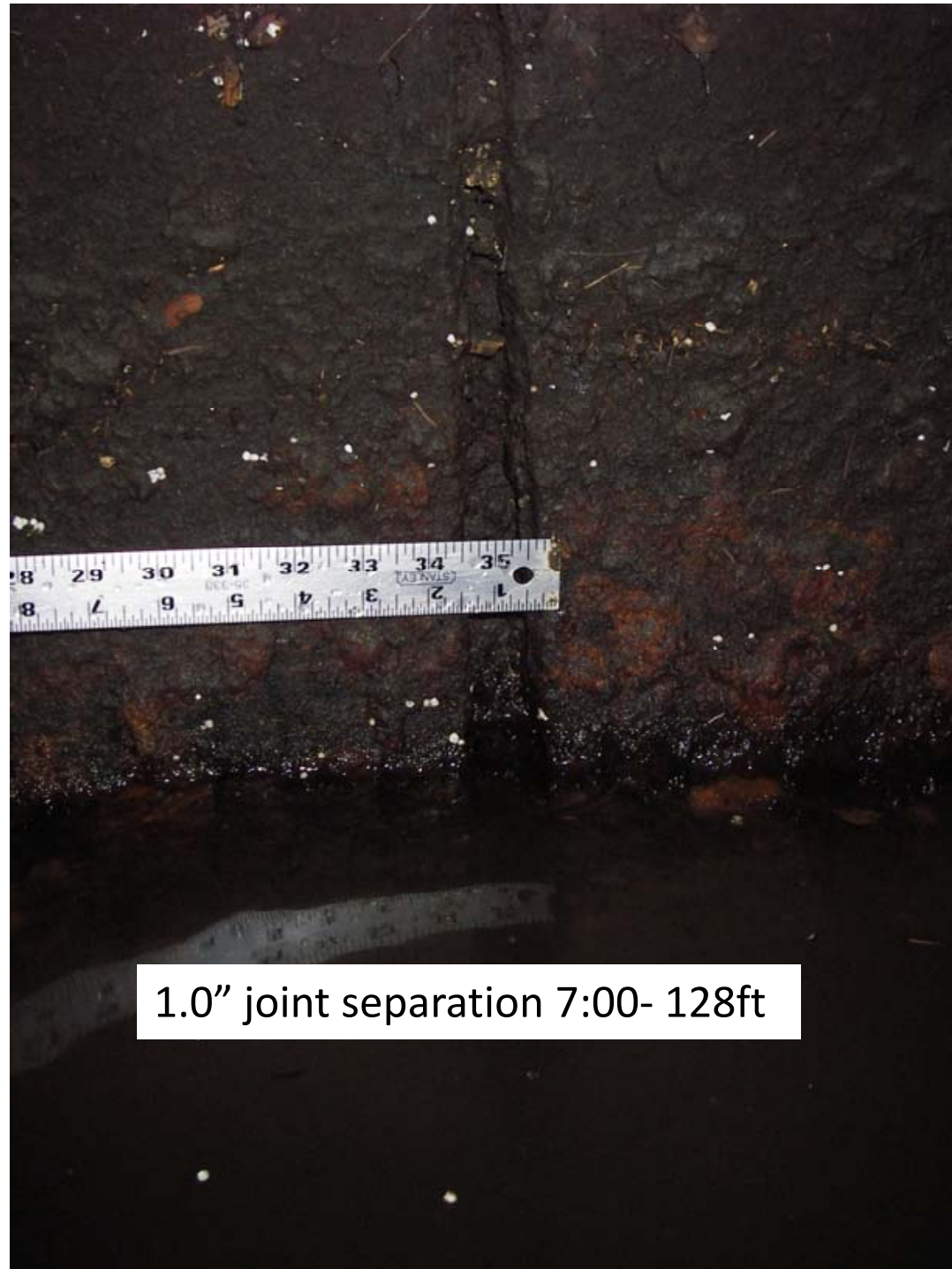
Pipe appears to be DIP-
92ft



100.9 FT.

60" RCP LINE # 33 NORTH LINE

Looking down barrel at gate well



1.0" joint separation 7:00- 128ft



122.6 FT.

60" RCP LINE # 33 NORTH LINE

2 ¼ " joint separation right side

134.4 FT.

X=2.249
Y=7.857
D=8.172

60" RCP LINE # 33 NORTH LINE



Closed gate- Total distance 140ft

Massillon, Ohio

Federal Avenue Pump Station

Pipe #34, 35, and 36



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Federal Avenue, Pump Pipes (34, 35, 36) PIPE SIZE: 30" LENGTH INSPECTED: 141 ft.

PROJECT: Massillon Levee TYPE: Coated DIP INSPECTION DATE: 9/15/09

OVERALL CONDITION: NASSCO Grade 4: Pipe will probably fail in 5 to 10 years. Pipe rated at a more serious condition due to that it is a pump line going through a levee.

GENERAL INSPECTION FINDINGS: All three pipes have moderate to severe corrosion at the joints. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints.

*Note: Pipe #35 has severe loss of lining from air-release valve to pump station on the downward grade section of pipe.

MAJOR DEFECTS

Feet	Defect
0-141 ft	All three pipes have moderate to severe corrosion at the joints. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints. *Note: Pipe #35 has severe loss of lining from air-release valve to pump station on the downward grade section of pipe.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



Federal Ave. Siphon Breakers



Federal Avenue Discharge Well



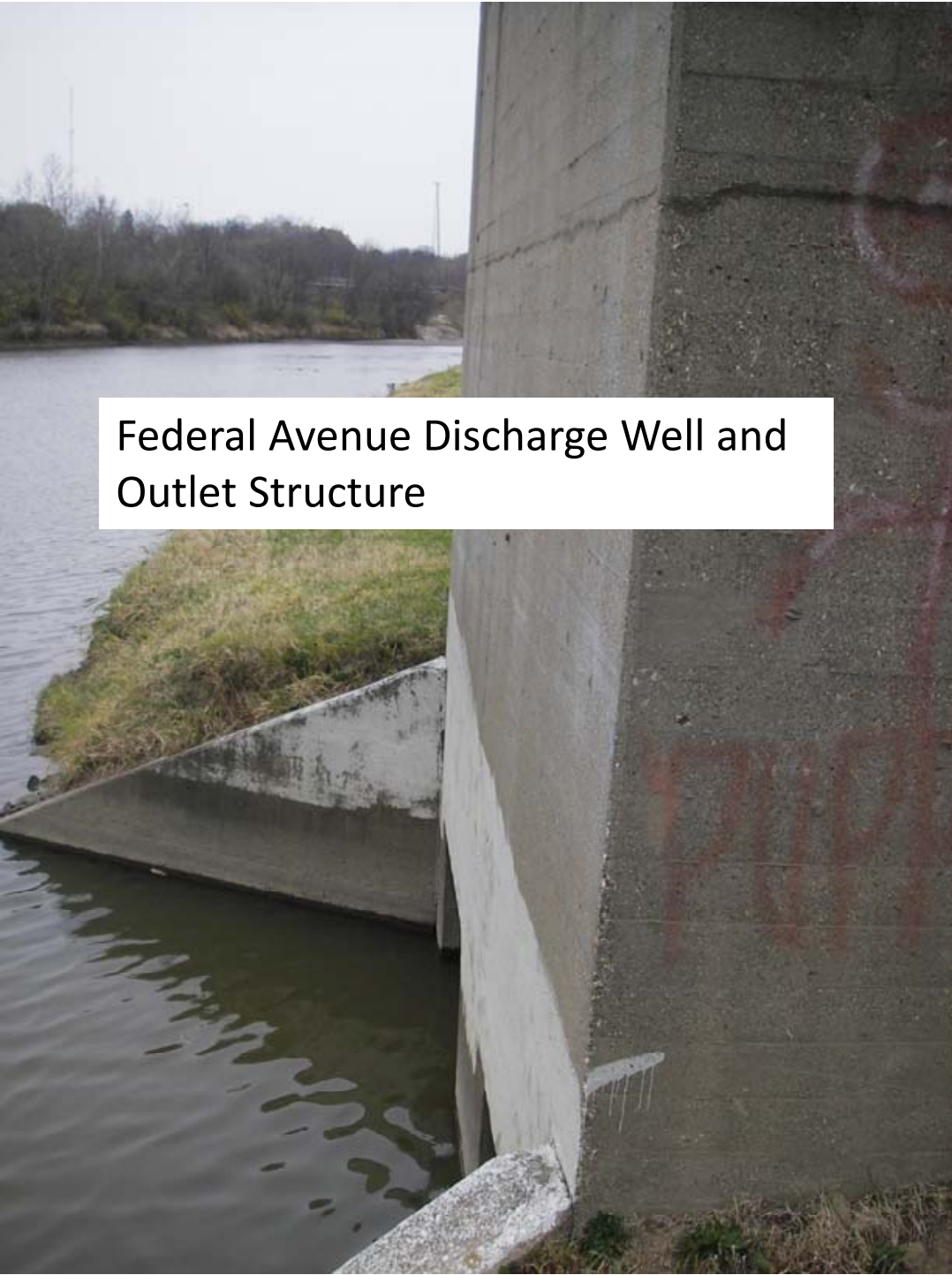
Federal Avenue Discharge Well



Federal Avenue Discharge Pipes



Federal Avenue Pump Station from top of levee

A photograph of a concrete discharge well and outlet structure. The structure is a large, grey concrete wall with a sloped base that meets the water. To the left of the structure is a body of water, and to the right is a grassy bank. In the background, there are trees and a distant tower. The sky is overcast. A white text box is overlaid on the image.

Federal Avenue Discharge Well and
Outlet Structure



Federal Avenue Outlet

Massillon, Ohio
Federal Avenue Pump Station
Pipe #34 (South Pipe)

=== INSPECTION SETUP ===

SECTION: M91237-09-P-0133

09/15/09

ID: FEDERAL AVE. PUMP STATION

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP STATION

LOCATION: 50+00

PIPE: 30" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0+00

ONSCREEN:

#34 SOUTH PIPE



Possible Repair/Patch



Moderate/Severe Corrosion at Joint



18.5 FT.

#34 SOUTH PIPE

Going upgrade to siphon breaker



28.6 FT.

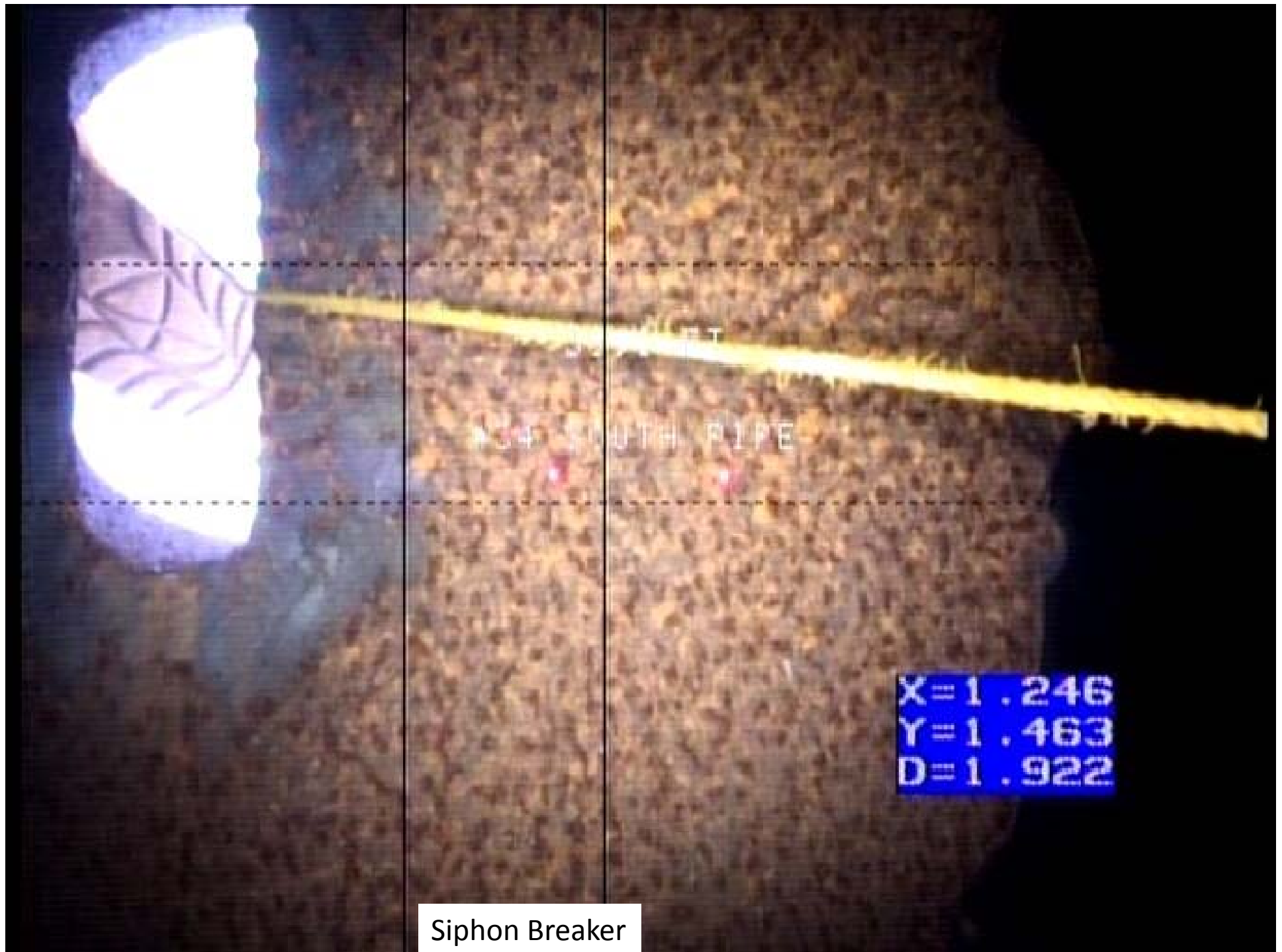
#34 SOUTH PIPE

Siphon Breaker

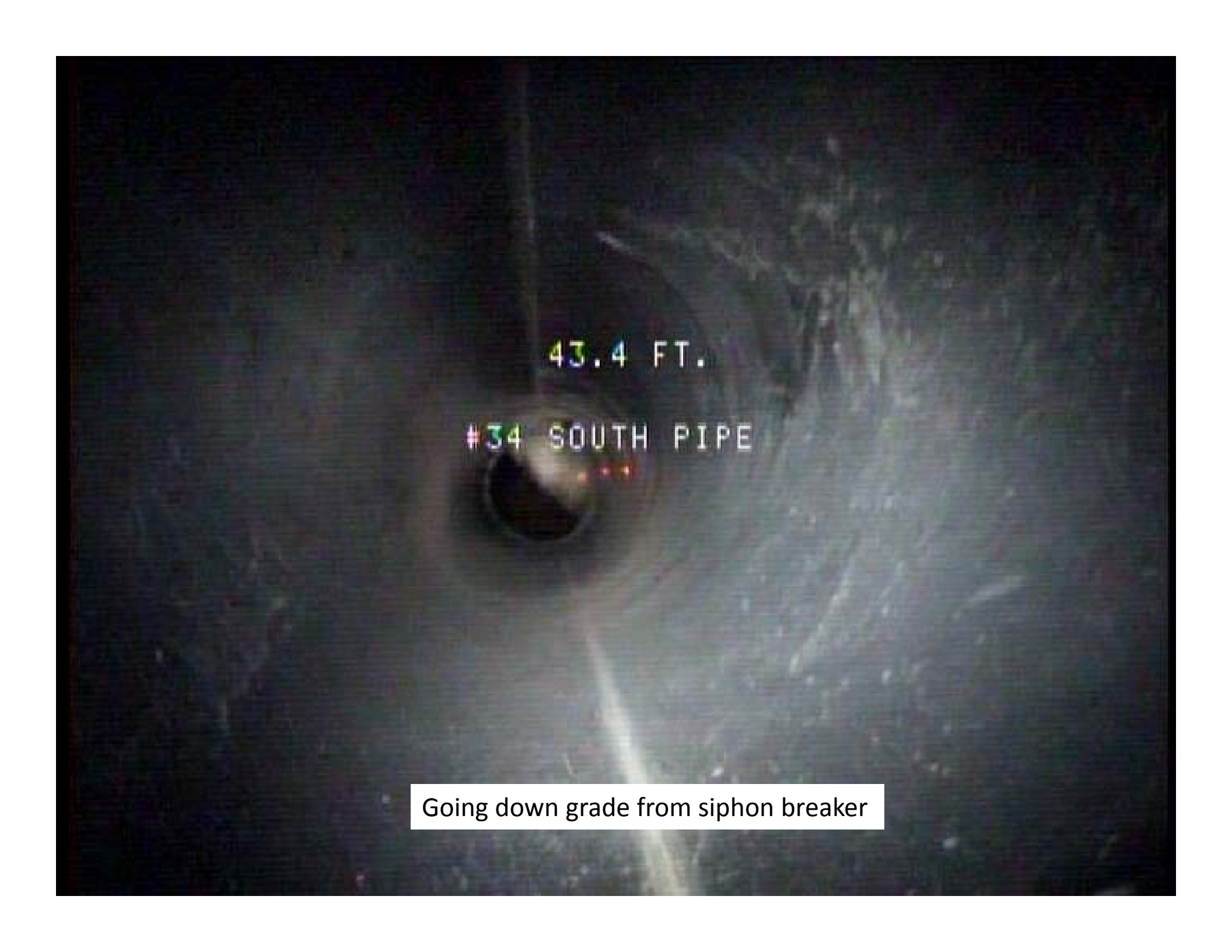


33.6 FT.

#34 SOUTH PIPE



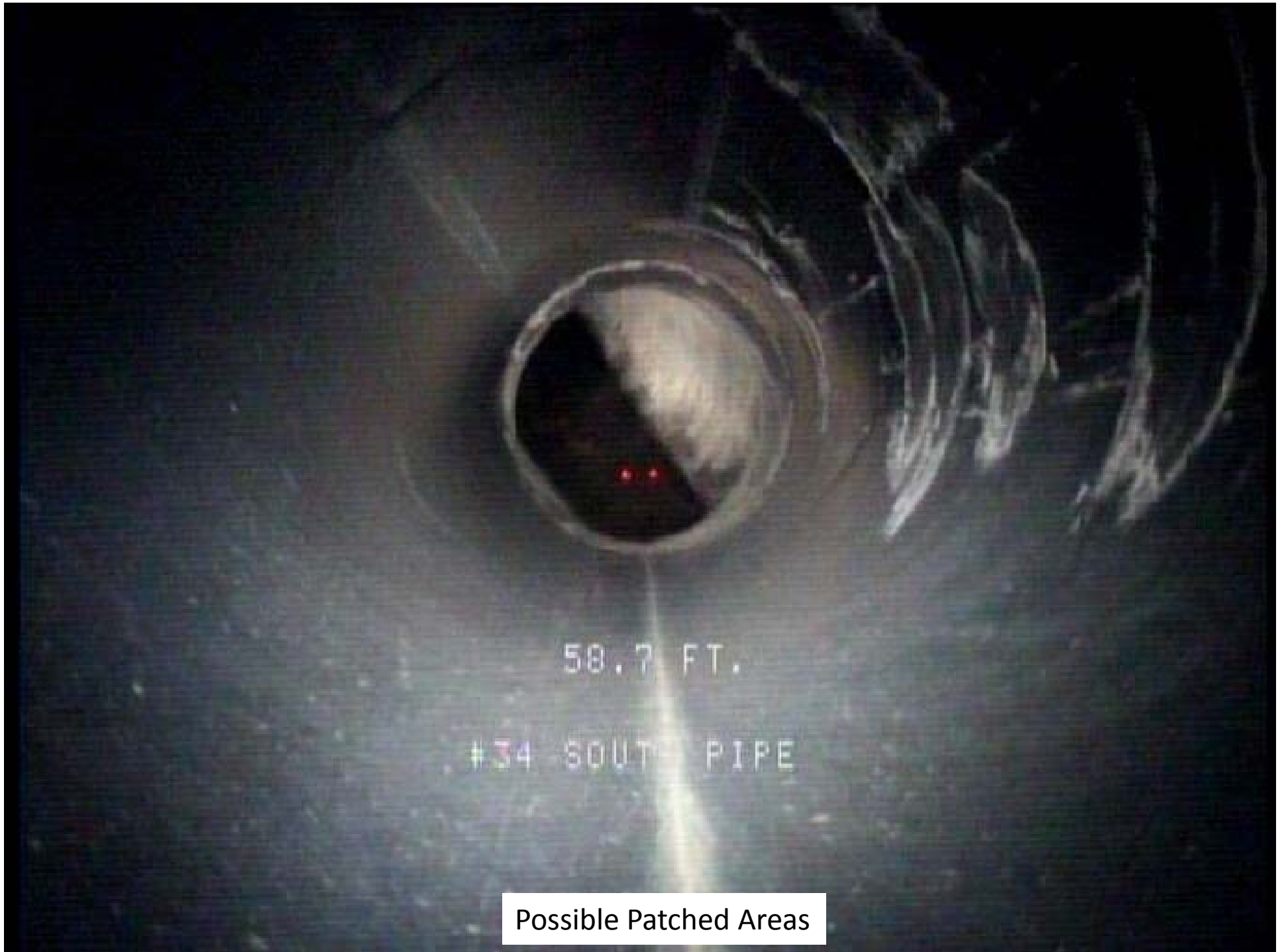
Siphon Breaker

An underwater photograph showing a dark, circular pipe opening in the center. The surrounding water is dark and murky, with some light reflecting off particles. Overlaid text in a digital font indicates a depth of 43.4 feet and identifies the pipe as #34 South Pipe. A white text box at the bottom provides context about the location relative to a siphon breaker.

43.4 FT.

#34 SOUTH PIPE

Going down grade from siphon breaker



58.7 FT.

#34 SOUTH PIPE

Possible Patched Areas



59.7 FT.

#34 SOUTH PIPE



59.7 FT.

#34 SOUTH PIPE



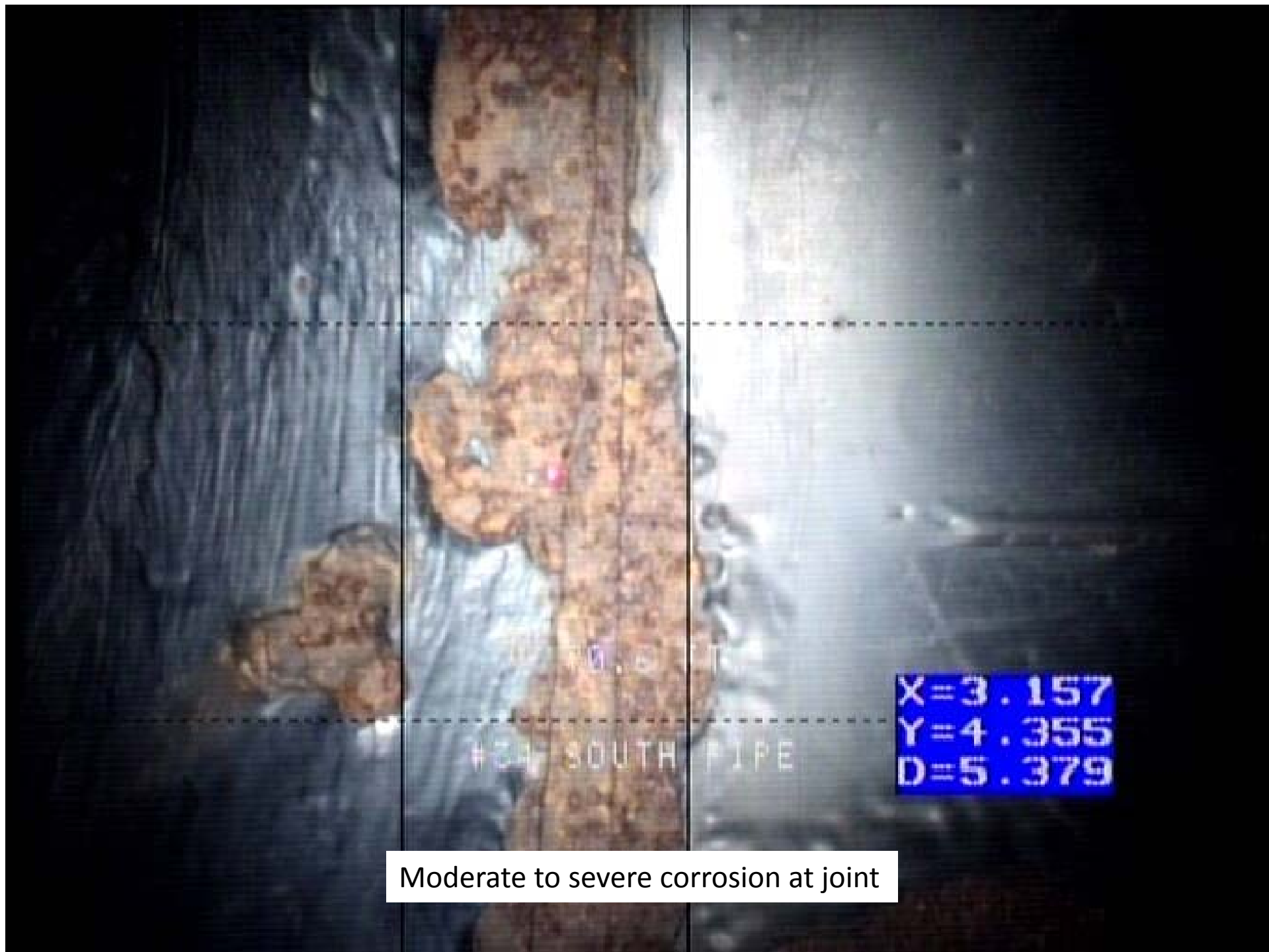
Possible patch in protective coating



Corrosion behind protective coating



Corrosion behind coating



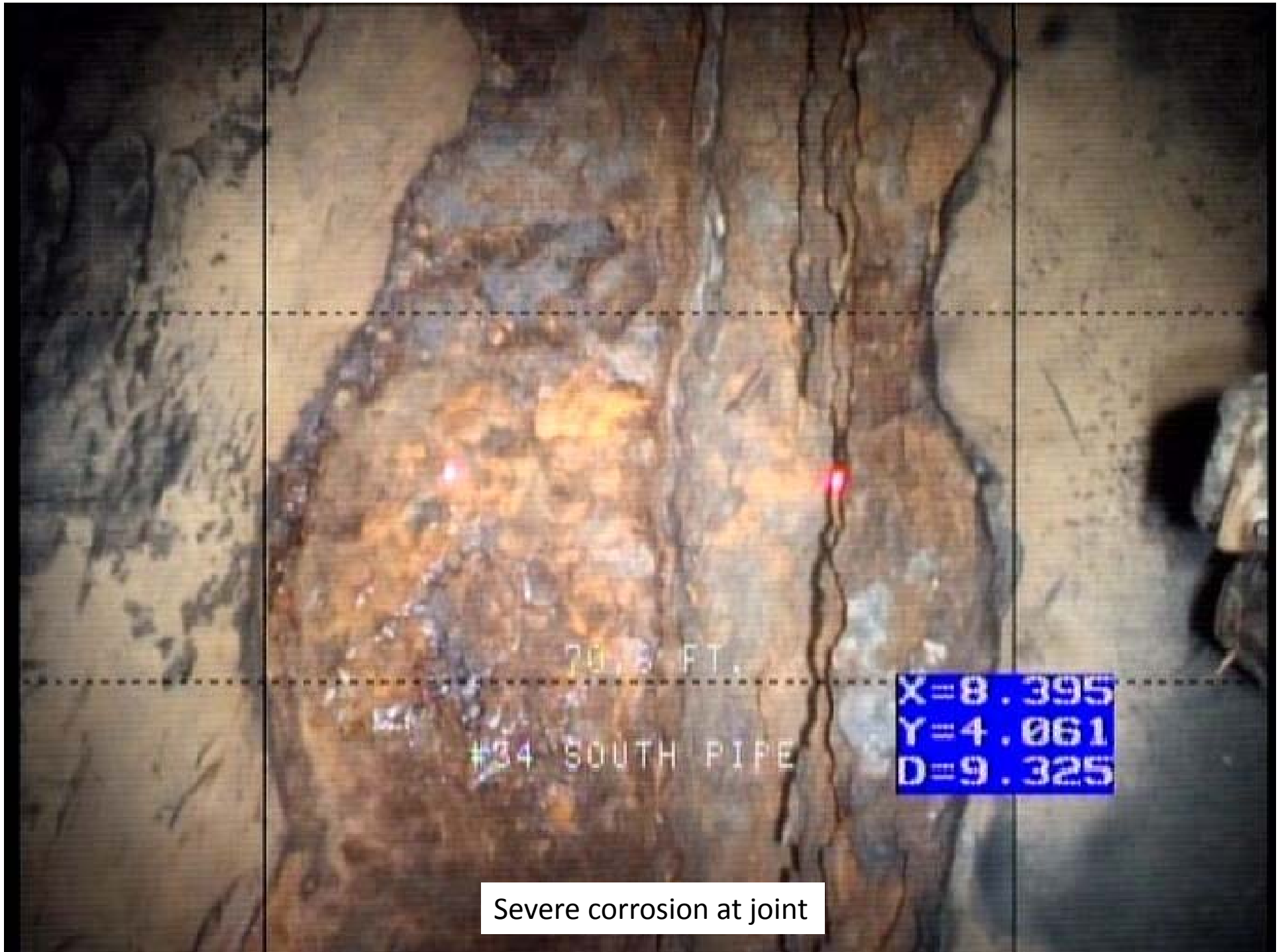
Moderate to severe corrosion at joint



Moderate to severe corrosion at joint



Severe corrosion at joint



Severe corrosion at joint



70.6 FT.

#34 SOUTH PIPE

X=10.59
Y=4.061
D=11.35

Severe corrosion at joint



Bottom of slope, levee



Severe corrosion at joint



78.1 FT.

#34 SOUTH PIPE

Bottom of slope leading to pump



Moderate to severe corrosion at joint

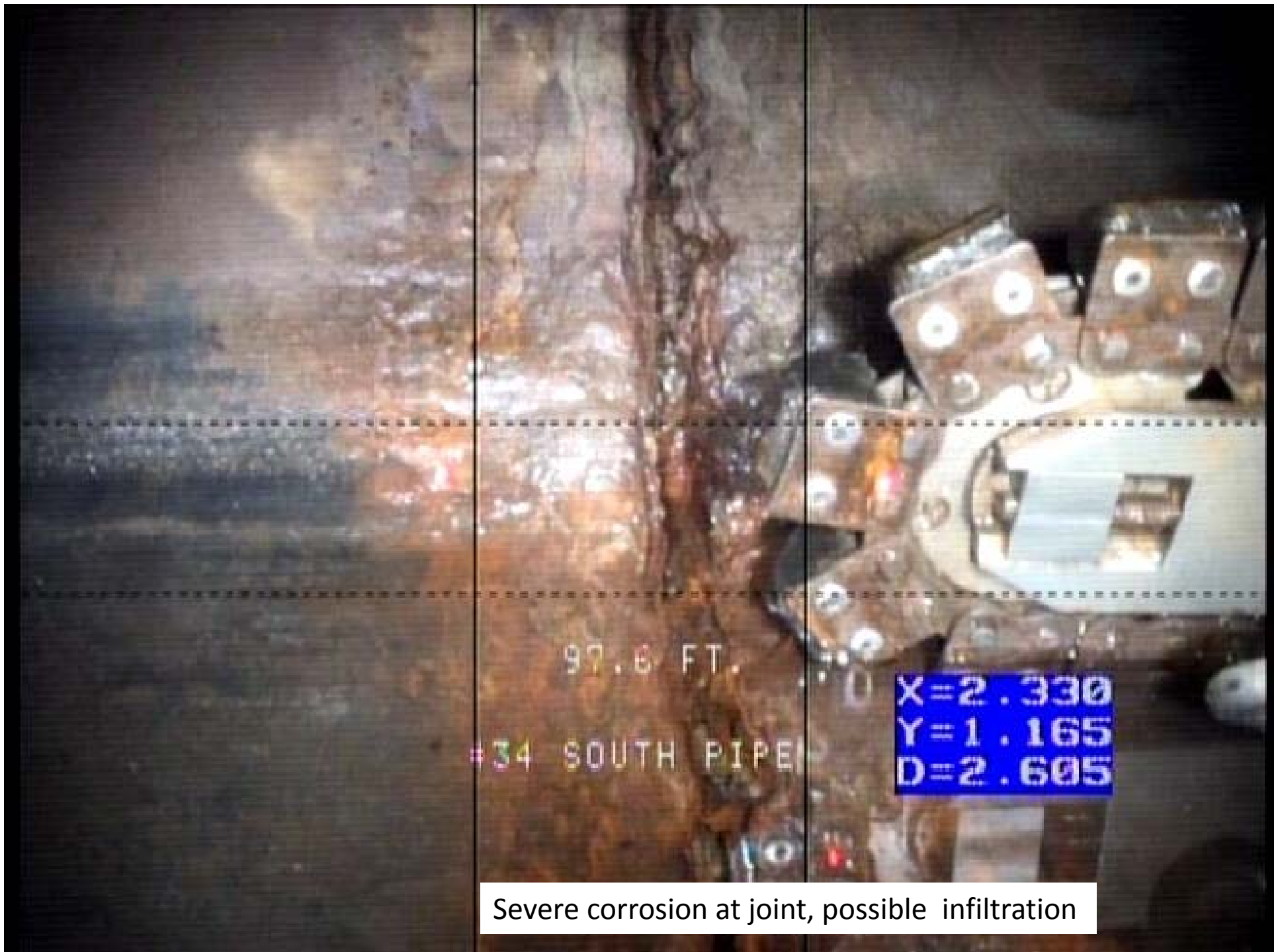




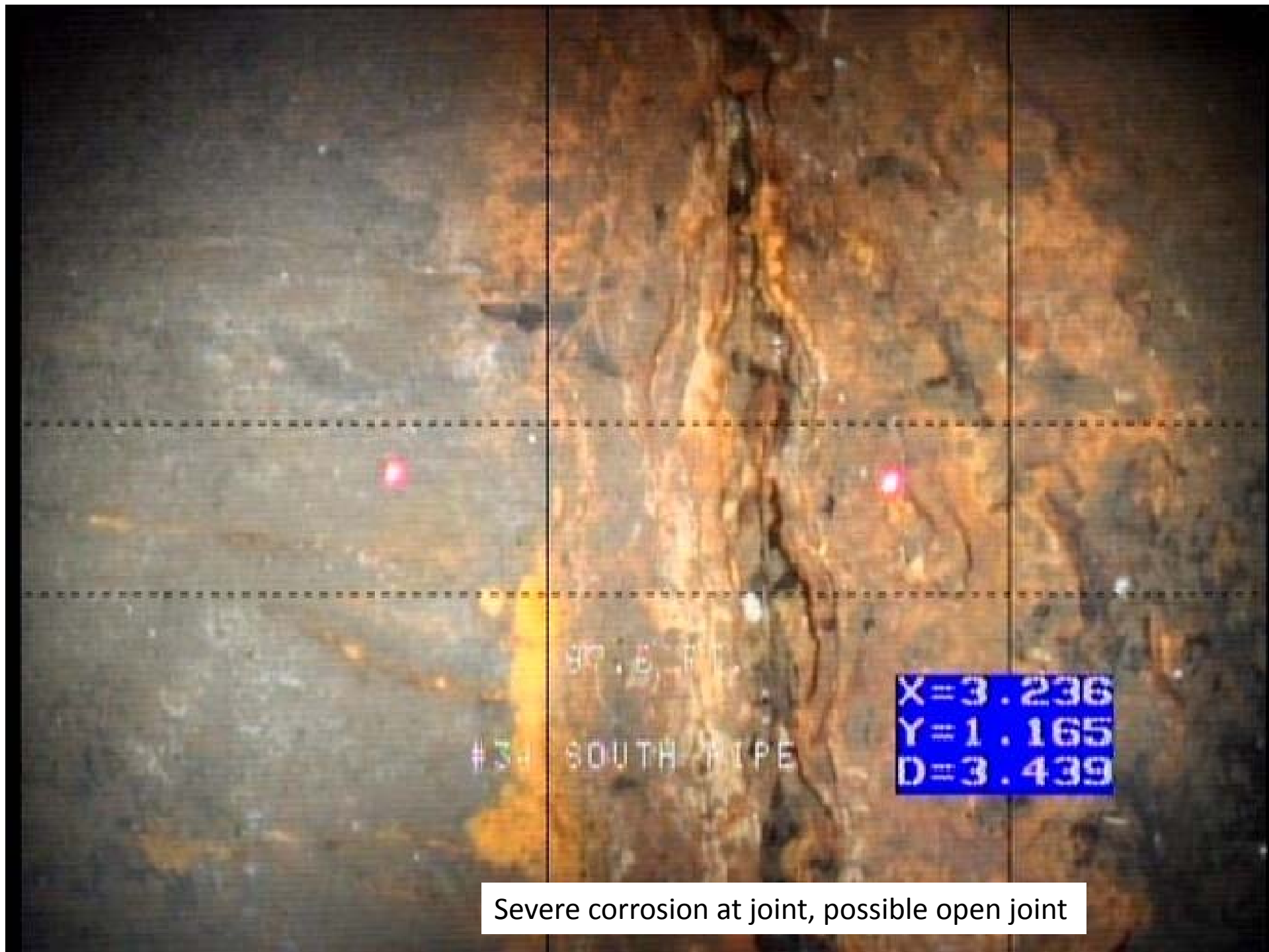


92.1 FT.

#34 SOUTH PIPE



Severe corrosion at joint, possible infiltration



Severe corrosion at joint, possible open joint



View of pump





132.2 ft.

#34 SOUTH PIPE

Protective coating missing near pump



Massillon, Ohio
Federal Avenue Pump Station
Pipe #35 (Center Pipe)

=== INSPECTION SETUP ===

SECTION: 091237-09-P-0133

09/15/09

ID: FEDERAL AVE. PUMP STATION

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP STATION

LOCATION: 50+00

PIPE: 30" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 1:04

ONSCREEN:

#35 CENTER PIPE



Moderate corrosion in invert



Going up grade to Siphon Breaker





23.6 FT.

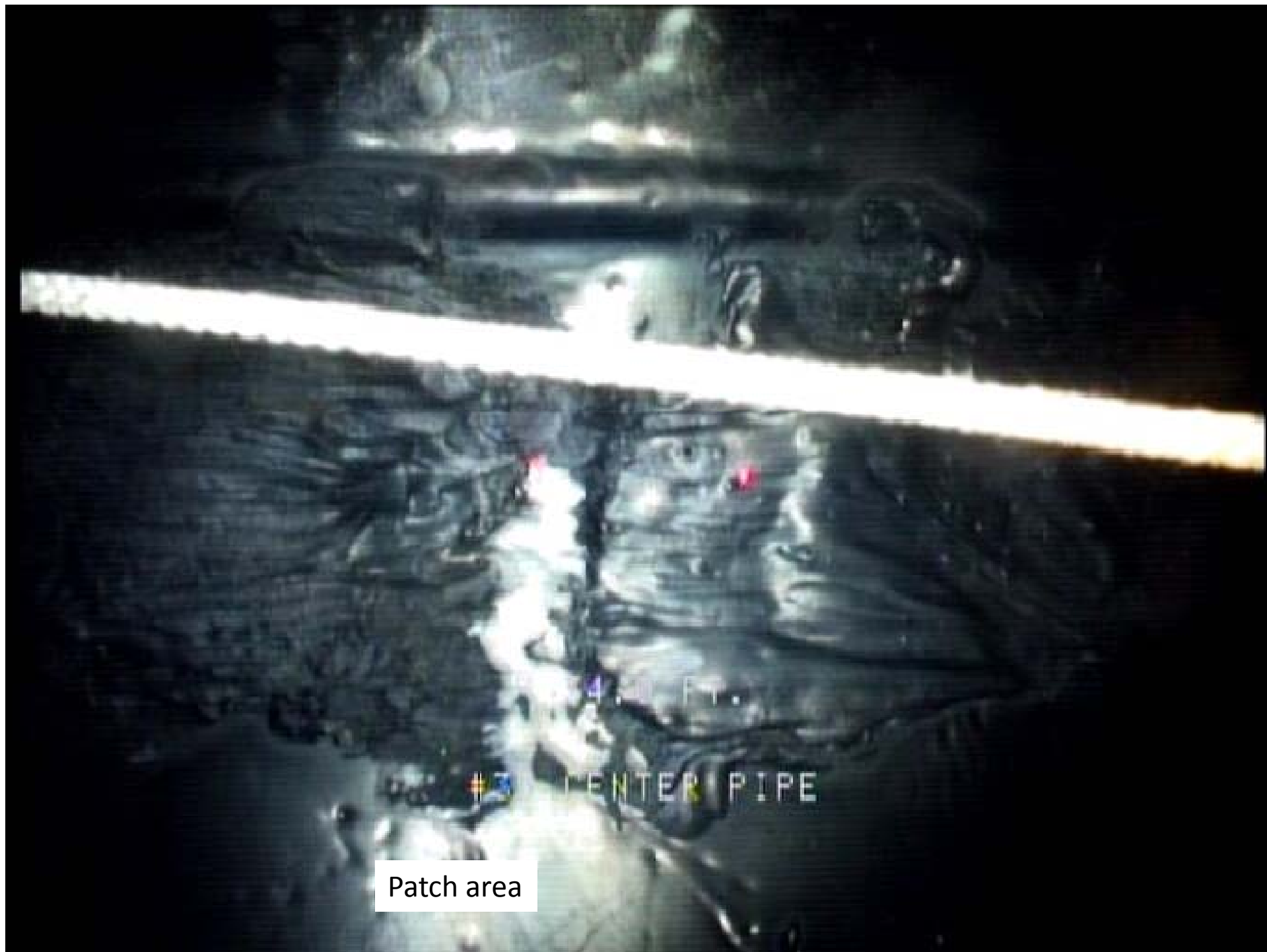
#35 CENTER PIPE

X=6.503
Y=2.825
D=7.090



Possible patched areas near siphon breaker





Patch area



34.0 FT.

#35 CENTER LINE +1

Start of down grade towards pump





41.0 FT.

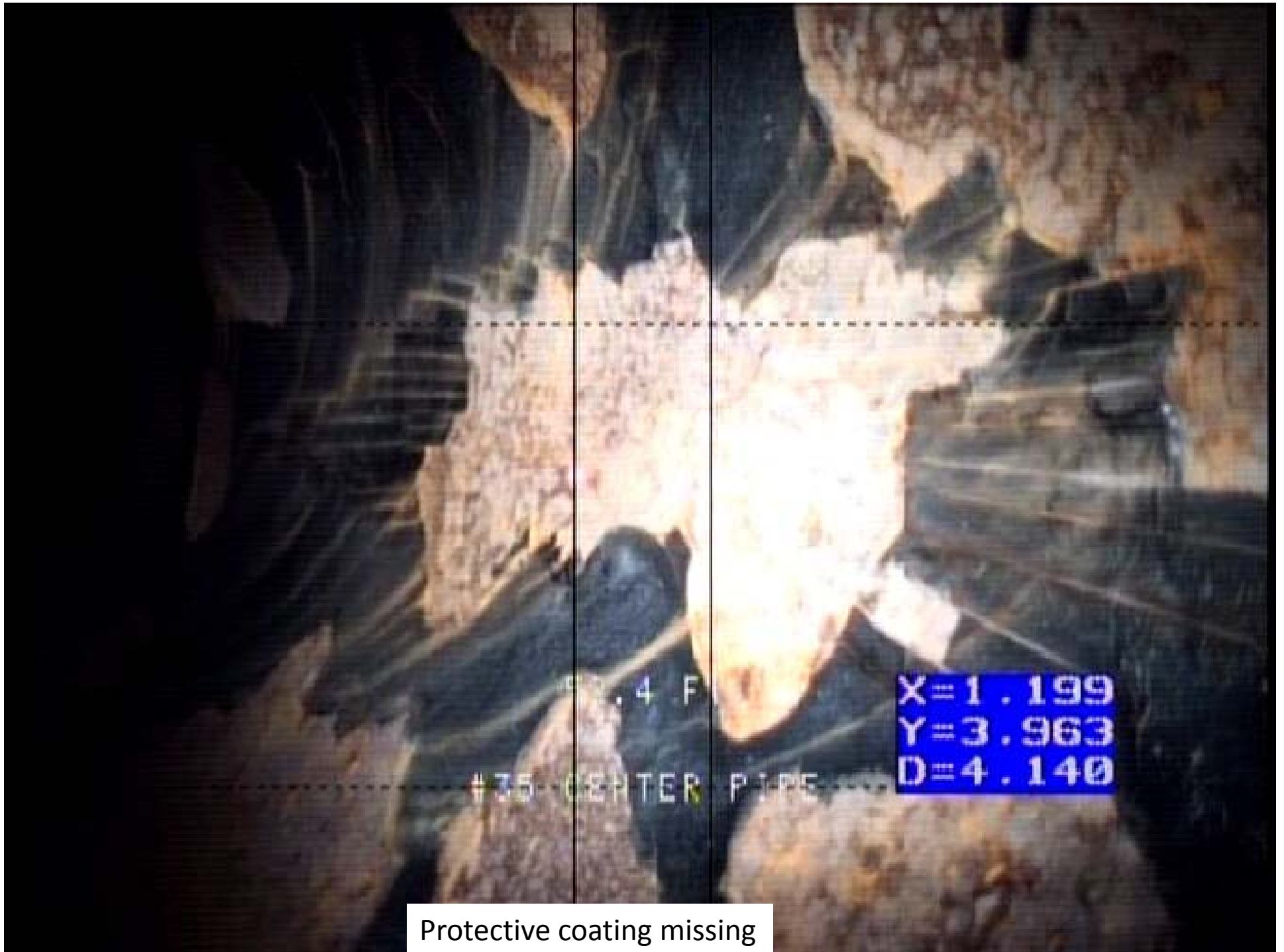
#35 CENTER PIPE

Protective coating missing



Missing coating





X=1.199
Y=3.963
D=4.140

Protective coating missing



Protective coating missing, near base of levee





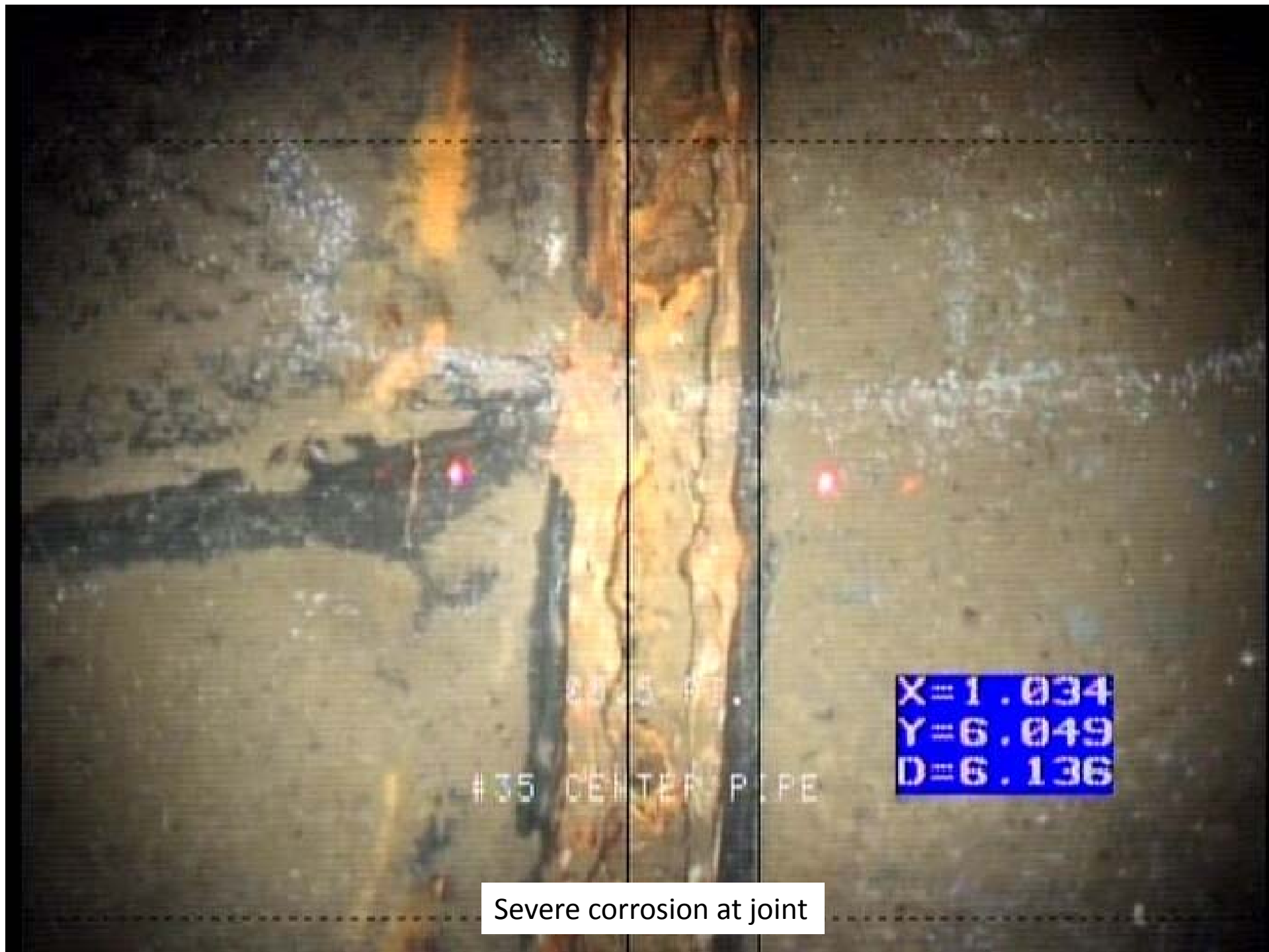
Base of levee



74.8 FT.

#35 CENTER PIPE

Flat grade leading to pump



Severe corrosion at joint



Corrosion under protective coating



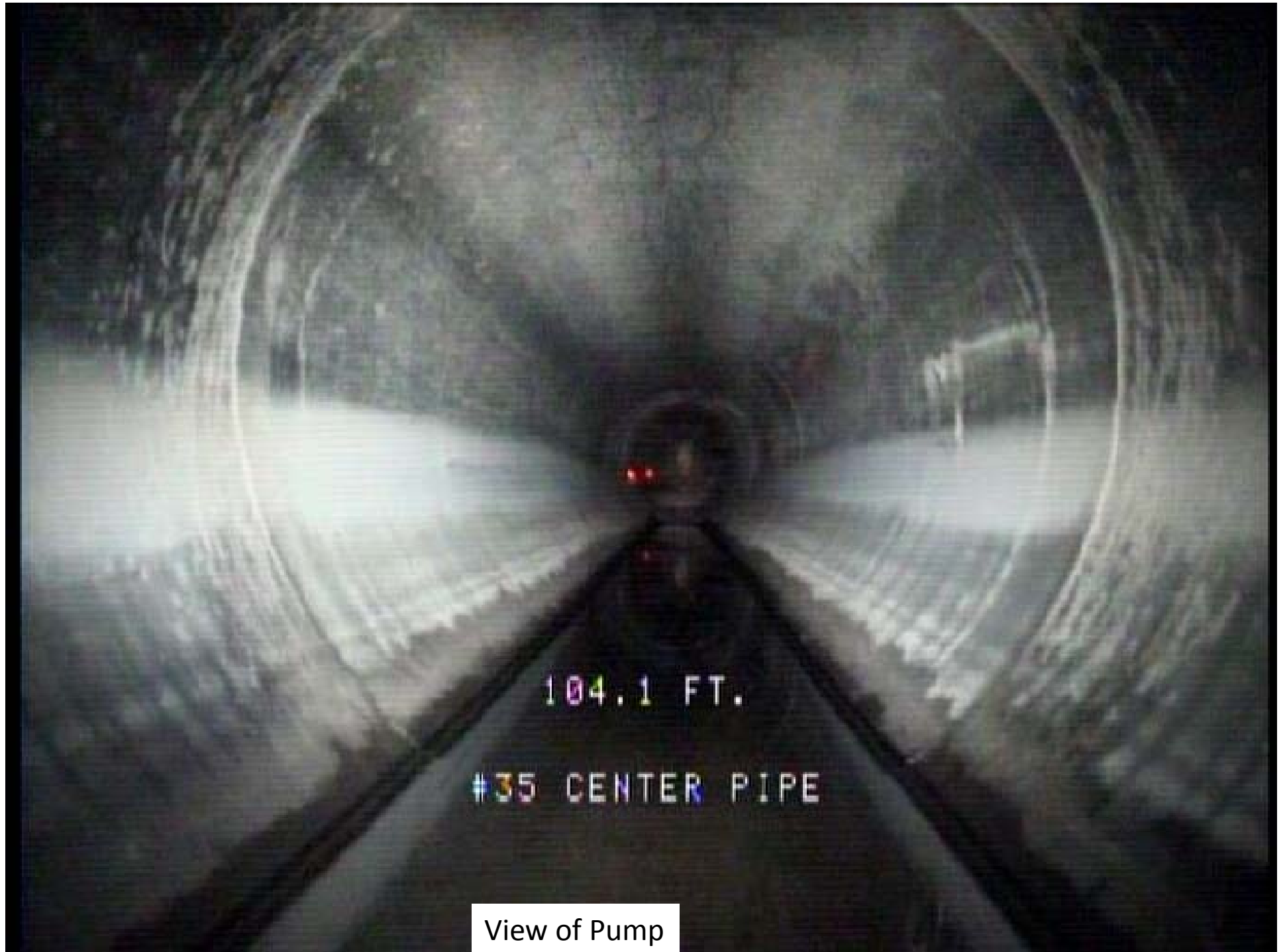
93.2 FT.

#35 CENTER PIPE



Severe corrosion at joint

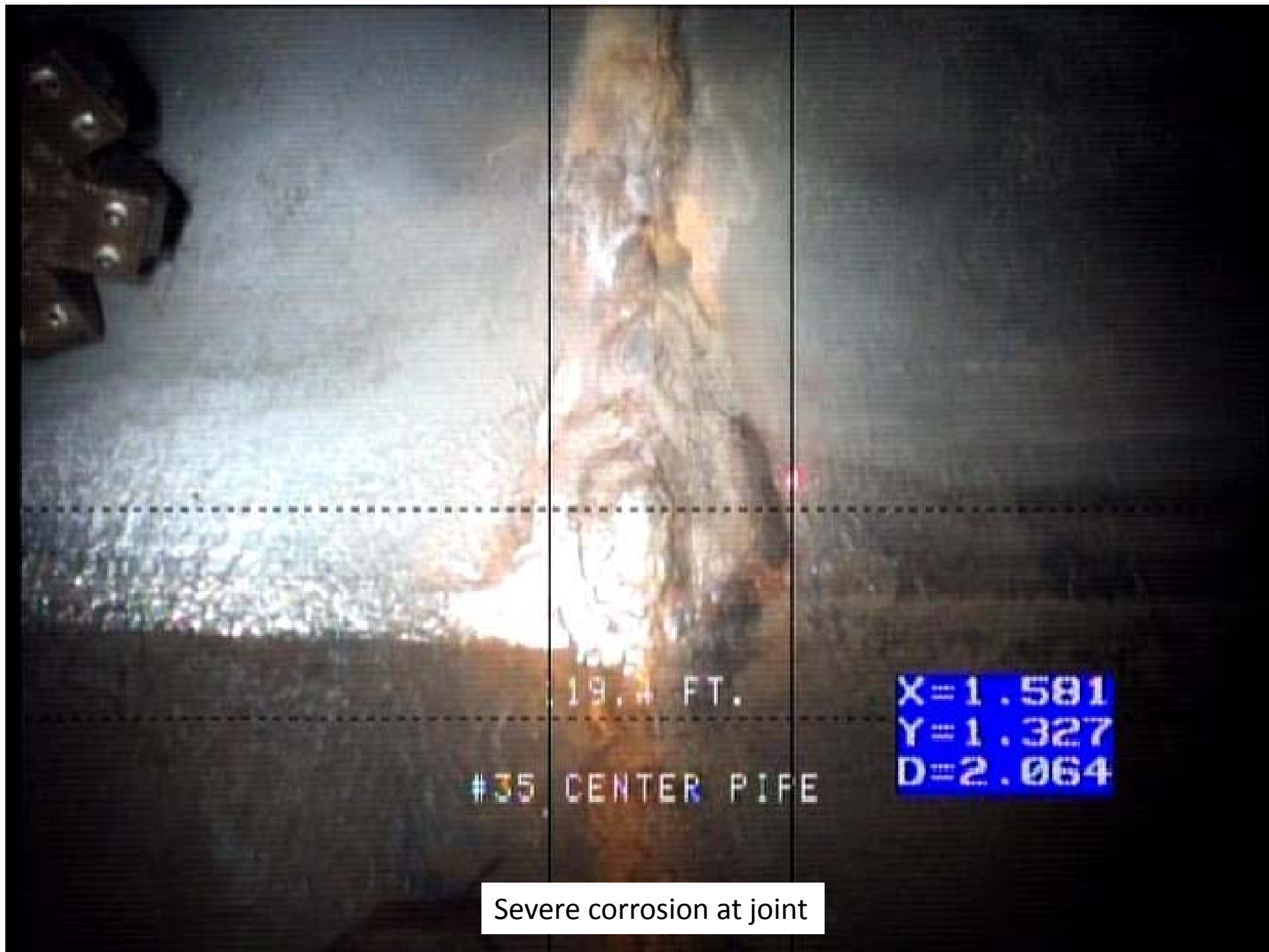


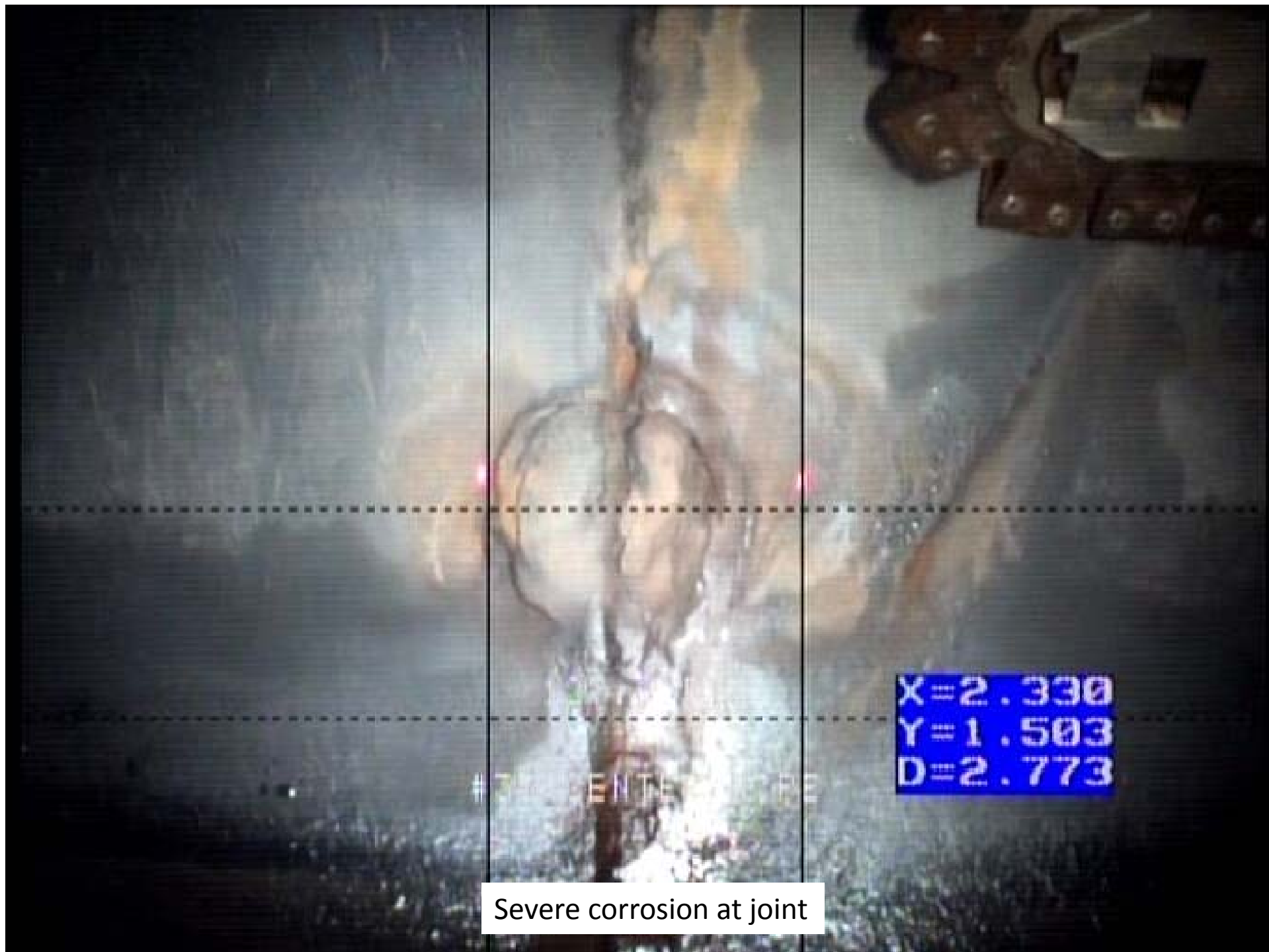


104.1 FT.

#35 CENTER PIPE

View of Pump





Severe corrosion at joint



127.6 FT

#35 CENTER PILE

Severe corrosion at joint



130.3 FT.

#35 CENTER PIPE

Severe corrosion at joint



Severe corrosion at joint



Missing protective coating near pump



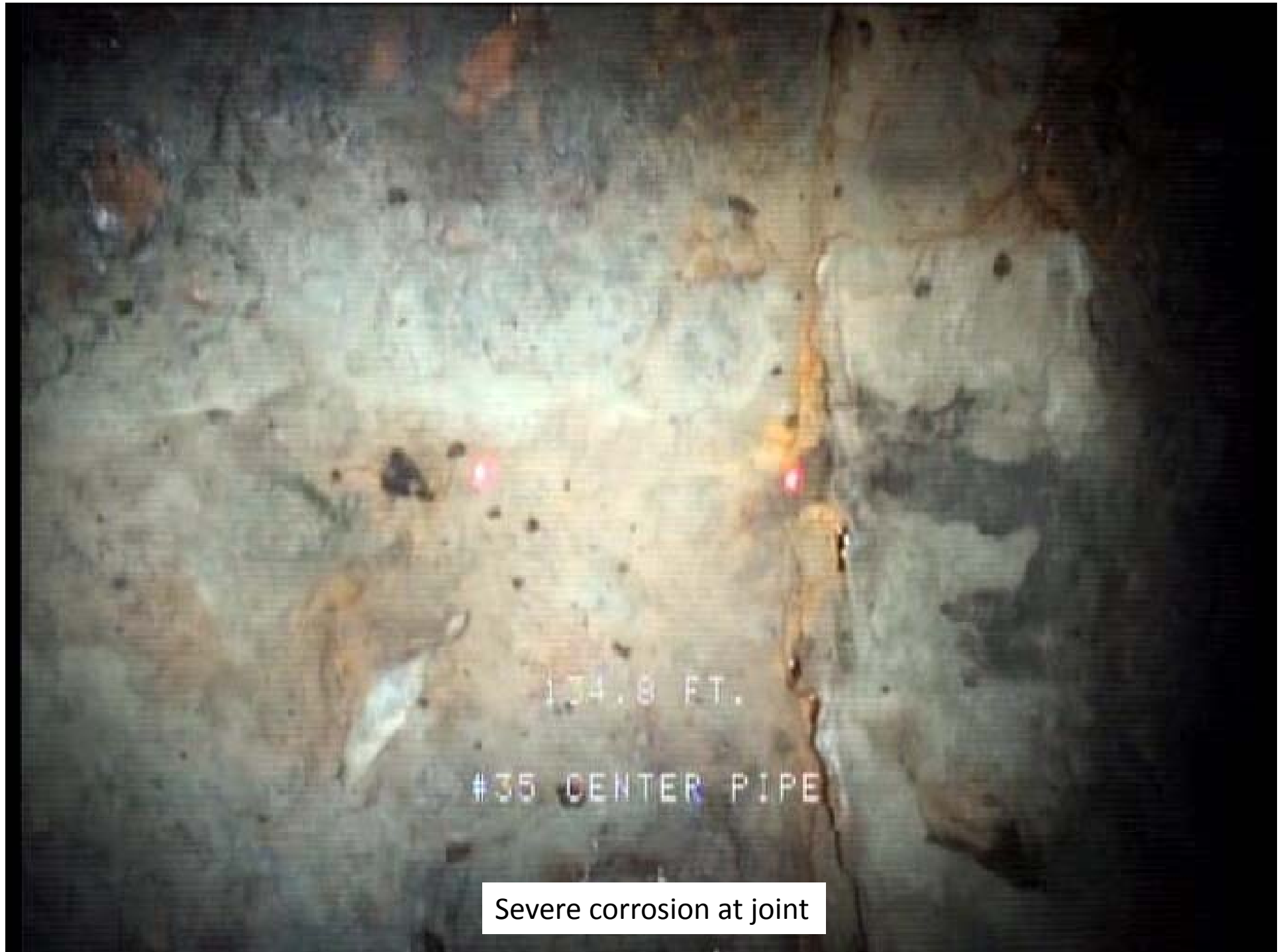
130.3 FT
#35 CENTER PIPE

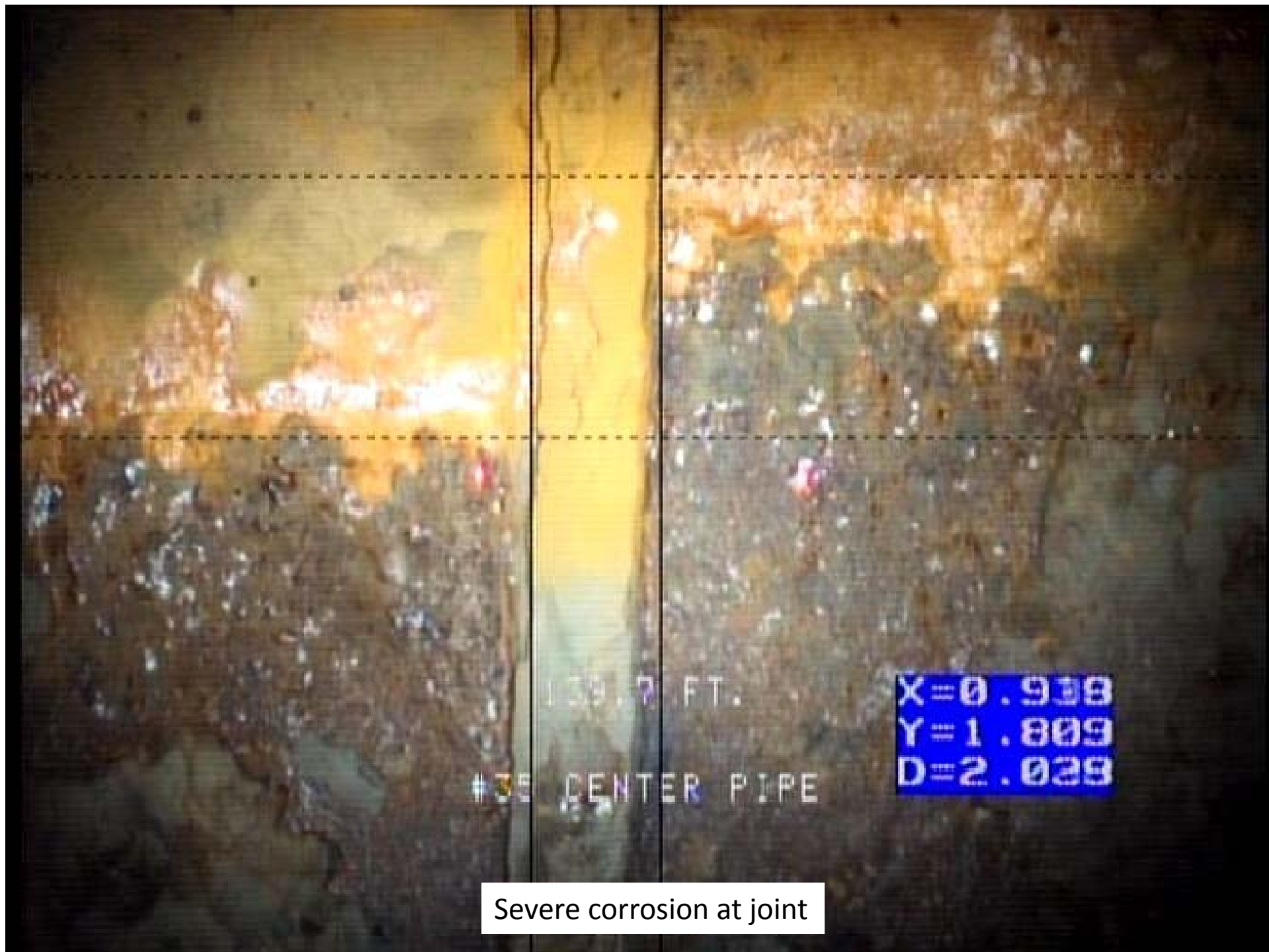
X=2.310
Y=1.804
D=2.930

Severe corrosion at joint



Missing protective coating





Severe corrosion at joint



Massillon, Ohio
Federal Avenue Pump Station
Pipe #36 (North Pipe)

=== INSPECTION SETUP ===

SECTION: 091237-09-P-0133

09/15/09

ID: FEDERAL AVE. PUMP STATION

MH START: OUTLET DNSTREAM

MH STOP: INLET PUMP STATION

LOCATION: 50+00

PIPE: 30" CIP

OPERATOR: JOHN

TARE ID: N631LON

START: 1:55

ONSCREEN:

#36 NORTH PIPE



7.9 FT.

#36 NORTH PIPE

Start upgrade from outlet



22.3 FT.

#36 NORTH PIPE

Nearing siphon breaker



26.4 FT.

#36 NORTH PIPE

Corrosion at joint, view of siphon breaker



Corrosion at joint, view of siphon breaker



29.9 FT.

#36 NORTH PIPE

X=9.986
Y=9.986
D=14.12

Moderate corrosion at joint



29.9 FT.

#36 NORTH PIPE

Moderate corrosion at joint



29.9 FT.

#36 NORTH PIPE

Possible patched area



31.0 FT.

#36 NORTH PIPE

Possible patched area



32.2 FT.

#36 NORTH PIPE

Protective coating missing near siphon breaker



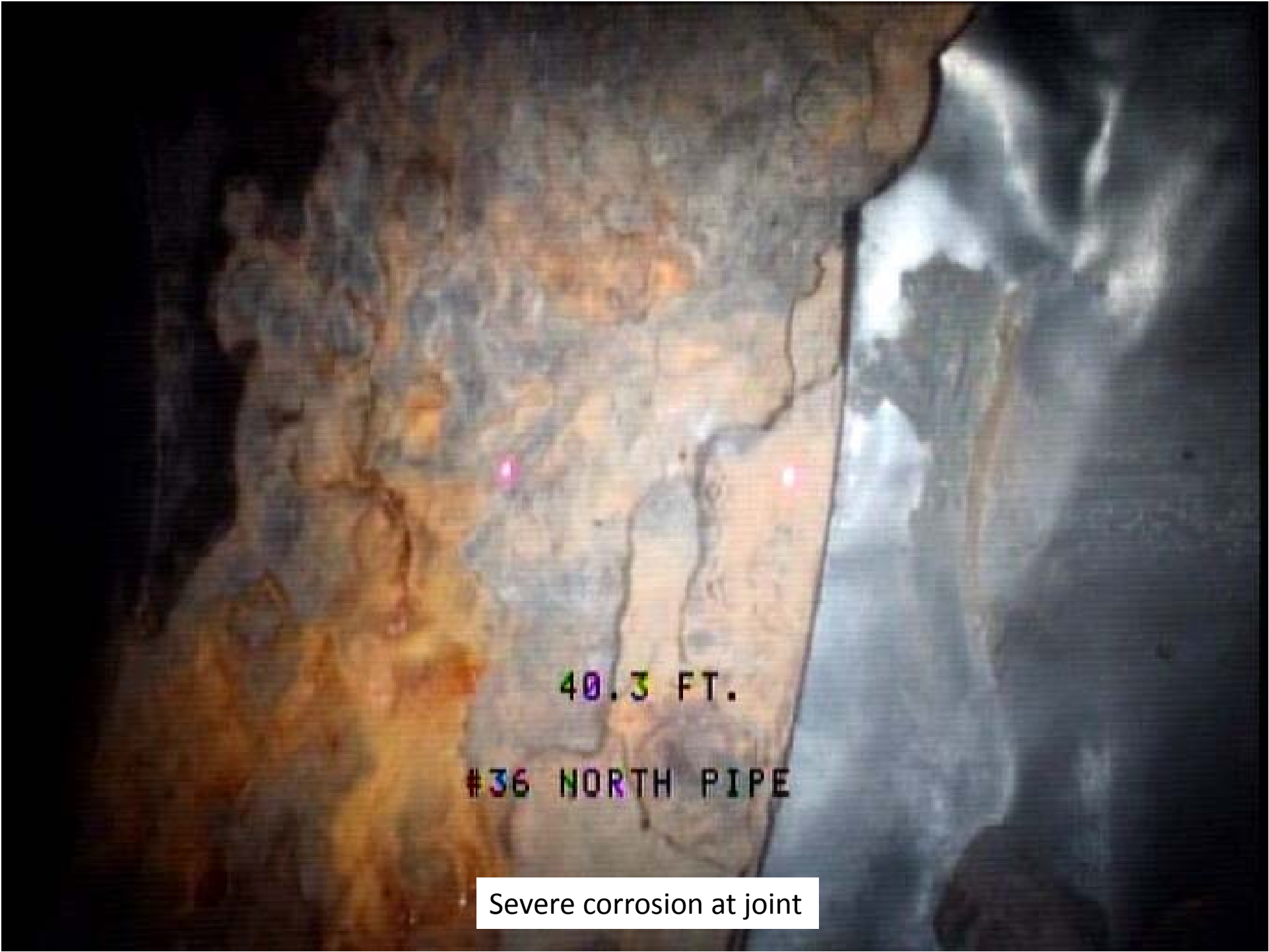
34.0 FT.

#36 NORTH PIPE

Corrosion at joints



Corrosion at joints



40.3 FT.

#36 NORTH PIPE

Severe corrosion at joint



40.3 FT.

#36 NORTH PIPE

Severe corrosion at joint



40.3 FT.

#36 NORTH PIPE

Severe corrosion at joint

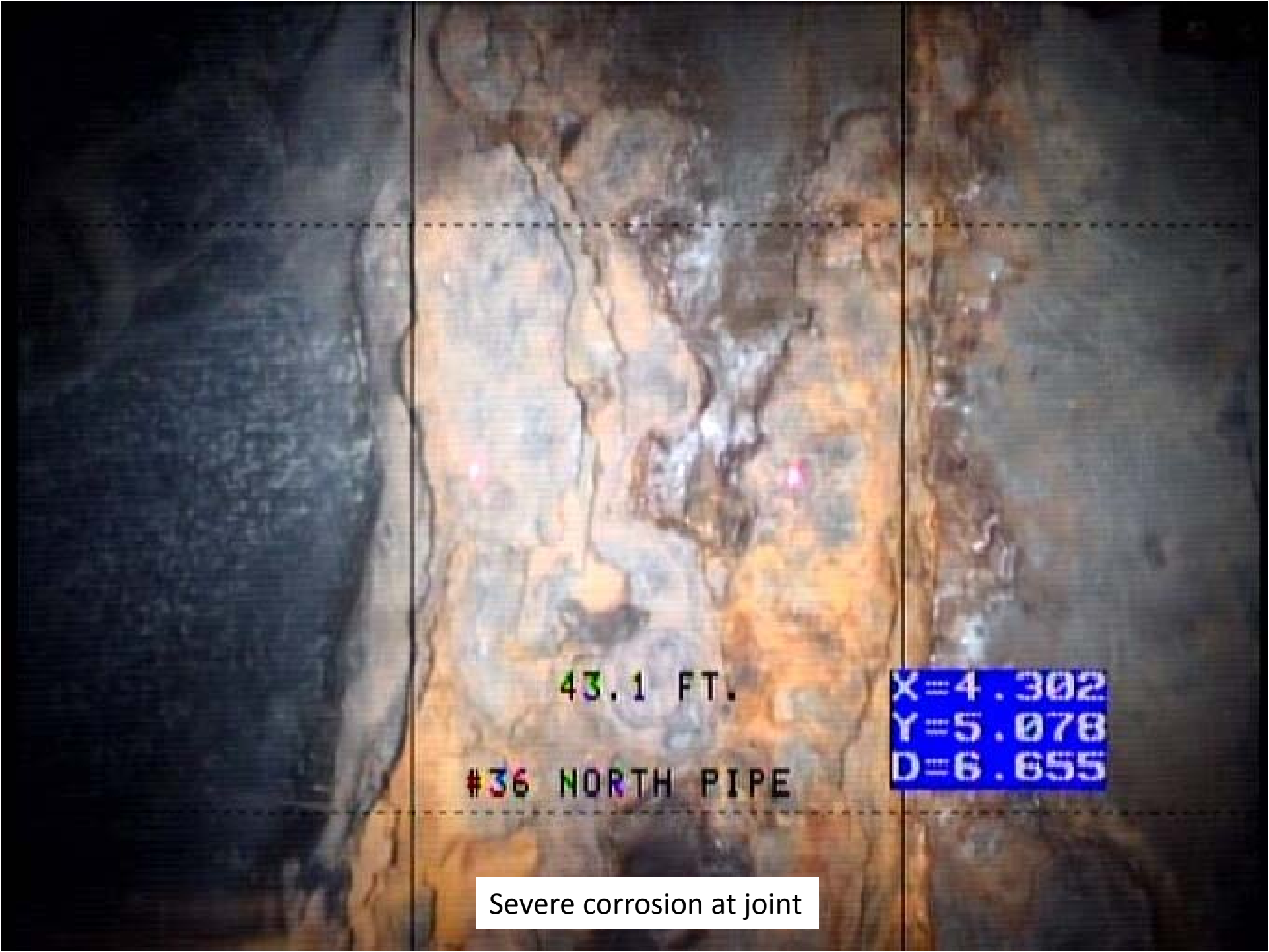


43.1 FT.

#36 NORTH PIPE

X=2.330
Y=5.078
D=5.587

Visible corrosion at joint



43.1 FT.

#36 NORTH PIPE

X=4.302
Y=5.078
D=6.655

Severe corrosion at joint



43.1 FT.

#36 NORTH PIPE

X=4.353
Y=5.078
D=6.688

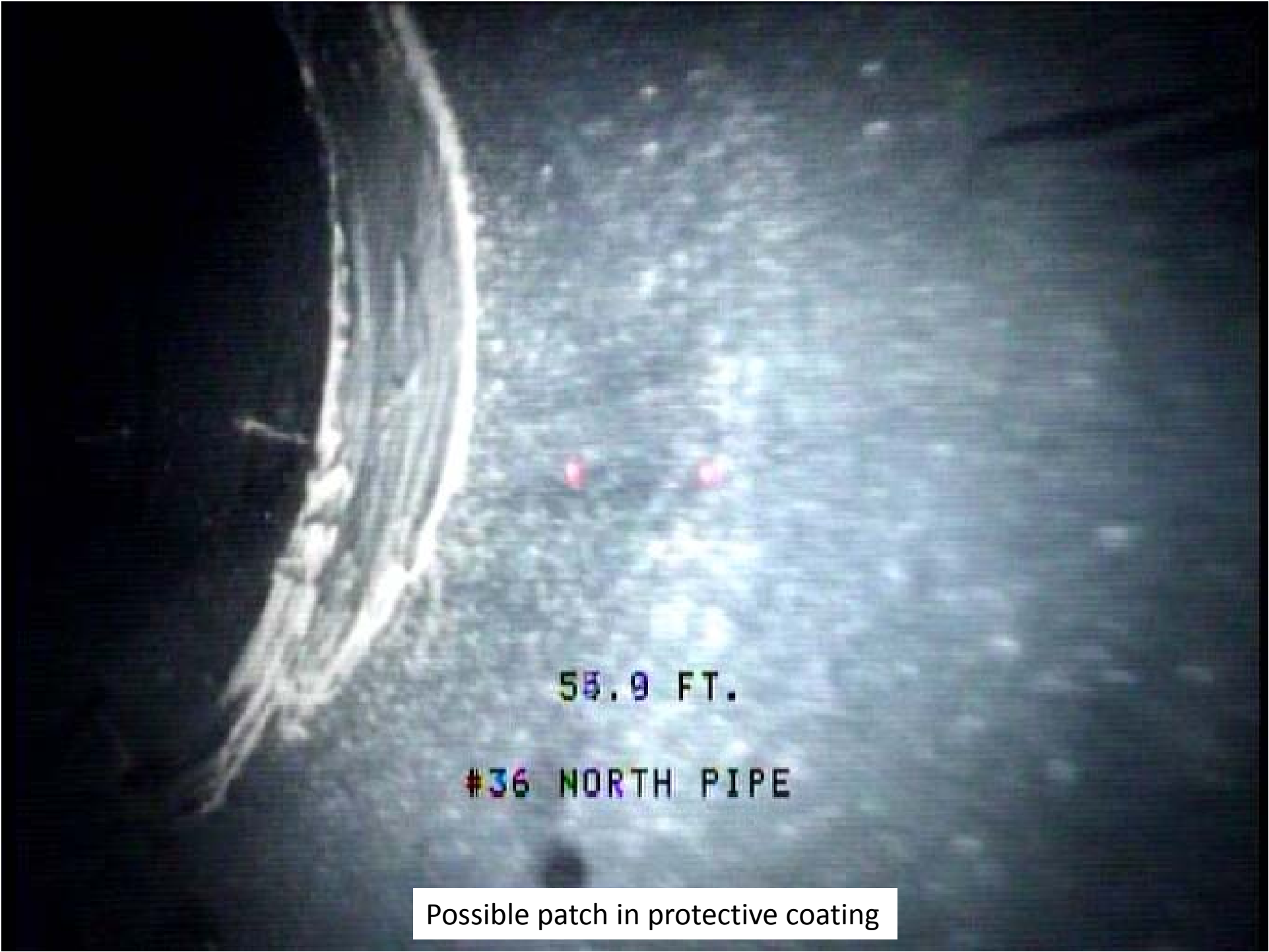
Severe corrosion at joint



43.1 FT.

#36 NORTH PIPE

Going down grade towards pump



55.9 FT.

This is an underwater photograph showing a large, curved, metallic structure, likely a pipe or part of a ship's hull. The surface is dark and textured, possibly due to water or sediment. Two small, bright, circular lights are visible in the center of the frame. The text '55.9 FT.' is overlaid in the lower-middle section, and '#36 NORTH PIPE' is overlaid below it. A white box with black text is at the bottom.

#36 NORTH PIPE

Possible patch in protective coating



64.7 FT.

#36 NORTH PIPE

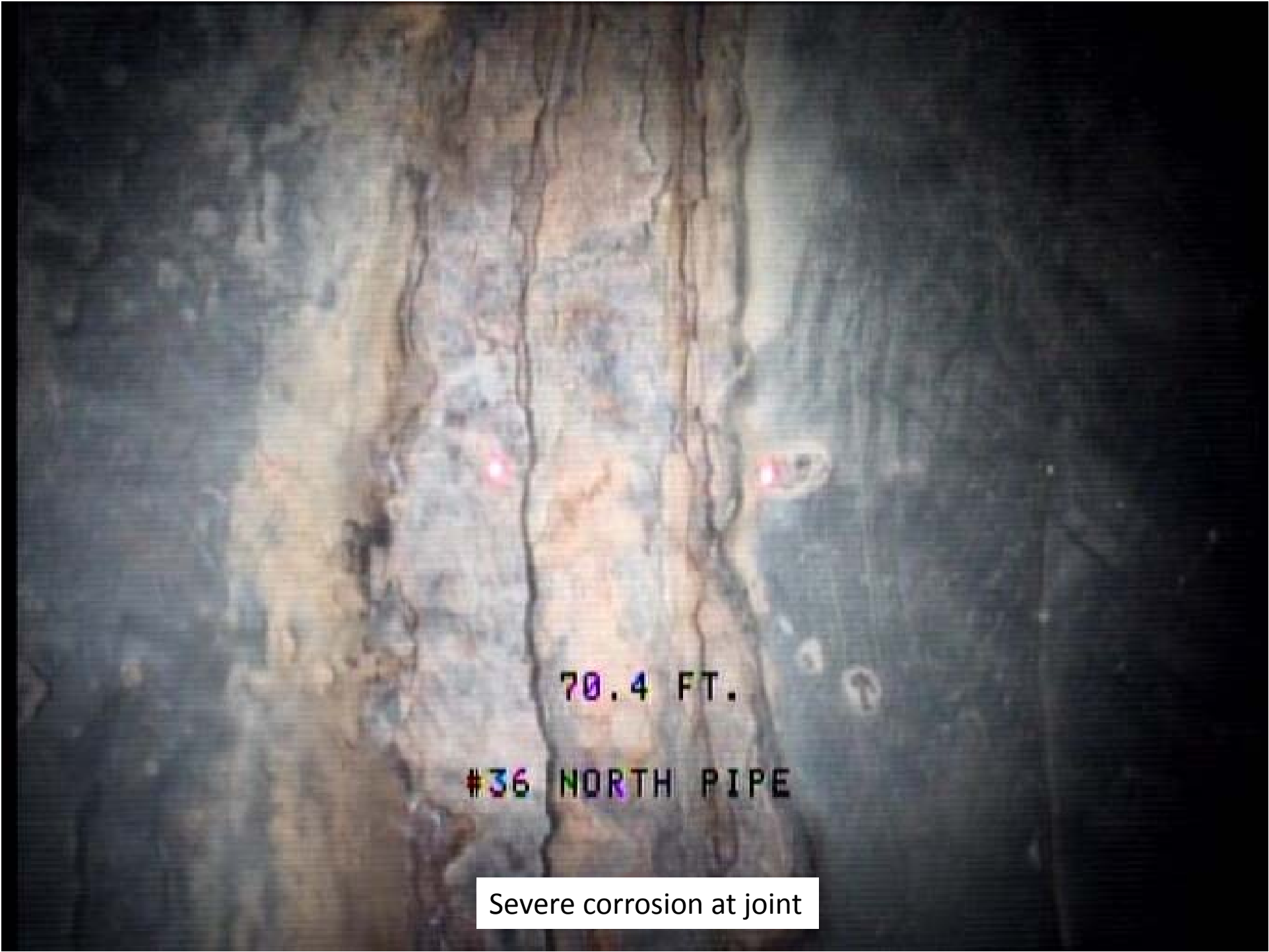
Nearing base of levee



67.4 FT.

#36 NORTH PIPE

Nearing base of levee, visible corrosion in invert



70.4 FT.

#36 NORTH PIPE

Severe corrosion at joint



70.4 FT.

#36 NORTH PIPE

X=2.880
Y=4.882
D=5.668

Severe corrosion at joint



70.4 FT.

#36 NORTH PIPE

X=5.997
Y=4.882
D=7.733

Severe corrosion at joint



76.5 FT.

#36 NORTH PIPE

Severe corrosion at joint



81.7 FT.

#36 NORTH PIPE

Base of levee



91.3 FT.

#36 NORTH PIPE



96.7 FT.

#36 NORTH PIPE

Severe corrosion at joint

A photograph taken from inside a tunnel, looking down its length. The tunnel walls are rough and grey. A very bright light source is at the far end of the tunnel, creating a large, bright white area. In the middle distance, a small red light is visible. The perspective is from a low angle, looking down the center of the tunnel.

96.7 FT.

#36 NORTH PIPE





130.8 FT.

This is an underwater photograph showing a vertical pipe structure. The pipe is heavily corroded, with a large, irregular, orange-brown mass of corrosion product (rust) visible on the left side. The background is dark and murky, typical of an underwater environment. Two small red lights are visible on the pipe, one above and one below the main corrosion area.

#36 NORTH PIPE

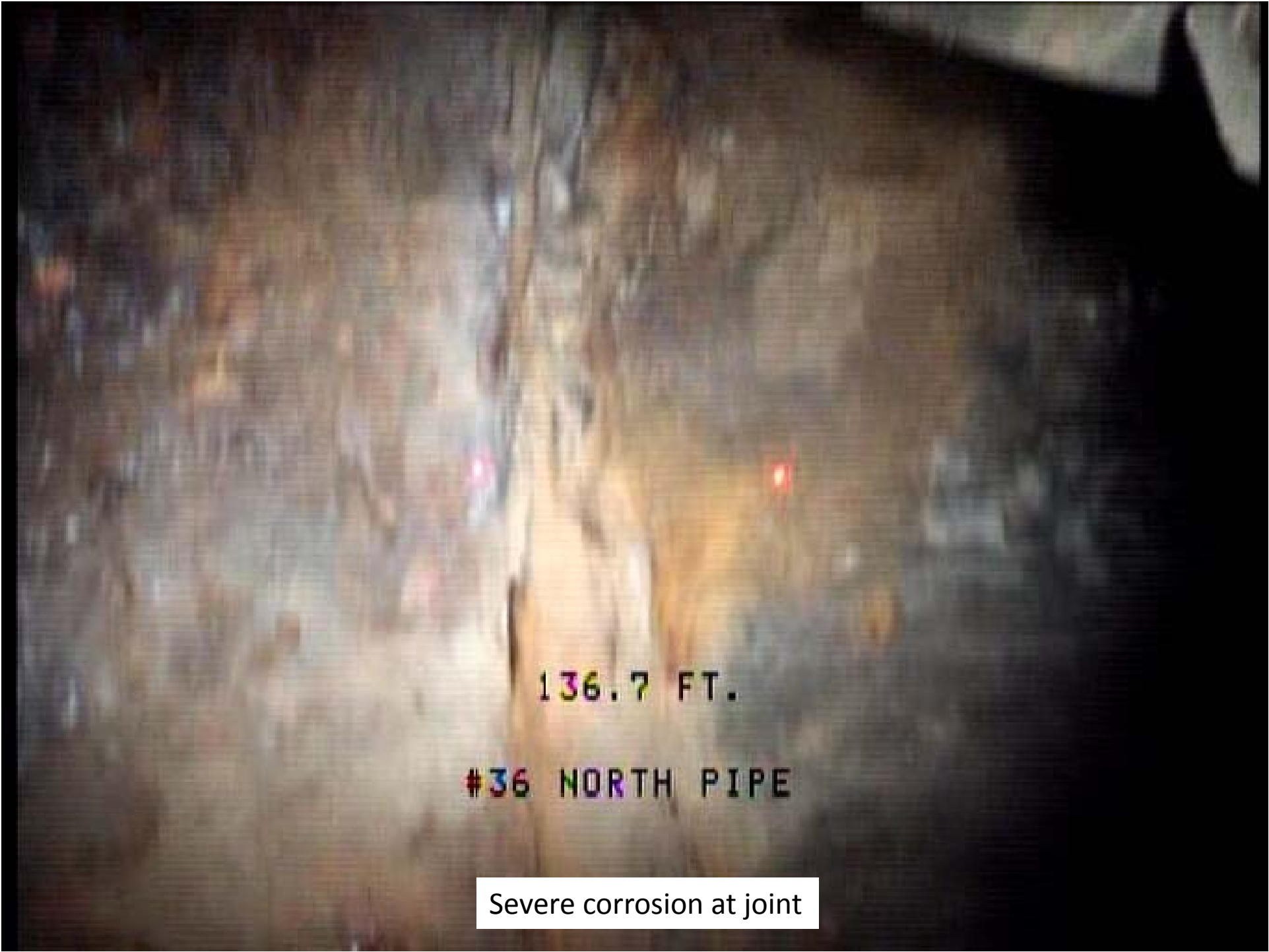
Severe corrosion at joint



131.4 FT.

#36 NORTH PIPE

Corrosion and missing coating near pump



136.7 FT.

#36 NORTH PIPE

Severe corrosion at joint



136.7 FT.

#36 NORTH PIPE

Pitting at joint



136.7 FT.

#36 NORTH PIPE

Massillon, Ohio
Sippo Creek 15'x10' RCB
Pipe #37



Pipes Inspected, Massillon Levee				
Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

Sippo Avenue Pump Station

Outlet box

Pump station

Inlet



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Sippo Avenue Box #37 PIPE SIZE: 15' X 10' LENGTH INSPECTED: 202 ft.
PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 11/12/09

OVERALL CONDITION: NASSCO Rating 3: Moderate defects that will continue to deteriorate.

GENERAL INSPECTION FINDINGS: Most of the joints appear to have some weeping and/or signs of staining at the joints. Invert is rough in areas indicating moderate scouring. Rebar exposed and some spalling noticed in areas.

MAJOR DEFECTS

Sippo Avenue 15' X 10' Box #37	
Feet	Defect
28ft	Spalling at joint
30ft	Reinforcing steel exposed in crown
39ft	Reinforcing steel exposed in crown
56ft	Weeping and stained joint. Rebar exposed from deteriorating joint.
76ft	Rebar exposed from deteriorating joint.
83ft	Weeping and stained joint. Rebar exposed from deteriorating joint.
98ft	Significant weeping and stained joint
110ft	Weeping and stained joint. Rebar exposed from deteriorating joint.
118ft	4" scour hole left haunch
Outlet-Pump Pipes	Invert under water, rough in areas, indicating moderate scour in the invert.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. <u>A limited number of joints may have opened and soil loss may be beginning.</u> Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



Sippo Creek Pump Inlet and Gate

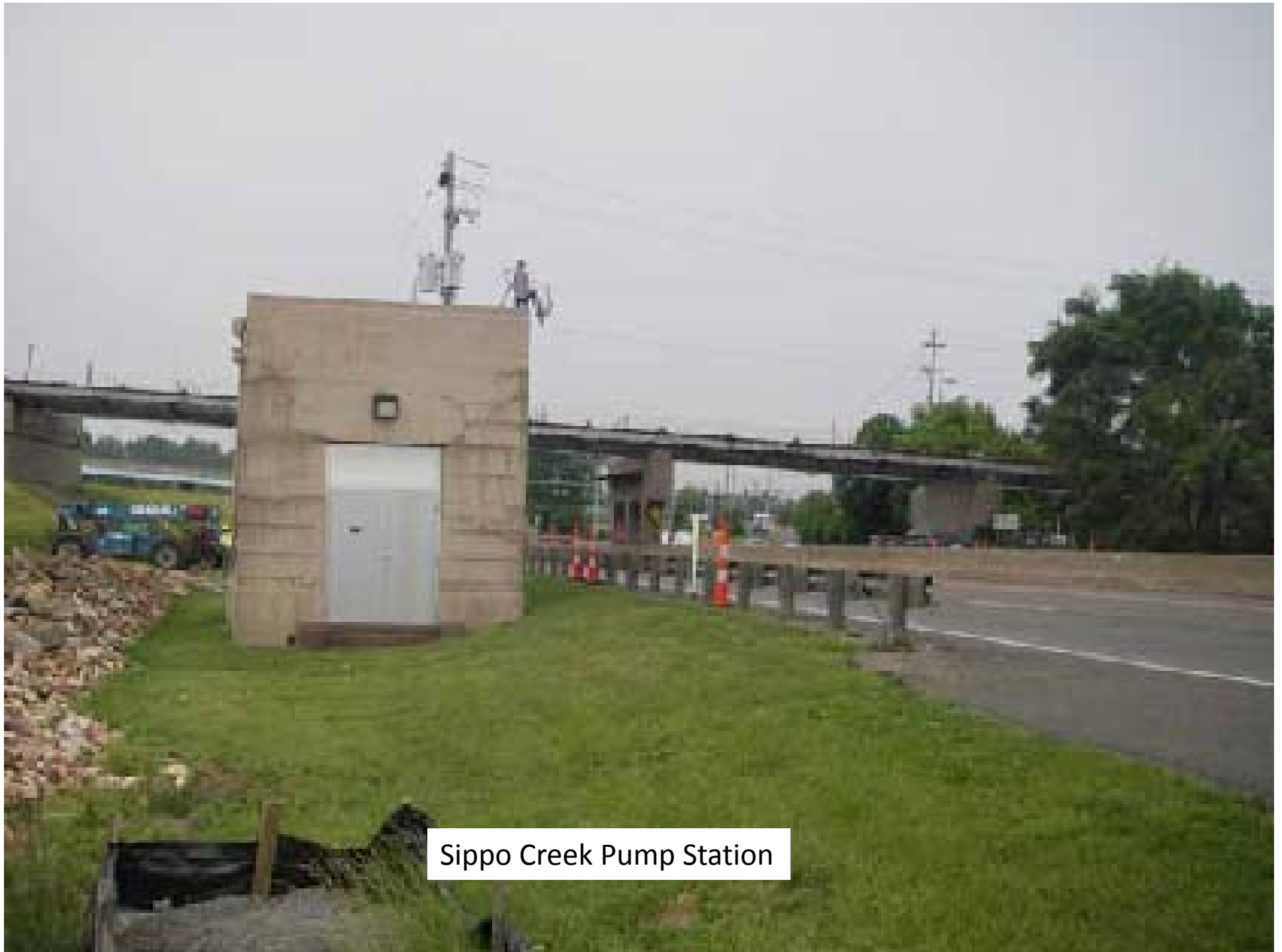


Pump Inlet



Sippo Creek Gate Leading to (15'x10') RCB





Sippo Creek Pump Station



Sippo Creek Pump Station



Sippo Creek Pump Station



Sippo Creek Pump Station from levee



Sippo Creek Box Outlet



Sippo Creek Box Outlet



View towards inlet from pump station



View down box







Joint material/Cork exposed- outlet end



4- inch penetration in right side of box- outlet of box





15' x 10' Sippo Box



Hairline crack in
crown/left corner



Spalling/deterioration of joint,
upper right corner- 28ft



Reinforcing steel exposed in crown- 30ft



Reinforcing steel exposed in crown- 39ft



Looking downstream from Sippo box- 50ft

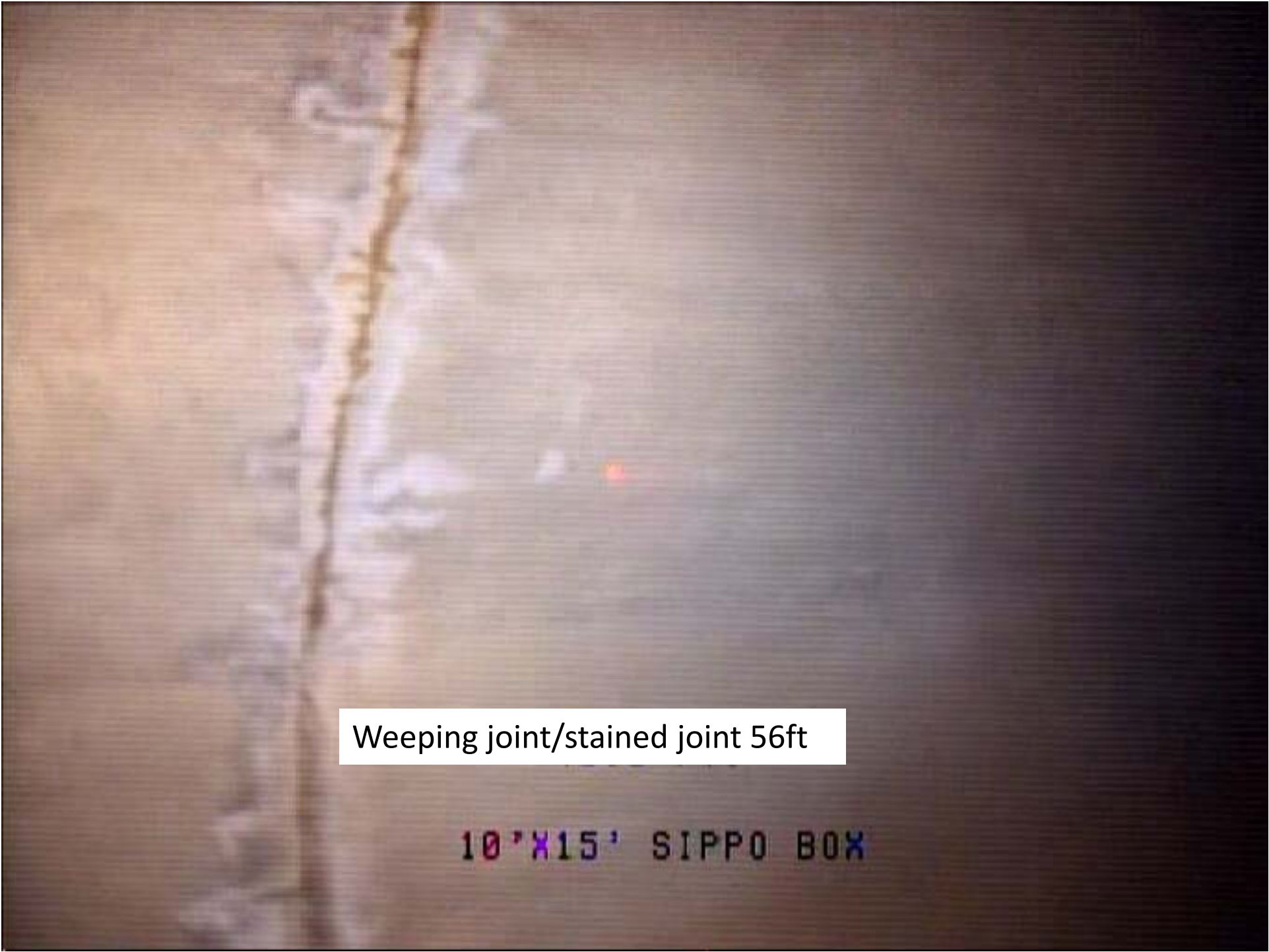


15' x 10' Sippo Box

54.3 FT.



Form Dent



Weeping joint/stained joint 56ft

10'X15' SIPPO BOX





Joint showing signs of leaking

15' x 10' Sippo Box



Staining at joint in crown, joint weeping- 56ft



Weeping joint, exposed rebar at right side-56ft

A photograph of a concrete structure, likely a tunnel or large pipe, showing a leaking joint. A red laser line is visible on the concrete surface, indicating the location of the leak. The joint is located at 56 feet. The structure is made of concrete and has a rough, textured appearance. The lighting is dim, and the overall color is a mix of brown and grey.

Leaking joint at 56 feet

15' x 10' Sippo Box



Weeping joint, right side- 76ft



Leaking joint at 56 feet

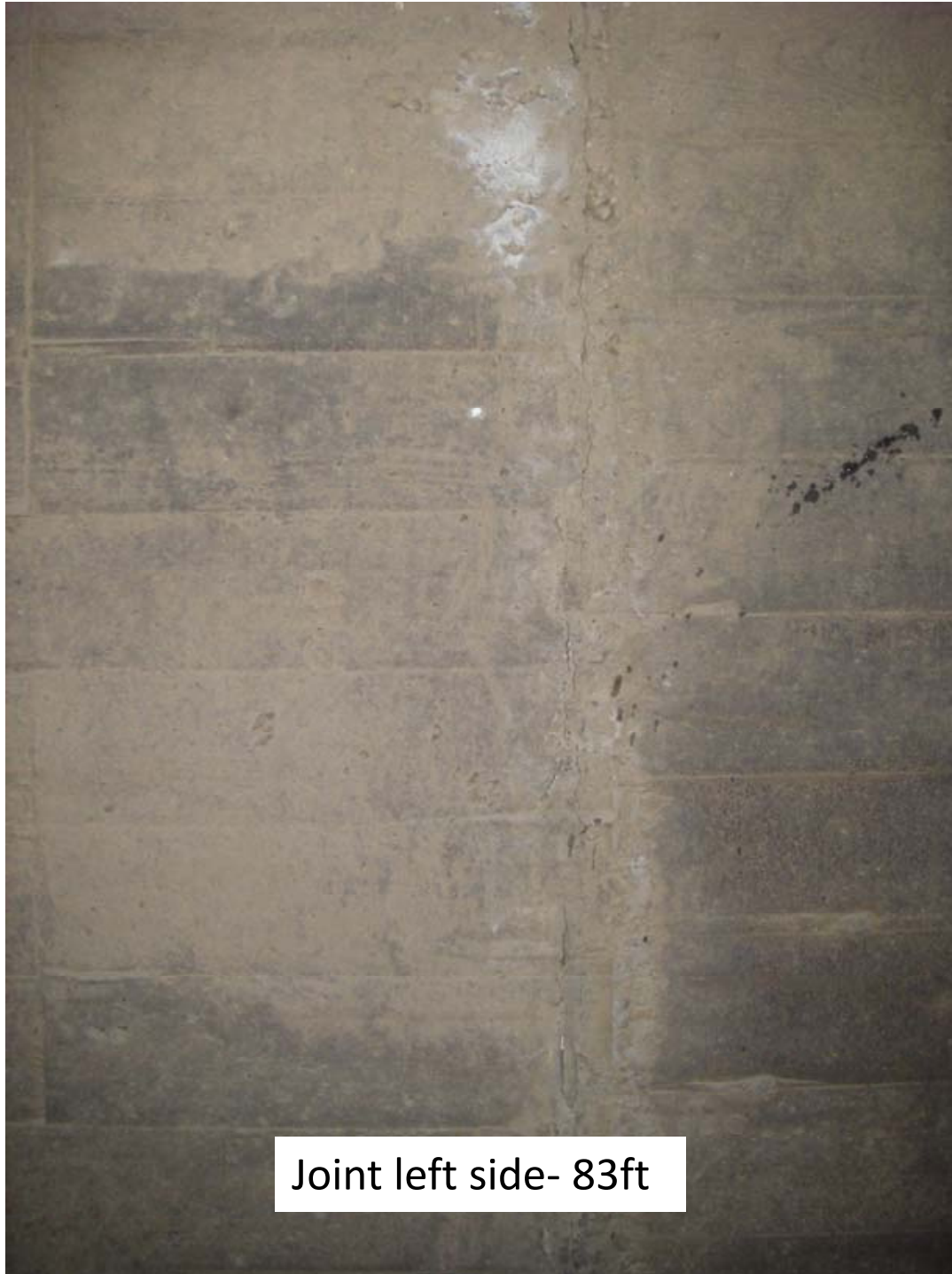
15' x 10' Sippo Box



Reinforcing steel showing left upper corner
11:00- 77ft



Signs of past water movement
at joint in crown- 76ft



Joint left side- 83ft



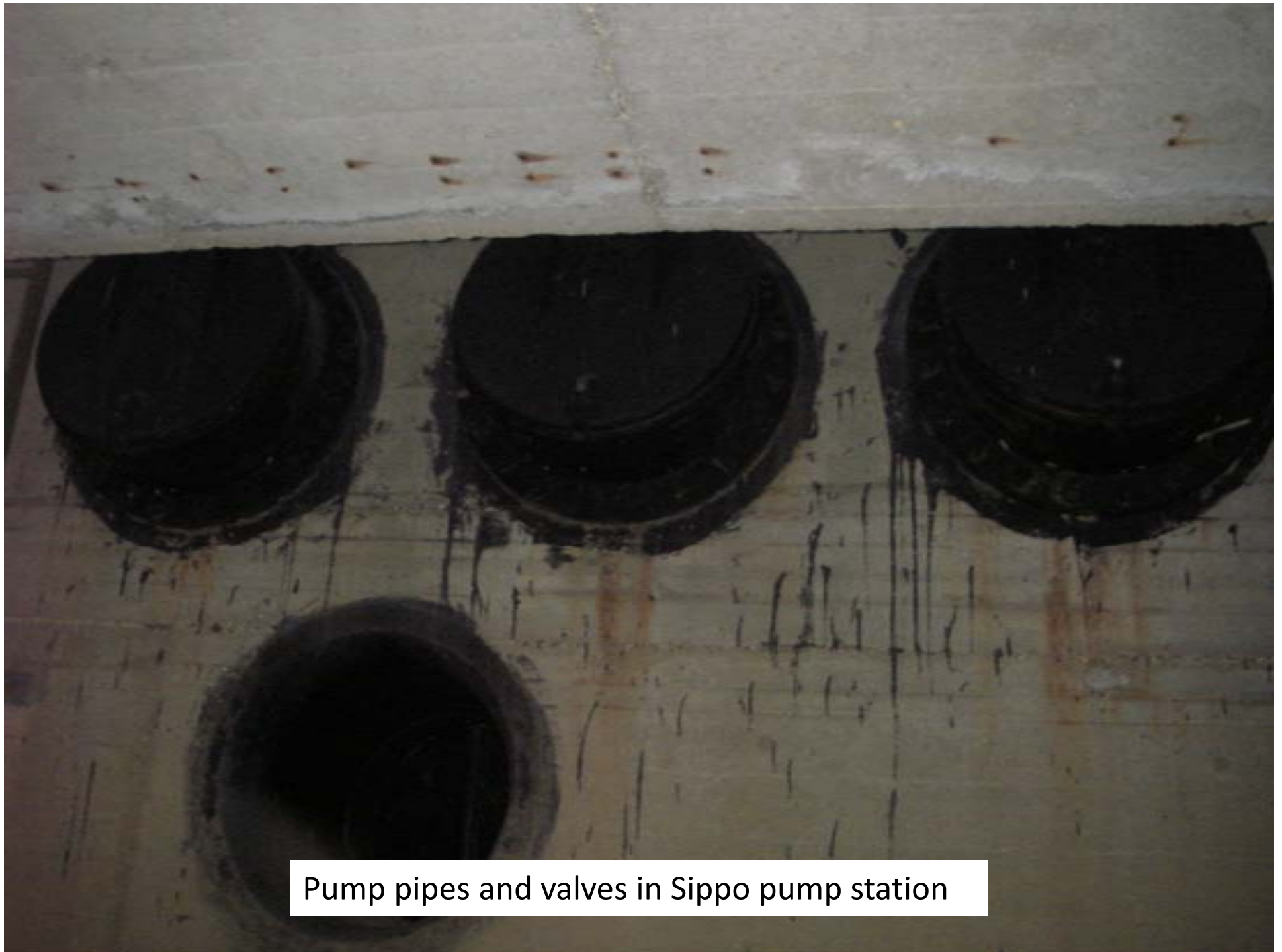


Cracked joint, rebar exposed in crown- 83ft

An aerial photograph showing a large, light-colored rectangular structure, identified as a 15' x 10' Sippo Box, situated in a body of water. A long, narrow pipe or channel extends from the box towards the bottom right of the frame. The surrounding water is dark, and the sky is visible in the upper left corner.

Outlet of pump pipes at box

15' x 10' Sippo Box



Pump pipes and valves in Sippo pump station



Looking out of pump station from box



6-inch penetration at joint 7:00- 98ft



Drainage pipe, weeping/stained joint
2:00- 100ft , upper right



Looking down grade above pump station

15' x 10' Sippo Box

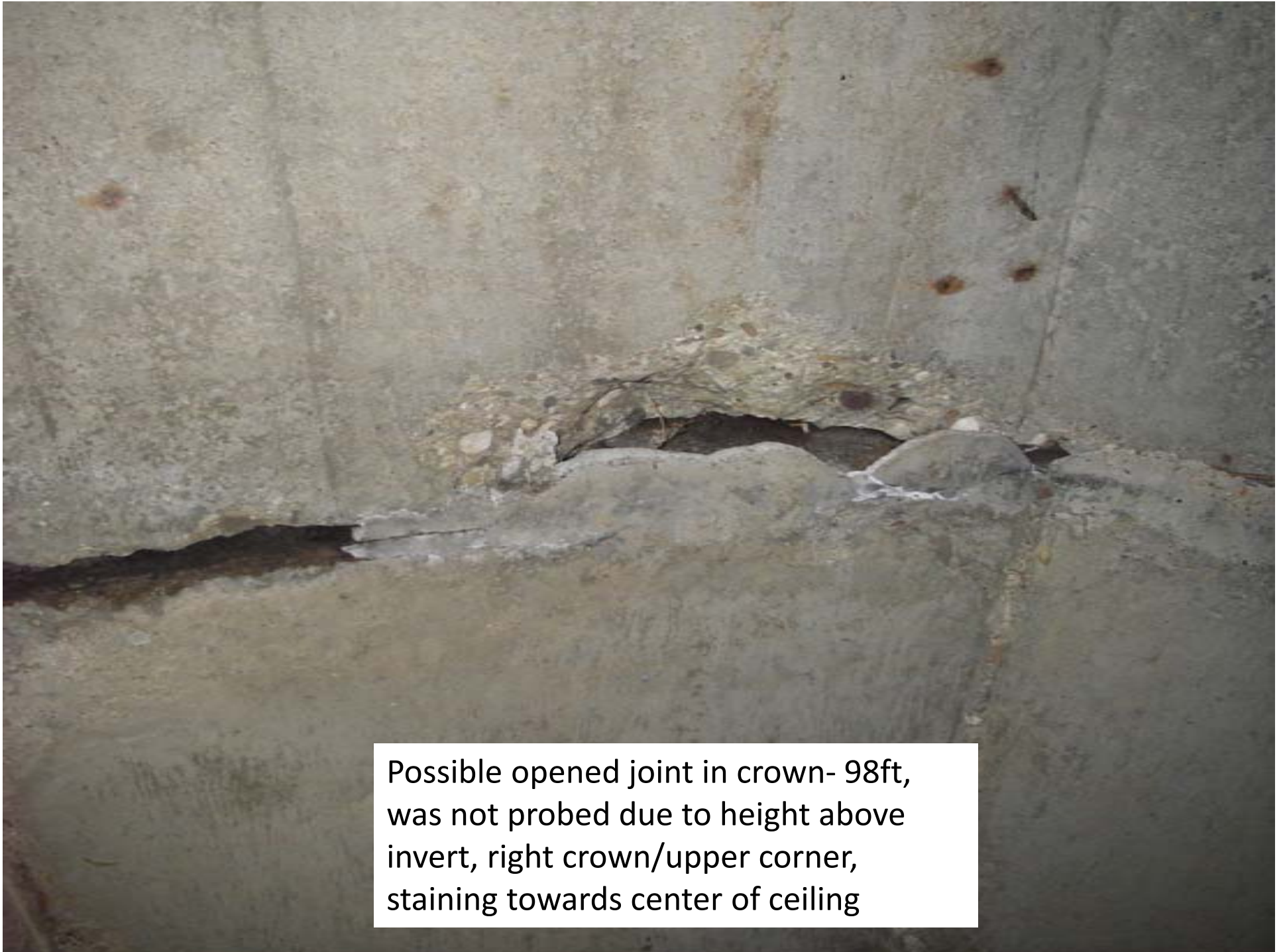
Cork exposed and weeping in joint 10:00- 98ft



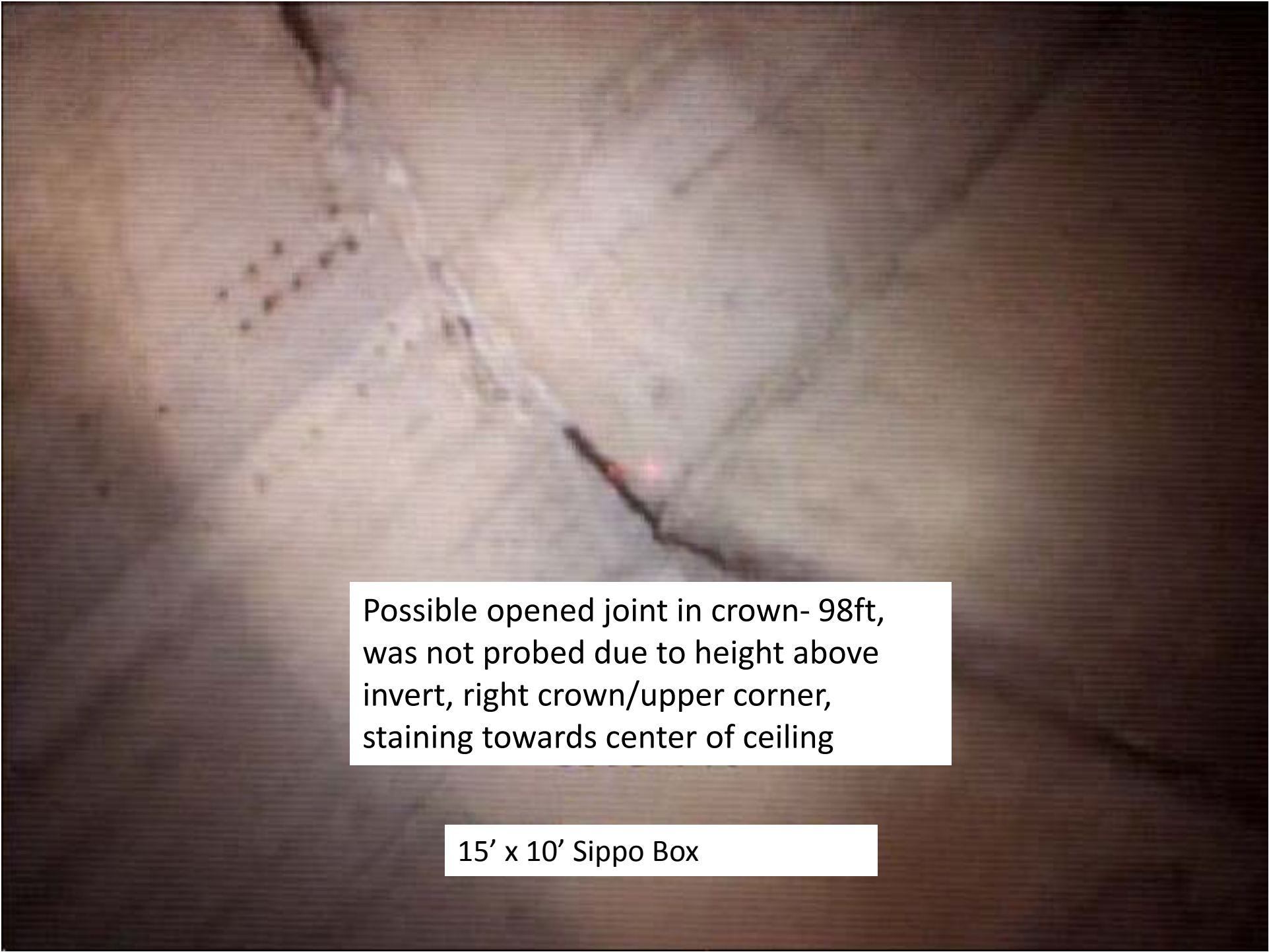


Stained and leaking joint

15' x 10' Sippo Box

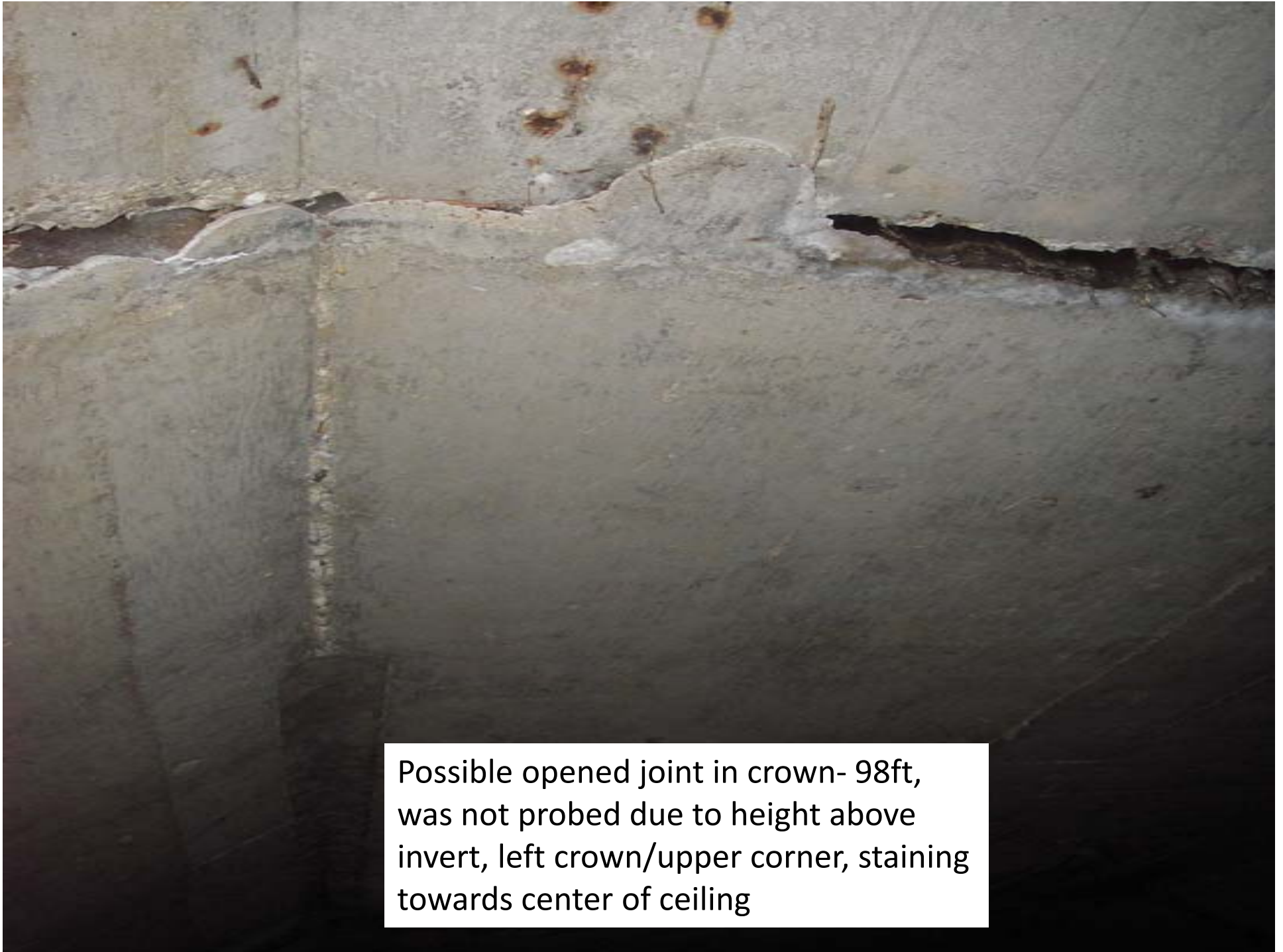


Possible opened joint in crown- 98ft,
was not probed due to height above
invert, right crown/upper corner,
staining towards center of ceiling

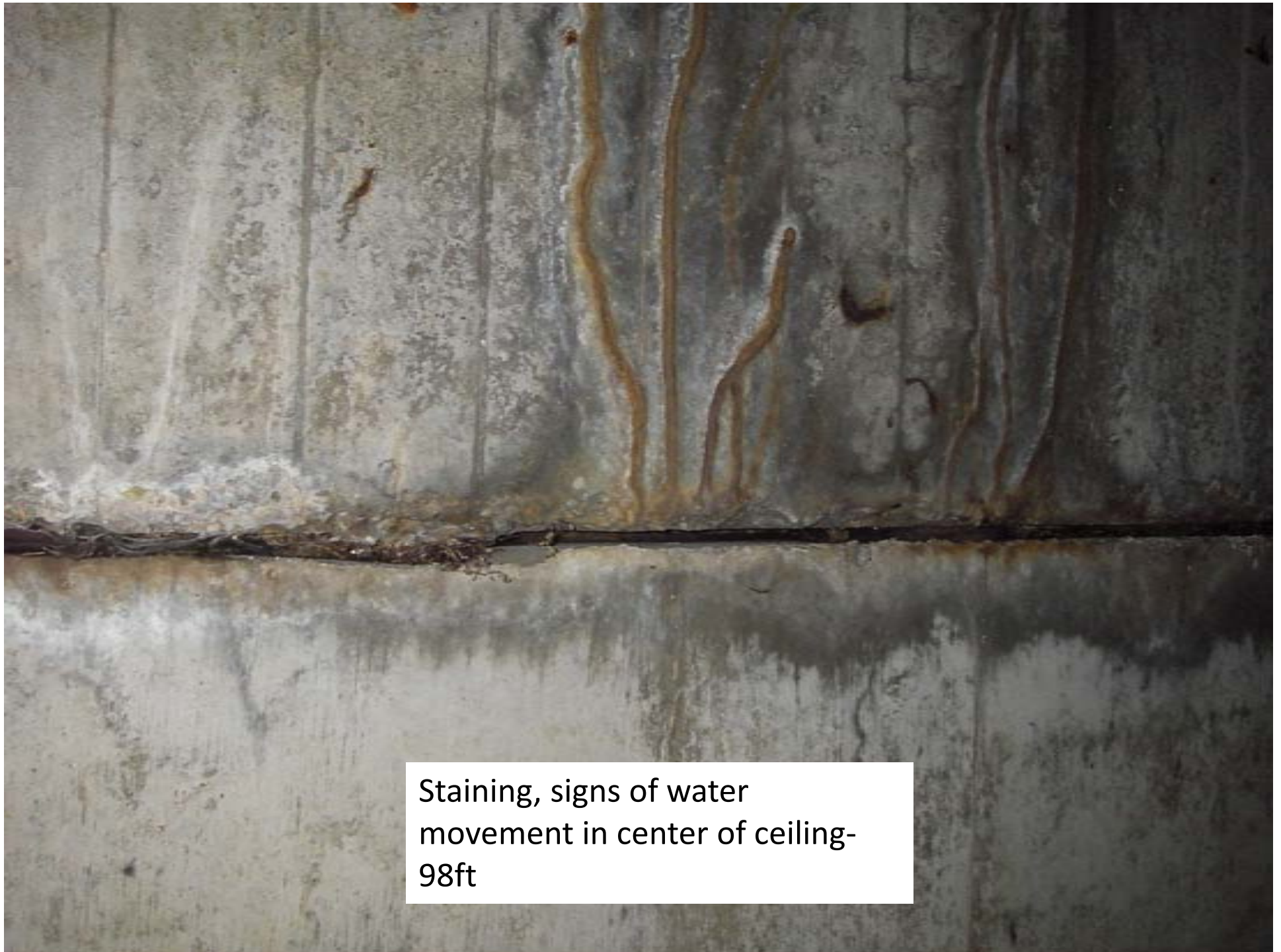
A photograph of a concrete ceiling. A prominent crack runs diagonally from the upper left towards the center. A red laser line is visible on the ceiling surface, intersecting the crack. The ceiling has a mottled, aged appearance with some staining.

Possible opened joint in crown- 98ft,
was not probed due to height above
invert, right crown/upper corner,
staining towards center of ceiling

15' x 10' Sippo Box



Possible opened joint in crown- 98ft,
was not probed due to height above
invert, left crown/upper corner, staining
towards center of ceiling



Staining, signs of water
movement in center of ceiling-
98ft



Open joint , staining, right
side wall/upper corner- 98ft

A photograph showing a close-up of a concrete surface with a dark, irregular stain and a visible crack. A red laser line is projected across the crack, highlighting the area of concern. The background is a textured, light-colored concrete wall.

Stained and leaking joint

15' x 10' Sippo Box



Weeping joint left side 10:00-110ft



Joint deterioration, weeping, rebar exposed in crown- 110ft



Joint deterioration, weeping, rebar exposed in crown- 110ft



70.7 FT.

15' x 10' Sippo Box



Weeping joint, rebar exposed 2:00- 110ft,
Upper right corner





Looking at outlet- 120ft



Looking upstream- 100ft



Looking down grade from pump station , next to gate

15' x 10' Sippo Box



Looking up grade from pump station

15' x 10' Sippo Box



Looking down grade from gate at side of box

15' x 10' Sippo Box

Looking upstream from inlet

18.3 FT.

15' x 10' Sippo Box



A photograph taken from inside a dark tunnel, looking towards a bright light source at the far end. The tunnel walls are made of concrete and show some structural details like joints and a slight curve. The floor is dark and reflective. A digital distance measurement is overlaid on the image.

202.9 FT.

15' x 10' Sippo Box



202.9 FT.

15' x 10' Sippo Box



View downstream near outlet

15' x 10' Sippo Box

Massillon, Ohio

Sippo Creek 24" DIP Pump Pipes

Pipe #38, 39, 40



Pipes Inspected, Massillon Levee				
Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

Sippo Creek Pump Station

Pump Station Discharge Pipes

Outlet Structure

Pump Station

Pump Station Inlet



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Sippo Avenue, Pump Pipes (38, 39, 40) PIPE SIZE: 24" LENGTH INSPECTED: 5, 10, 20
PROJECT: Massillon Levee TYPE: Coated DIP INSPECTION DATE: 9/17/09

OVERALL CONDITION: NASSCO Grade 4: Pipe will properly fail in 5 to 10 years. Pipe rated at a more serious condition due to that it is a pump line going through a levee.

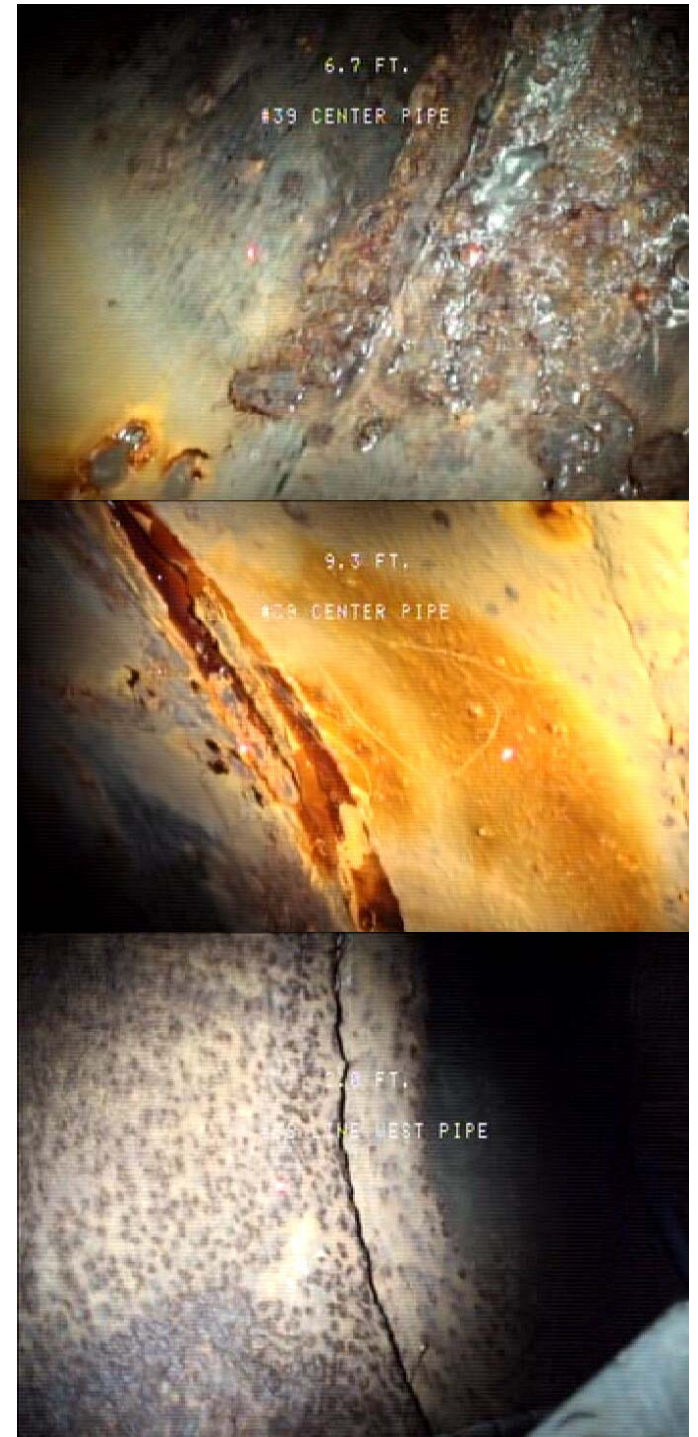
GENERAL INSPECTION FINDINGS: All three pipes have moderate to severe corrosion and rust at the joints and pipe walls. Missing protective coating was predominately around the haunches and inverts of the pipe. Recommend air pressure testing to verify integrity of the joints.

*Note: Pipe #39 (center) at 9.3ft has a severe offset/separated joint with potential leakage.

*Note: Punch list read total line footage at 120' per line. Actual footage: #38) approximately 5ft, #39) approximately 10ft, #40) approximately 20ft.

MAJOR DEFECTS

Feet	Defect
5, 10, 20 ft	All three pipes have moderate to severe corrosion and rust at the joints and pipe walls. Missing protective coating was predominately around the haunches and inverts of the pipe. Recommend air pressure testing to verify integrity of the joints. *Note: Pipe #39 (center) at 9.3ft has a severe offset/separated joint with potential leakage.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



Inlet for Pump Station/Pump Pipes



Inlet for Pump Station



Inlet/Gate leading to 15'x10' RCB





Sippo Creek Pump Station



Sippo Creek Station Inlet

Sippo Creek Pump Station



Discharge and bypass, Sipapo Creek pump station

Massillon, Ohio
Sippo Creek Pump Station
Outlet Pipe #38 (West Pipe)

=== INSPECTION SETUP ===

SECTION: 49-127-09-R-0103

09/12/09

ID: 001127-09

MH START: AVE RUM

MH STOP: IN

LOCATION: 60+60

START: 0+00

STOP: 0+00

START: 0+00

STOP: 0+00

ONSCREEN:

#38 LINE WEST PIPE



Possible open joint



Possible open joint



Possible open joint

2.0 FT.

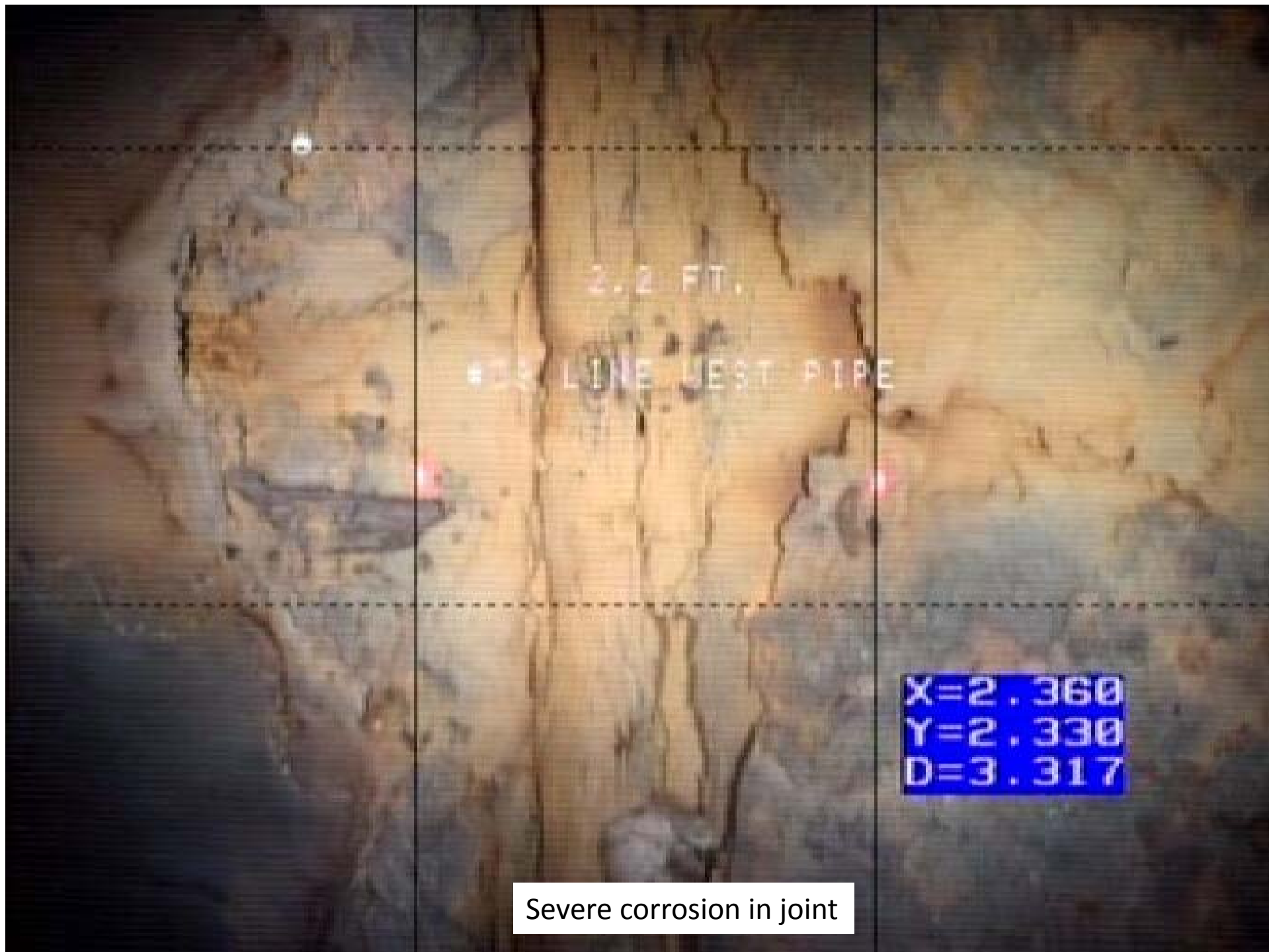
#38 LINE BEST PIPE

X=2.330
Y=2.431
D=3.367

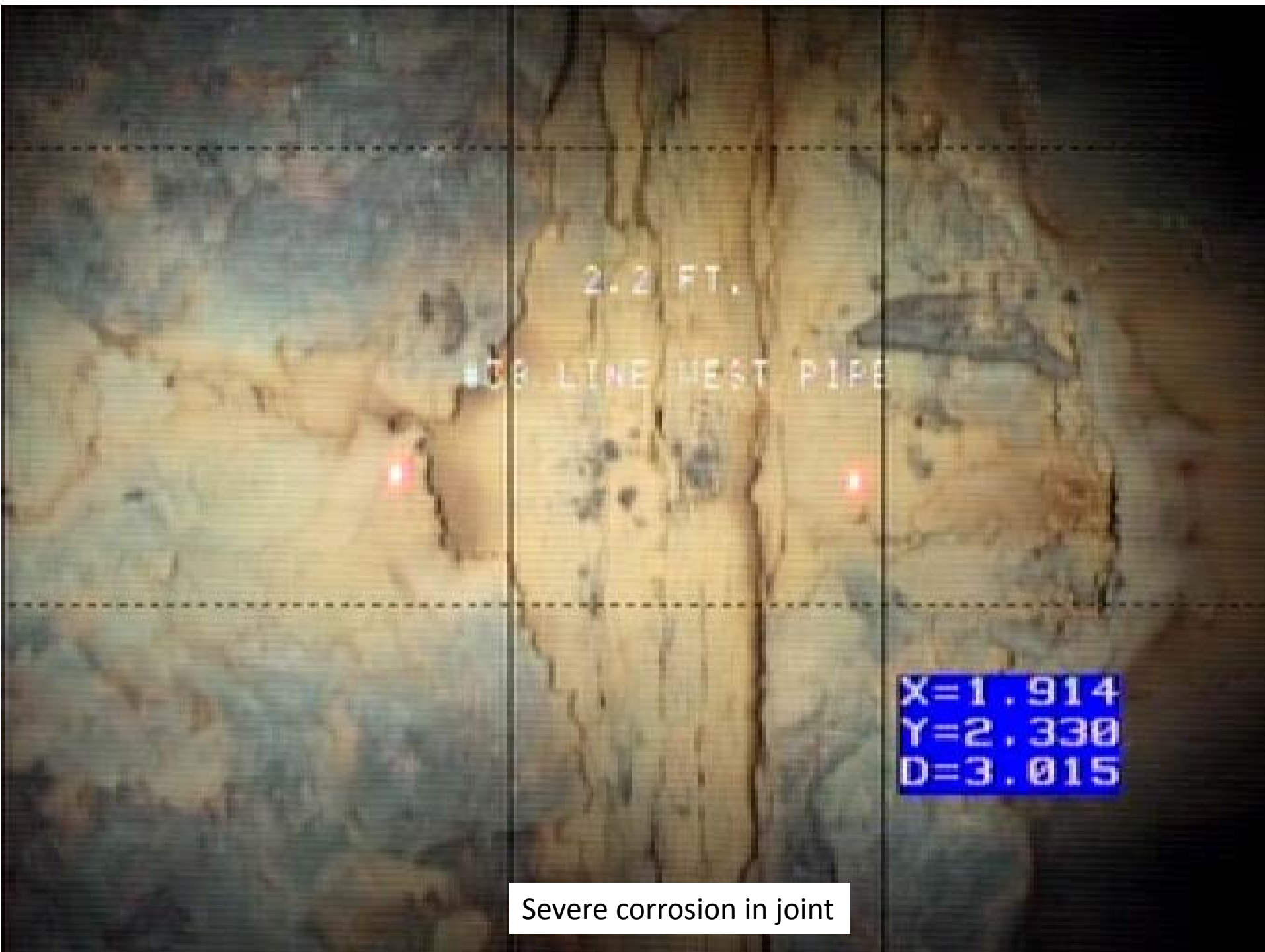
Pitting in pipe wall







Severe corrosion in joint





View of Pump

Massillon, Ohio
Sippo Creek Pump Station
Outlet Pipe #39 (Center Pipe)

=== INSPECTION SETUP ===

SECTION: U91237-09-P-0133

09/17/09

ID: SIPRO AVE PUMP ST.

NH START: OUTLET DN STRM

NH STOP: INLET PUMP

LOCATION: 60+60

PIPE: 4" CIP

OPERATOR: JOHN

TARGET: DISSILON

START: 70+00

ONSCREEN:

#33 CENTER PIPE

=== INSPECTION SETUP ===

SECTION: M91237-09-P-0133

09/17/09

ID: SIPP0 AVE PUMP ST.

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP

LOCATION: 60+60

PIPE: 24" CIP

OPERATOR: JOHN

TAPE ID: HASSILON

START: 0+00

ONSCREEN:

#32 CENTER PIPE

Protective Coating Missing



Protective Coating Missing

3.4 FT.

#39 CENTER PIPE

Protective Coating Missing



6.7 FT.

#39 CENTER PIPE

Severe corrosion in joint



6.7 FT.

#39 CENTER PIPE

Severe pitting and corrosion under protective coating

6.7 FT.

#39 CENTER PIPE

X=2.660
Y=3.609
D=4.484

9.3 FT.

#103 CENTER PIPE

Severe corrosion in joint





View of Pump

Massillon, Ohio
Sippo Creek Pump Station
Outlet Pipe #40 (East Pipe)

=== INSPECTION SETUP ===

SECTION: U91237-09-P-0133

09/17/09

ID: SIPPON AVE PUMP ST.

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP

LOCATION: 60+60

PIPE: 24" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0+00

ONSCREEN:

#40 EAST PIPE ■

=== INSPECTION SETUP ===

SECTION: U91237-09-P-0133

09/17/09

ID: SIPP0 AVE PUMP ST.

MH START: OUTLET DNSTRM

MH STOP: INLET PUMP

LOCATION: 60+60

PIPE: 24" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0+00

ONSCREEN:

#40 EAST PIPE ■

Missing protective coating in areas

2.0 FT.

#40 EAST PIPE

Possible open joint



2.0 FT.

EAST PIPE

Possible open joint

2.0 FT.

#40 EAST PIPE

Possible open joint



2.0 FT.

#40 EAST PIPE

Missing protective coating in areas



2.4 FT.

#40 EAST PIPE



Moderate to severe corrosion in areas



5.3 FT.

EAST PIPE

Protective coating missing

6.2 FT.

#40 EAST PIPE

Moderate to severe corrosion in areas

8.7 FT.

#40 EAST PIPE



12.2 FT.

#40 EAST PIPE



15.8 FT.

#41 EAST PIPE

Missing protective coating



18.9 FT.

#40 EAST PIPE

Joint showing potential sagging

16.3 FT.

H40 EMMET PIPE

Joint near pump

Arch Avenue Pump Station

Pump Station

Discharge well and outlet

Gravity Conduit Outlet

© 2009 Tele Atlas

Image © 2009 DigitalGlobe

40°46'58.58"N 81°31'07.68"W elev. 282 m

©2009 Google

Imagery Dates: Apr 18, 2006 - Apr 19, 2006

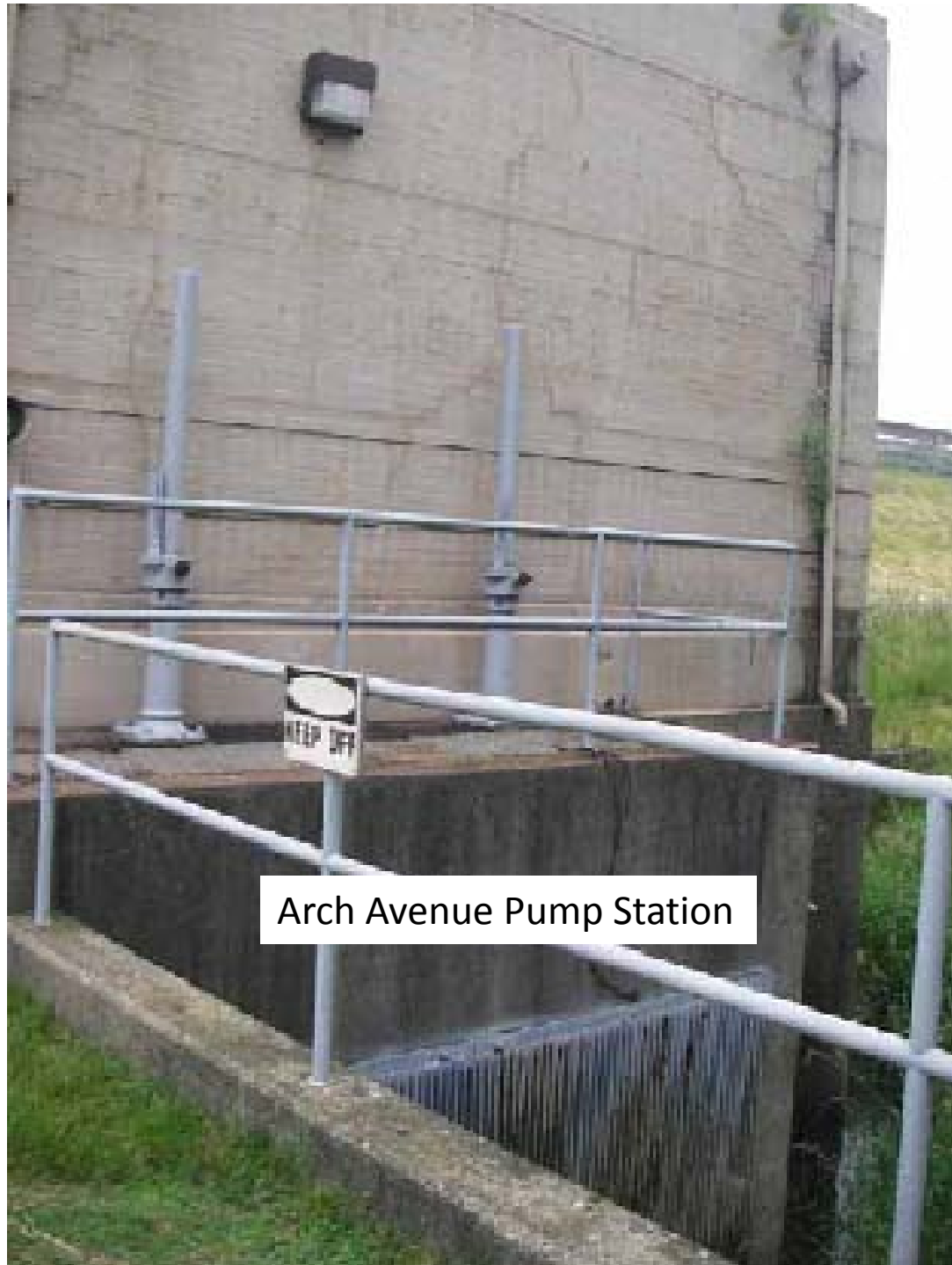
Eye alt 734 m

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Arch Avenue Pump Station



Arch Avenue Pump Station

Arch Avenue Pump Station Inlet



Arch Avenue Gravity RCB





Entrance to box

A photograph of a concrete discharge well structure situated on a grassy embankment. The well has a metal railing on top and two vertical pipes. In the background, there is a wooden fence and some trees. The sky is overcast.

Arch Avenue Discharge Well

A photograph of a concrete outlet structure for a pipe, located on a grassy bank next to a body of water. The structure is a rectangular concrete wall with a sloped top. The water is calm and reflects the sky.

Arch Avenue Pipe No. 45 Outlet



Arch Avenue Outlet

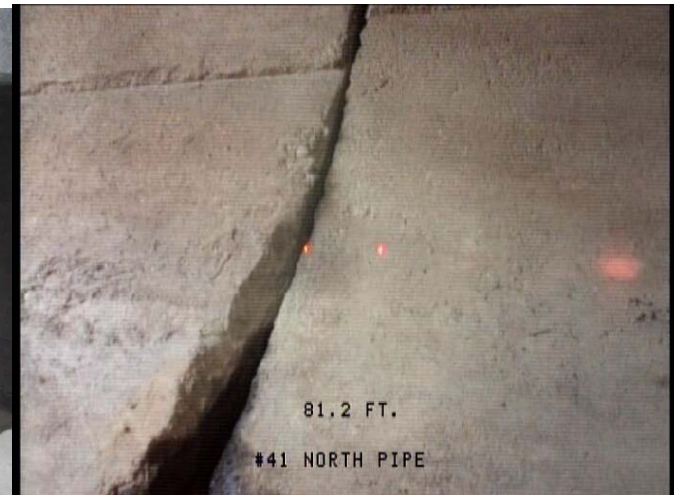


Outlet from Gatewell



Entrance to North Box-Arch Avenue

Massillon, Ohio
Arch Avenue 6'x6' RCB
Pipe #41 (North Box)



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

Arch Avenue Pump Station

Pump Station

Discharge Well and Outlet

Gravity Conduit Outlet

© 2009 Tele Atlas

Image © 2009 DigitalGlobe

40°46'58.58"N 81°31'07.68"W elev. 282 m

©2009 Google

Imagery Dates: Apr 18, 2006 - Apr 19, 2006

Eye alt 734 m

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Arch Avenue Box #41 PIPE SIZE: 6' X 6' LENGTH INSPECTED: 8/ ft.

PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 11/12/09

OVERALL CONDITION: NASSCO Rating 3: Moderate defects that will continue to deteriorate.

GENERAL INSPECTION FINDINGS: Some of the joints are starting to become offset, possible soil movement is starting to occur in some areas.

MAJOR DEFECTS

Arch Avenue Box #41	
Feet	Defect
5 ft	Rebar/nails visible in crown
23ft	Slight spalling/ offset joint in crown
32ft	Hairline cracking
46ft	Open joint between North and South barrel
68ft	Scouring/Staining in crown
80ft	Right haunch, offset joint approx. 2", possible soil penetration
85ft	Spalling/ cracking at headwall

*First part of the structure from the inlet to gatewell is RCB, gatewell to outlet is RCP



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. <u>A limited number of joints may have opened and soil loss may be beginning.</u> Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

=== INSPECTION SETUP ===

SECTION: W91237-09-P-0133

09/15/09

ID: ARCH AVE PUMP STATION

MH START: INLET UPSTREAM

MH STOP: OUTLET DNSTREAM

T

LOCATION: 102+60

PIPE: 6' X 6' RCP CULVERT

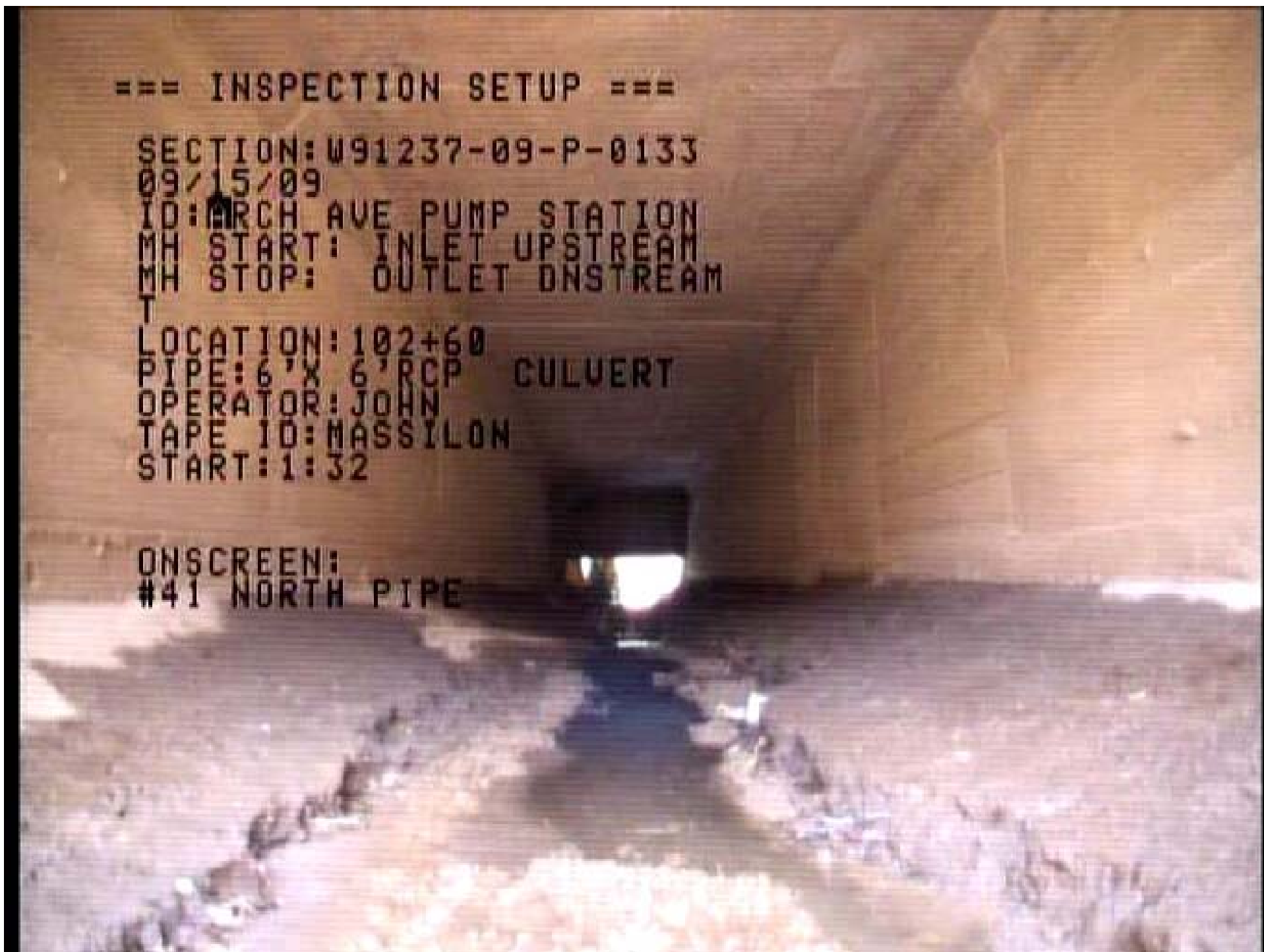
OPERATOR: JOHN

TAPE ID: MASSILON

START: 1:32

ONSCREEN:

#41 NORTH PIPE





Rebar exposed- entrance approx. 5ft at crown

A photograph of a tunnel interior. The walls are made of rough, textured material, possibly concrete or rock. A bright, rectangular light source is visible in the center of the tunnel, casting a strong glow. The floor is uneven and appears to be covered in debris or rubble. The overall atmosphere is dim and industrial.

13.4 FT.

#41 NORTH PIPE



Slight spalling at joint at
11:00- 23ft



Offset joint in crown-23ft



Joint material exposed in joint right side- 23ft

An underwater photograph showing a dark, horizontal pipe structure. A bright yellow cross-shaped marker is attached to the pipe. The surrounding environment is murky and appears to be a seabed or underwater construction site. The lighting is dim, with the yellow marker providing a point of contrast.

25.2 FT.

#41 NORTH PIPE

Possible hairline crack at 31.9 feet

31.9 FT.

#41 NORTH PIPE



31.9 FT.

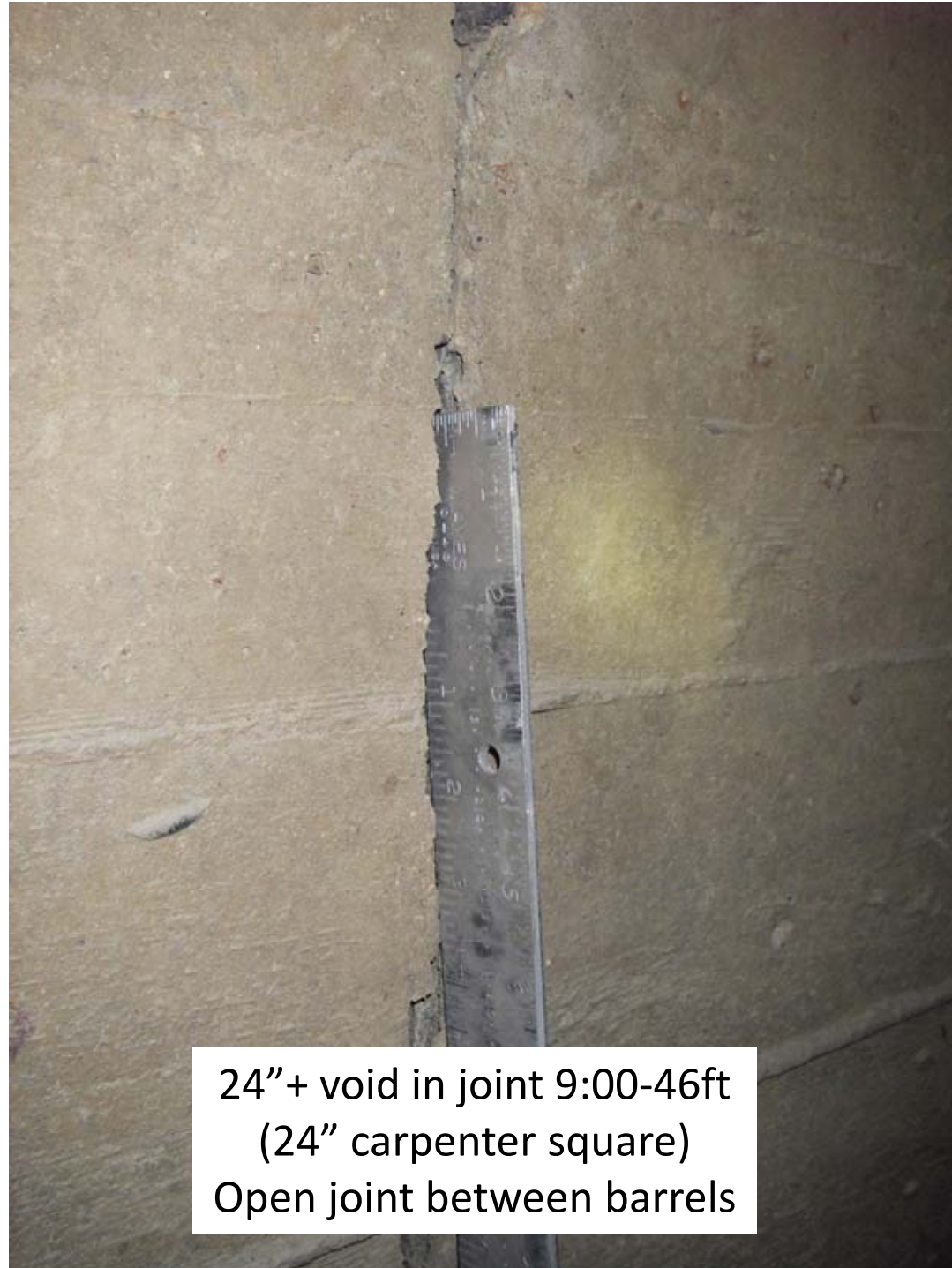
#41 NORTH PIPE

A photograph taken from inside a tunnel. In the center, a surveying instrument, likely a total station or theodolite, is mounted on a tripod. The instrument has a bright yellow body with a blue vertical stripe. It is positioned on a dark, uneven surface, possibly a rock floor. The background shows the rough, brownish walls and ceiling of the tunnel. The lighting is somewhat dim, with a brighter area around the instrument.

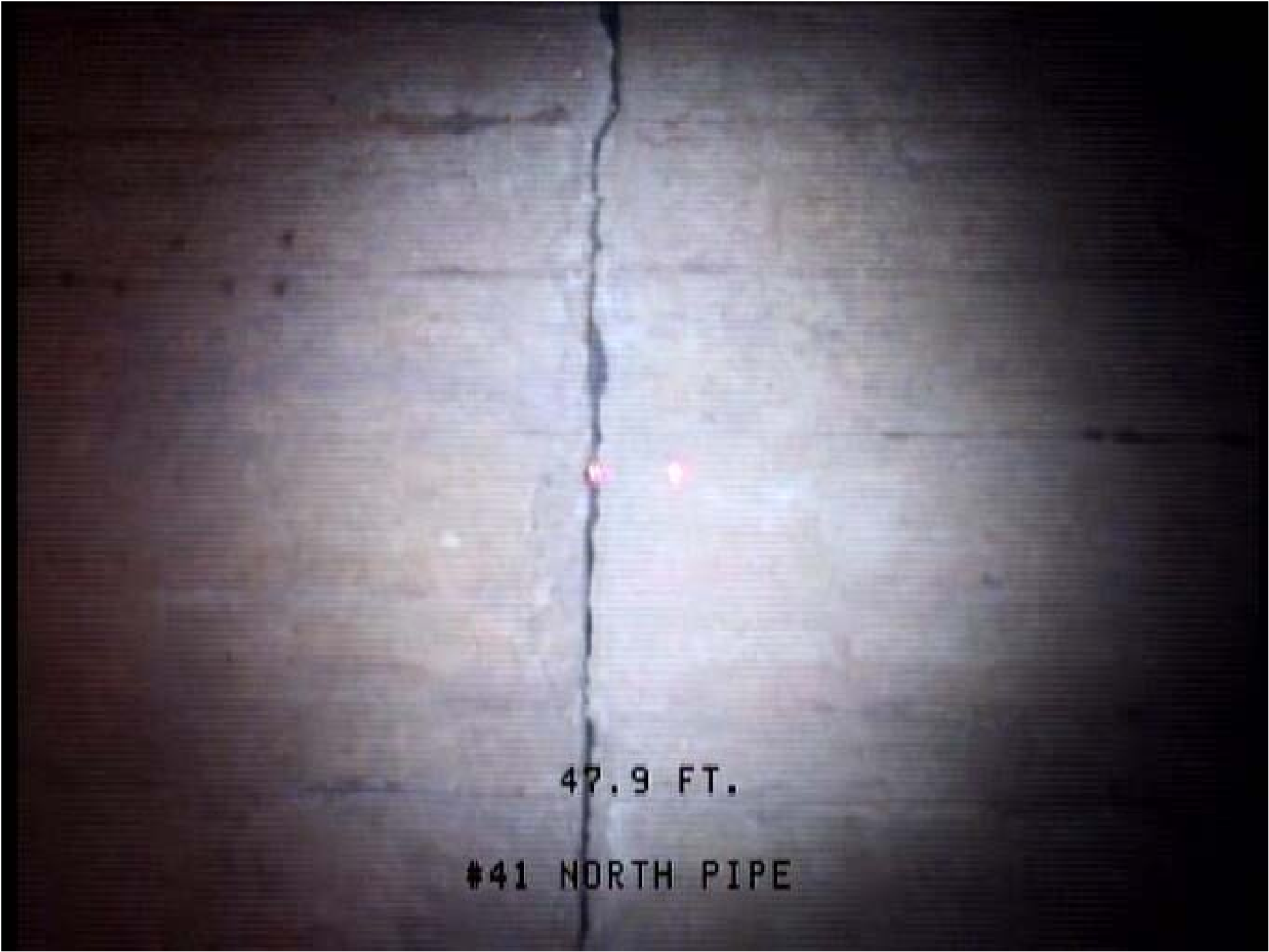
44.5 FT.

#41 NORTH PIPE

Nearing gatewell

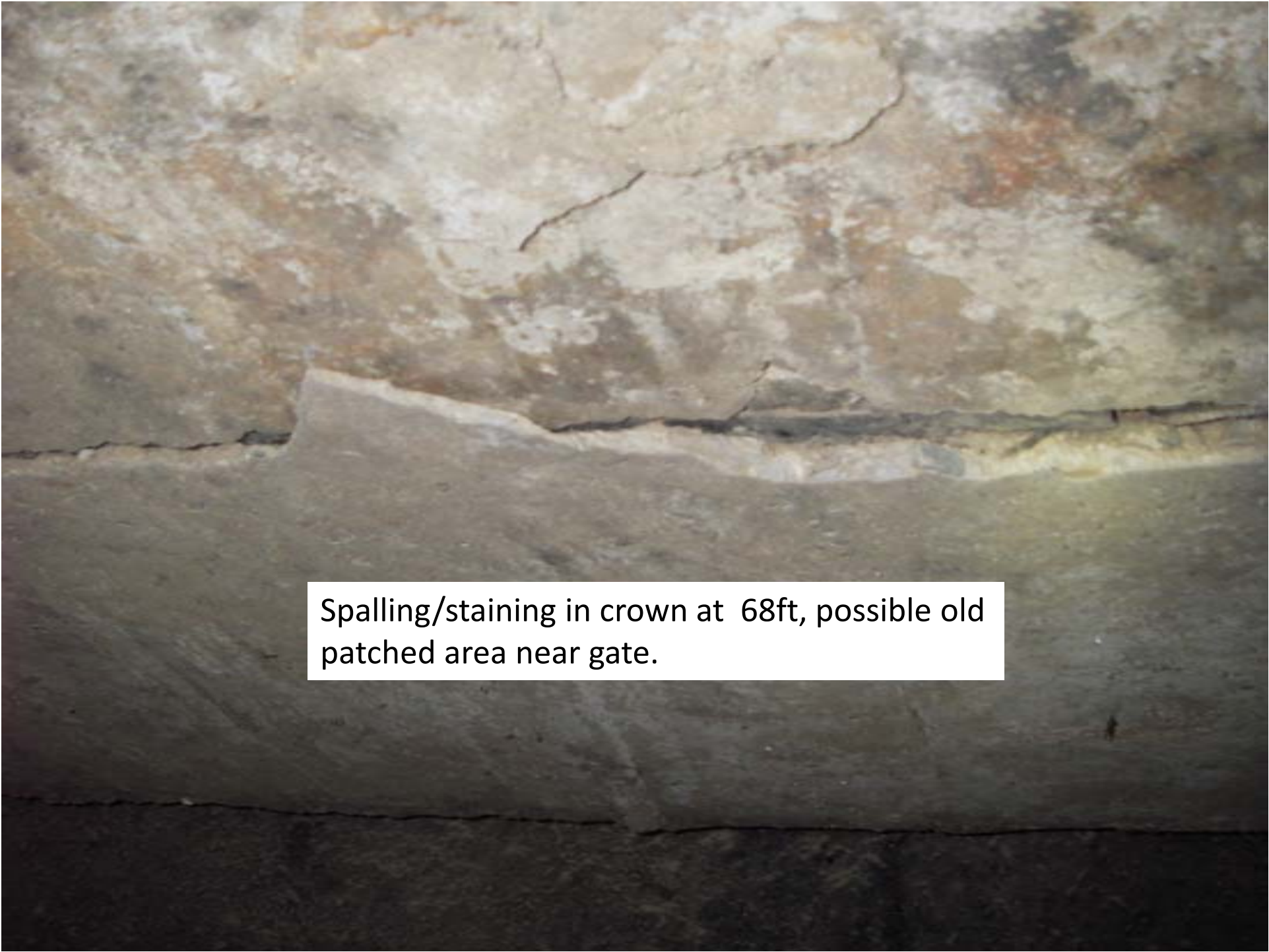


24"+ void in joint 9:00-46ft
(24" carpenter square)
Open joint between barrels

A photograph of a concrete wall with a vertical crack. Two red laser dots are visible on the wall, one on each side of the crack. The text "47.9 FT." is overlaid on the image.

47.9 FT.

#41 NORTH PIPE



Spalling/staining in crown at 68ft, possible old patched area near gate.



62.8 FT.

#41 NORTH PIPE

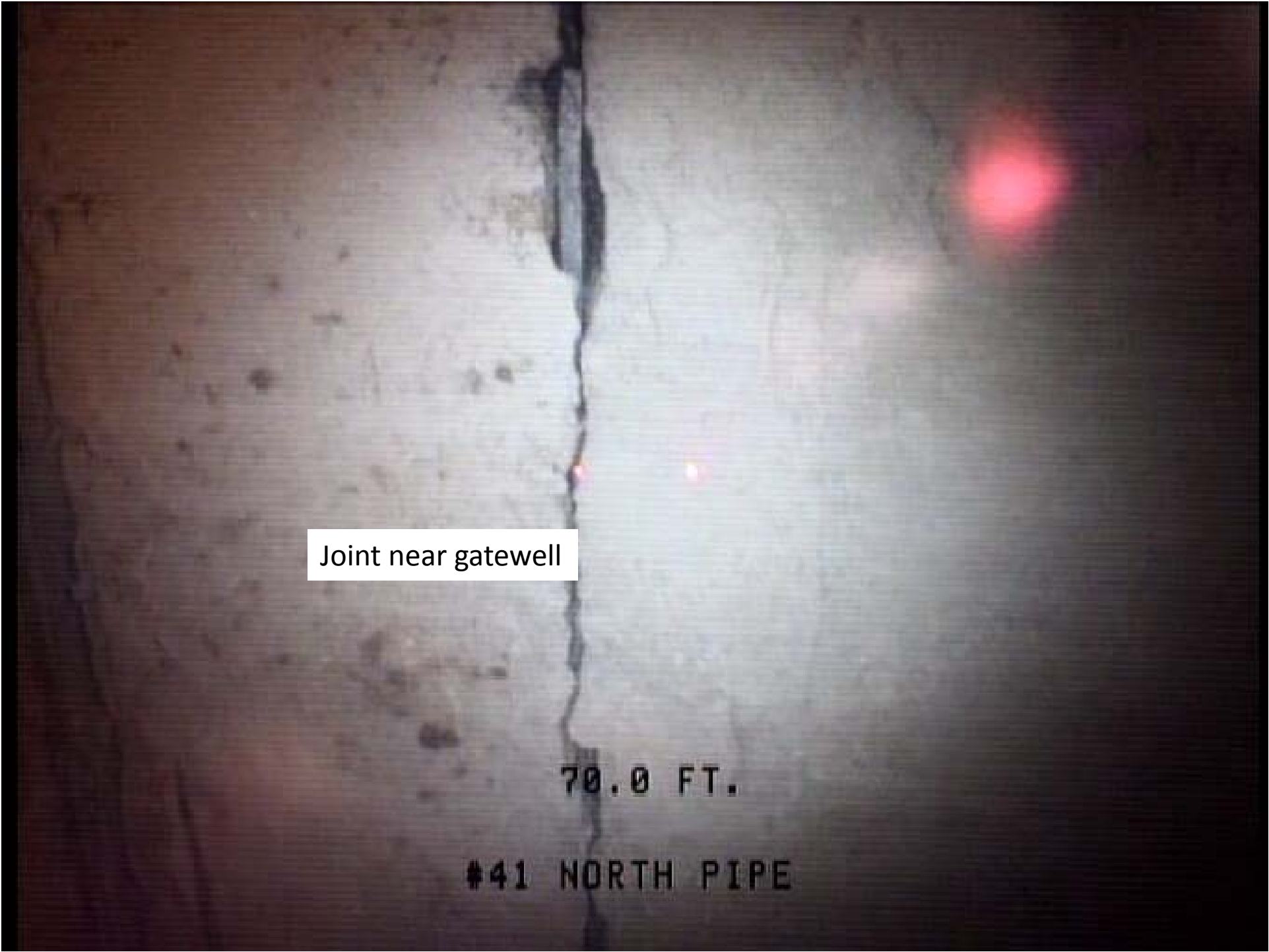


Gate from inside box- 73ft

Joint near gate

70.0 FT.

#41 NORTH PIPE



Joint near gatewell

70.0 FT.

#41 NORTH PIPE

Offset possible open joint in invert

70.0 FT.

#41 NORTH PIPE

An underwater photograph showing a vertical pipe joint. The pipe is dark and textured, possibly metal or concrete. There is a significant area of scour (erosion) at the joint, indicated by a bright, light-colored patch on the left side. Two red laser pointers are visible on the pipe, one on the left and one on the right, likely for scale or alignment. The background is dark and murky, typical of an underwater environment.

Scour at joint near gate

70.0 FT.

#41 NORTH PIPE



Looking up from bottom of
gatewell/discharge well - 73ft



Looking upstream from 46ft

Looking down stream from gatewell

74.1 FT.

NORTH PIPE



Offset Joint

74.1 FT.

#41 NORTH PIPE



Offset joint approximately 2-inch 80 ft

Staining possible soil movement through offset/open joint

01.2 FT.

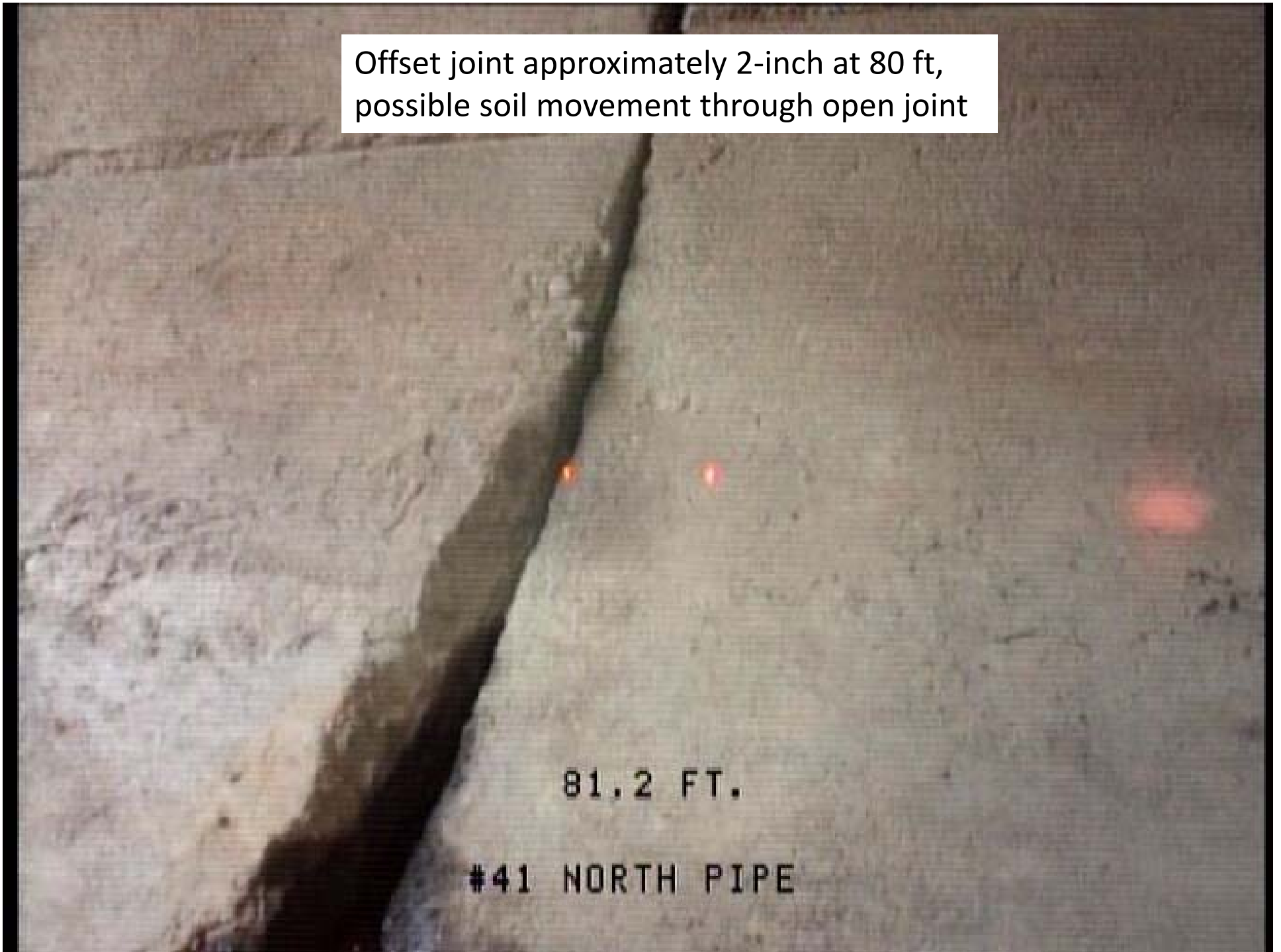
#41 NORTH PIPE



Offset joint approximately 2-inch at 80 ft,
possible soil movement through open joint

81.2 FT.

#41 NORTH PIPE





81.2 FT

#41 NORTH PIPE

A photograph of a rock face, likely a cliff or cave wall, showing a prominent vertical crack and a horizontal crack. The rock surface is textured and brownish. Two small red dots are visible on the rock face, one near the vertical crack and one further to the right. The text "85.4 FT." is overlaid on the image.

85.4 FT.

#41 NORTH PIPE



Offset joint 1.5in at invert- 80ft



Spalling/Cracking at headwall

85.4 FT.

#41 NORTH PIPE



85.4 FT.

#41 NORTH PIPE



Scouring at invert- 80ft



Looking at outlet- Total length 86 feet



Entrance- Arch Ave. south box

Massillon, Ohio
Arch Avenue 6'x6'RCB
Pipe #42 (South Box)



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Arch Avenue Box #42 PIPE SIZE: 6' X 6' LENGTH INSPECTED: 8/ ft.

PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 11/12/09

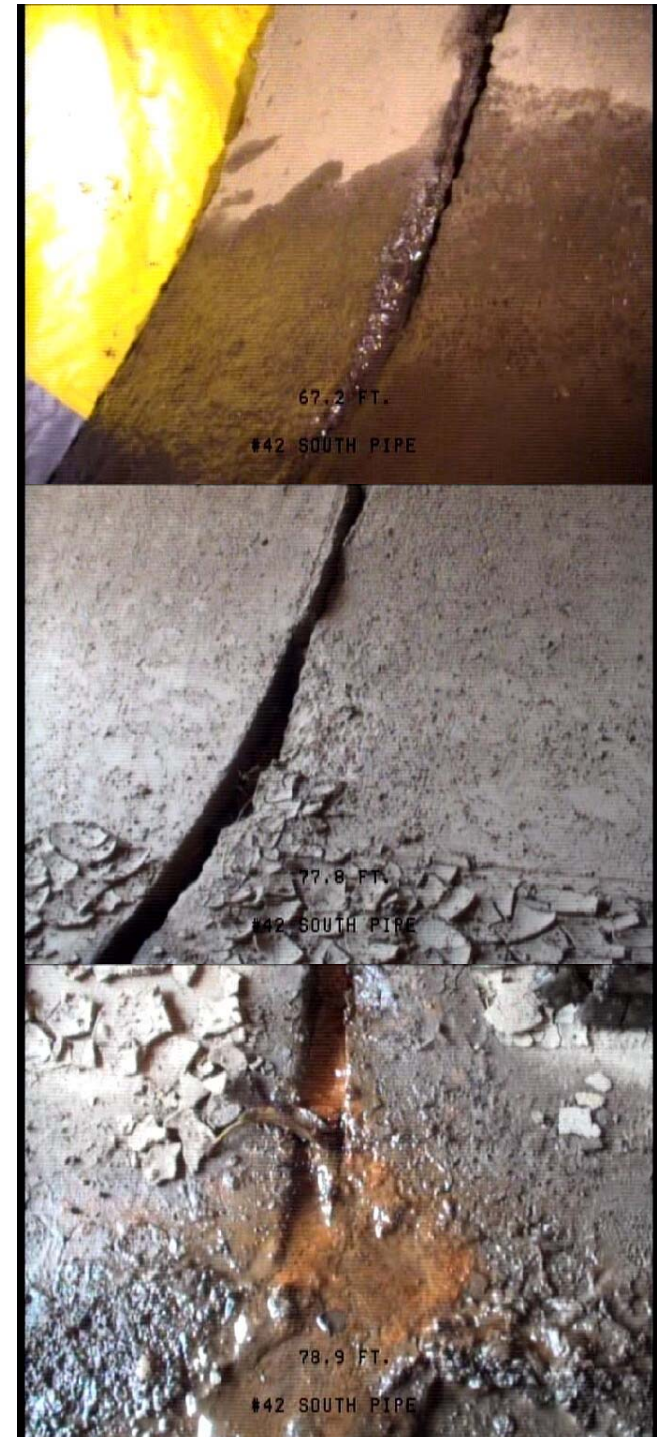
OVERALL CONDITION: NASSCO Rating 3: Moderate defects that will continue to deteriorate.

GENERAL INSPECTION FINDINGS: GENERAL INSPECTION FINDINGS: Some of the joints are starting to become offset, possible soil movement is starting to occur in some areas.

MAJOR DEFECTS

Arch Avenue Box #42	
Feet	Defect
0ft-2ft	Spalling, staining, and moisture at joint
13ft	Nails/Rebar in crown
18ft	Spalling at joint right side
23ft	10- inch penetration right side
46ft	Open joint between barrels/ 8- inch penetration in crown/ 6- inch penetration left side/ erosion of joint at invert
52ft	Moisture in joint
68ft-70ft	Spalling/staining of joint, deterioration and scouring at haunch
79ft	Scouring at joint in left haunch, missing mortar in joint, as well as soil/rust penetrating through joint
84ft	Radial cracking near joint/ cracking at joint and exposed rebar at 11 o'clock

*First part of the structure from the inlet to gatewell is RCB, gatewell to outlet is RCP



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
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	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

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=== INSPECTION SETUP ===

SECTION: W91237-09-P-0133

09/15/09

ID: ARCH AVE PUMP STATION

MH START: INLET UPSTREAM

MH STOP: OUTLET DNSTREAM

LOCATION: 102+60

PIPE: 6" X 6" RCP CULVERT

OPERATOR: JOHN

TAPE ID: MASSILON

WATER: 72

ONSCREEN:

#42 SOUTH PIPE



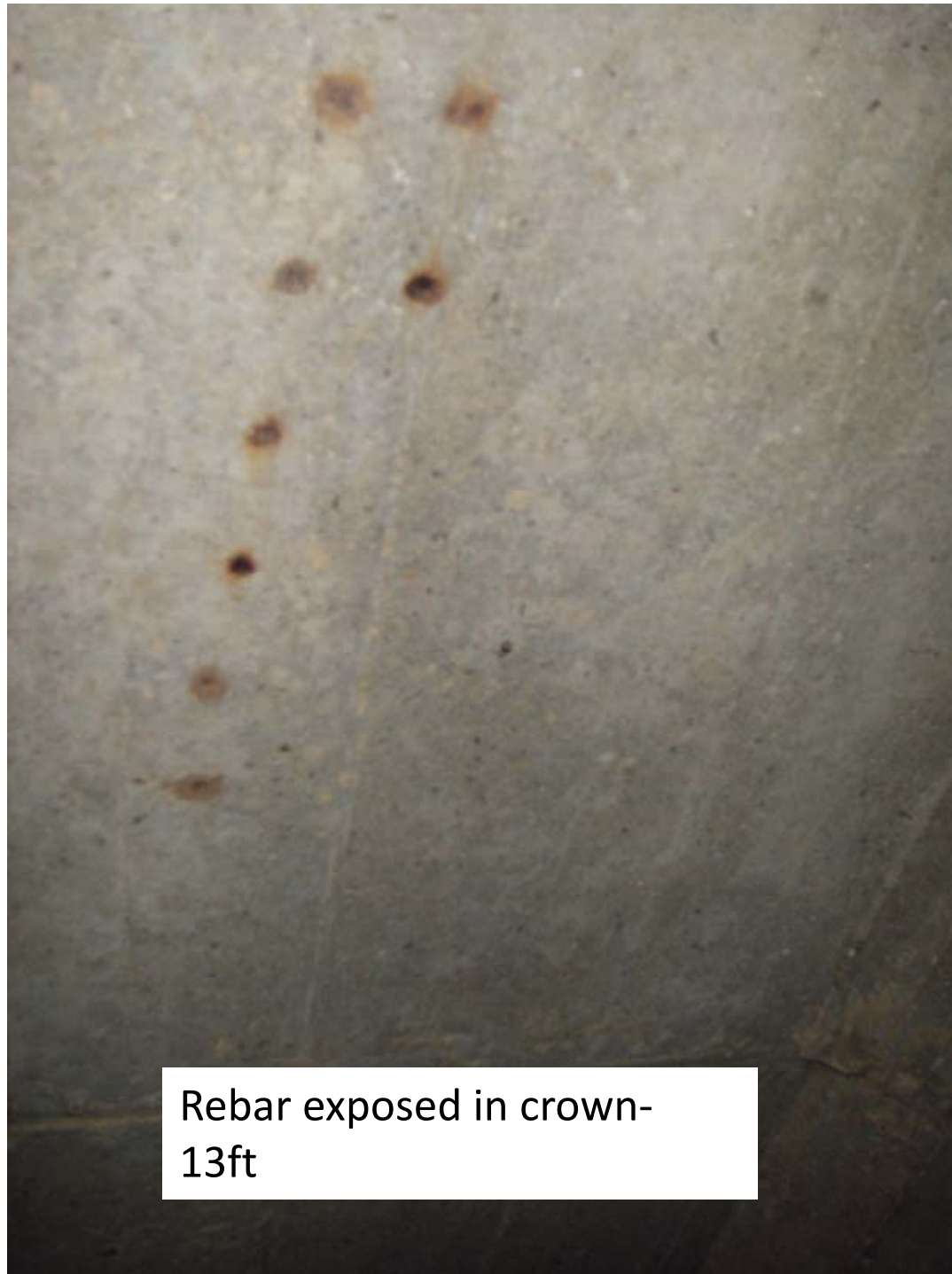
Spalling /staining/moisture in joint in
crown at entrance





10.9 FT.

#42 SOUTH PIPE



Rebar exposed in crown-
13ft



23.5 FT.

#42 SOUTH PIPE



Spalling at joint 3:00- 18ft



10 inch penetration at joint
3:00- 23ft



Joint 11:00- 23ft



Irregular joint at haunch- 23ft



30.5 FT.

#42 SOUTH PIPE



36" yard stick shown in photo-46ft
Open joint between barrels



47.7 FT.

#42 SOUTH PIPE



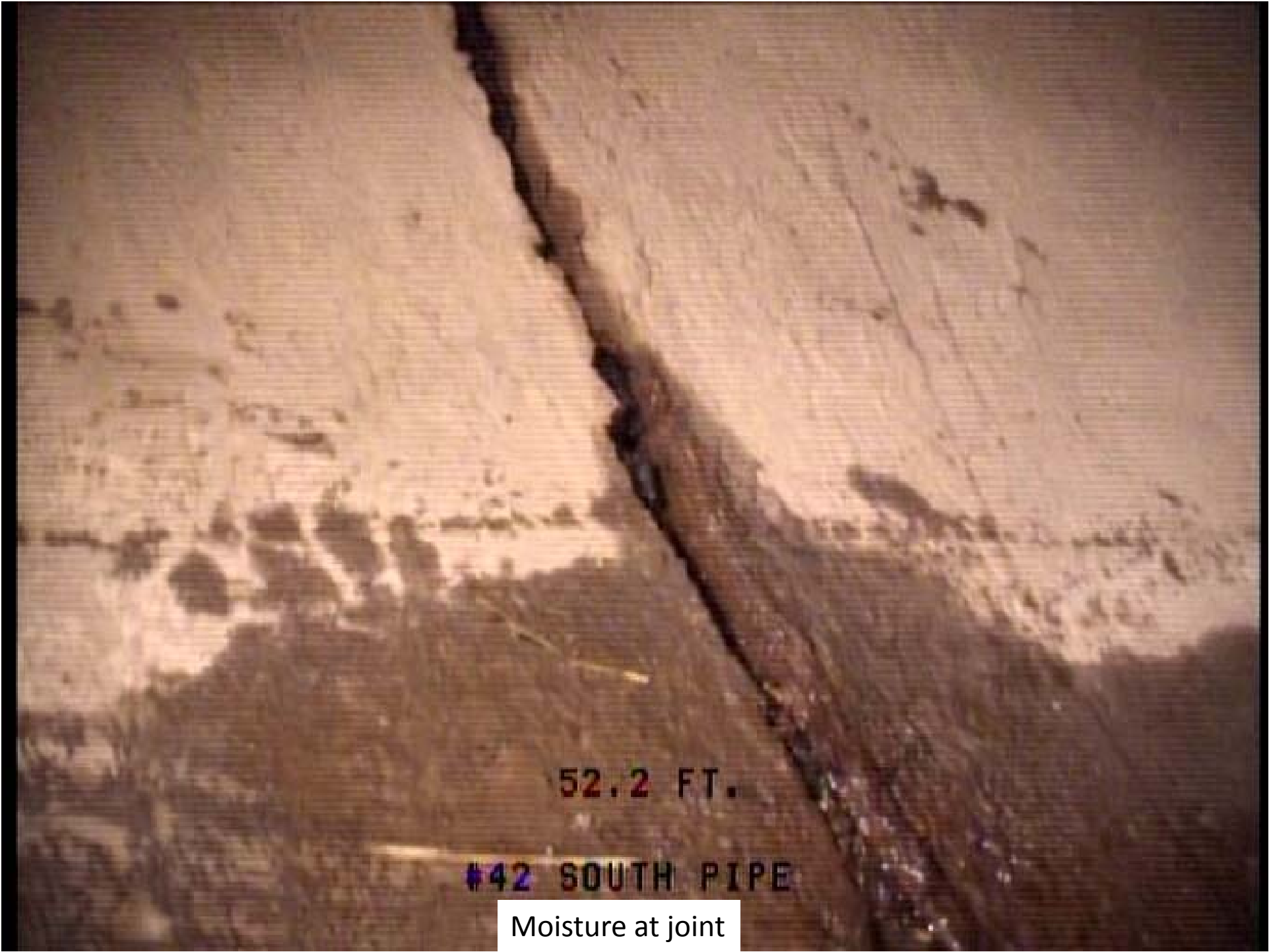
8-inch penetration at joint in
crown- 46ft



6-inch penetration at 9:00
left side- 46ft



Void in joint, 2-inch across at 2:00-46ft

A close-up photograph of a pipe joint. The pipe is made of a light-colored material, possibly concrete or metal, and shows signs of weathering and staining. A dark, wet area is visible at the joint, indicating moisture. The text "52.2 FT." is overlaid in red on the right side of the pipe.

52.2 FT.

#42 SOUTH PIPE

Moisture at joint



45.8 FT.

#42 SOUTH PIPE



Erosion of joint in invert- 46ft



67.2 FT.

#42 SOUTH PIPE

Possible open joint



Looking at gate from 55ft



62.2 FT.

#42 SOUTH PIPE



Joint separation/moderate erosion right haunch- 69ft



Erosion of joint left haunch- 69ft

#42 SOUTH PIPE

67.2 FT.





67.2 FT.

#42 SOUTH PIPE

A photograph showing a concrete wall and floor. A large, dark, jagged crack runs diagonally across the lower left portion of the frame. To the right, a bright yellow tarp is draped over a structure, partially obscuring a blue-grey area behind it. The overall scene appears to be an inspection or repair site for a concrete foundation or wall.

67.2 FT.

#42 SOUTH PIPE



59.5 FT.

#42 SOUTH PIPE



Looking upstream from outlet- 69ft

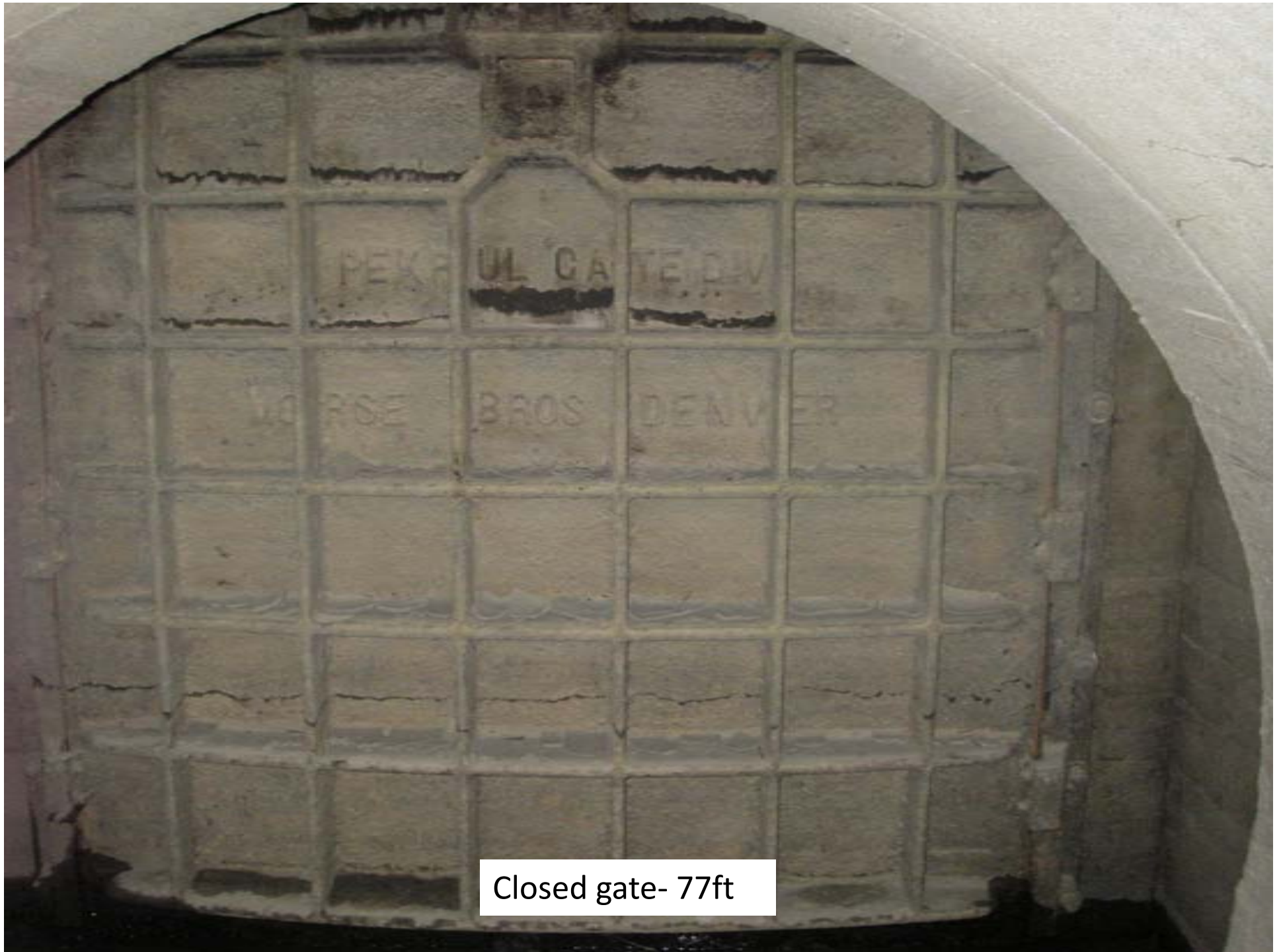


63.9 FT.

Ø42 SOUTH PIPE



Looking up from box- 71ft



Closed gate- 77ft



Scouring at joint in left haunch/soil or rust seeping in through joint- 79ft



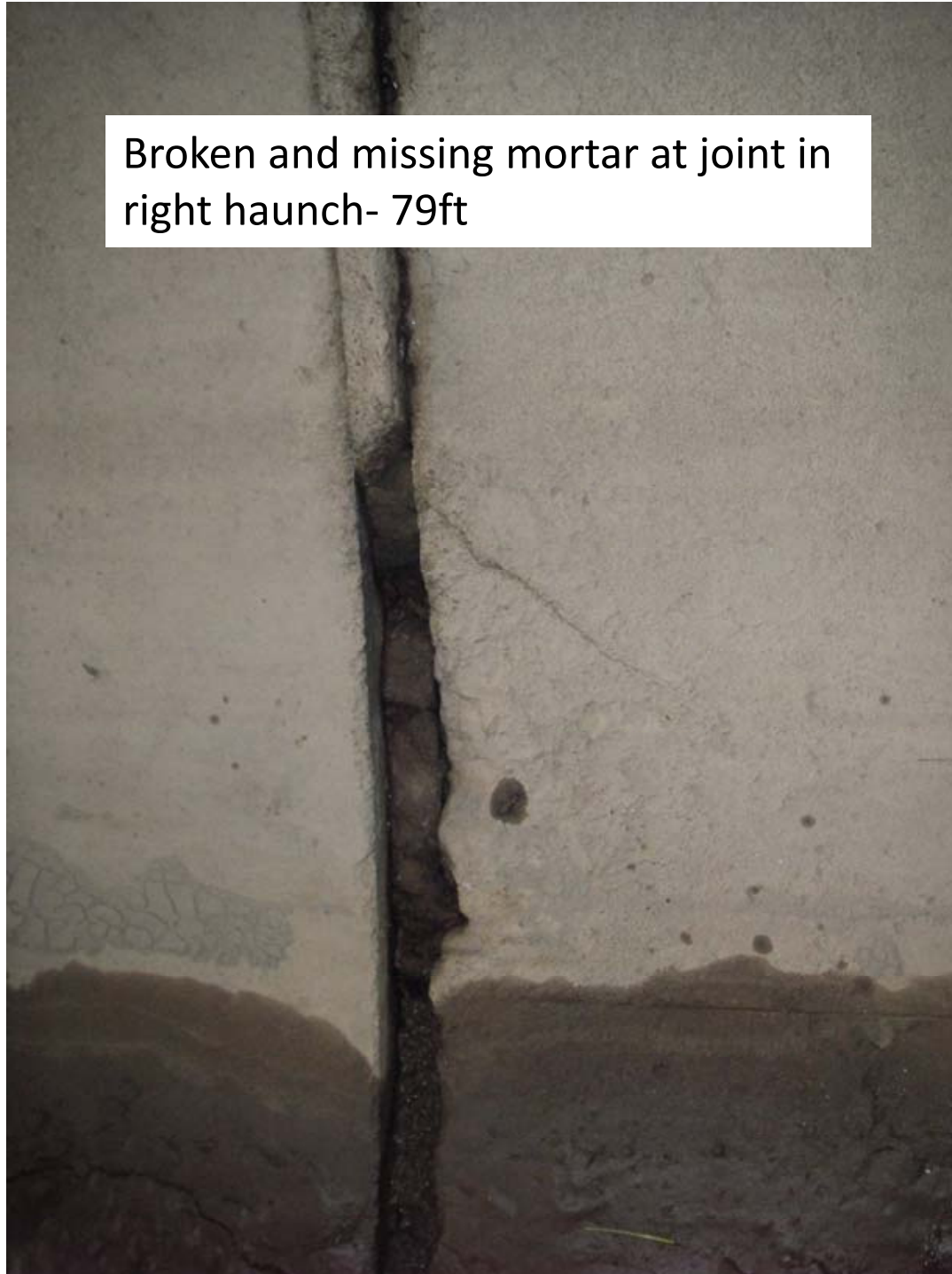
78.9 FT.

#42 SOUTH PIPE

Possible soil movement through joint



Broken and missing mortar at joint in
right haunch- 79ft





77.8 FT.

#42 SOUTH PIPE



3 inch penetration in joint 2:00- 79ft



Cracking, rebar exposed 11:00- 84ft



Radial cracking near
joint at 2:00- 84ft



77.5 FT.

#42 SOUTH PIPE



Gate from outlet- 84ft

Massillon, Ohio
Arch Avenue 24" CIP Pump Pipes
Pipe #43 (South), 44 (Center), 45 (North)



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCP	120	Sippo Avenue Pump Station
38	24	CIP	5	Discharge from Sippo Avenue Pump Station
39	24	CIP	10	Discharge from Sippo Avenue Pump Station
40	24	CIP	20	Discharge from Sippo Avenue Pump Station
41	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River

Arch Avenue Pump Station

Pump Station

Pump/box Outlet



HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

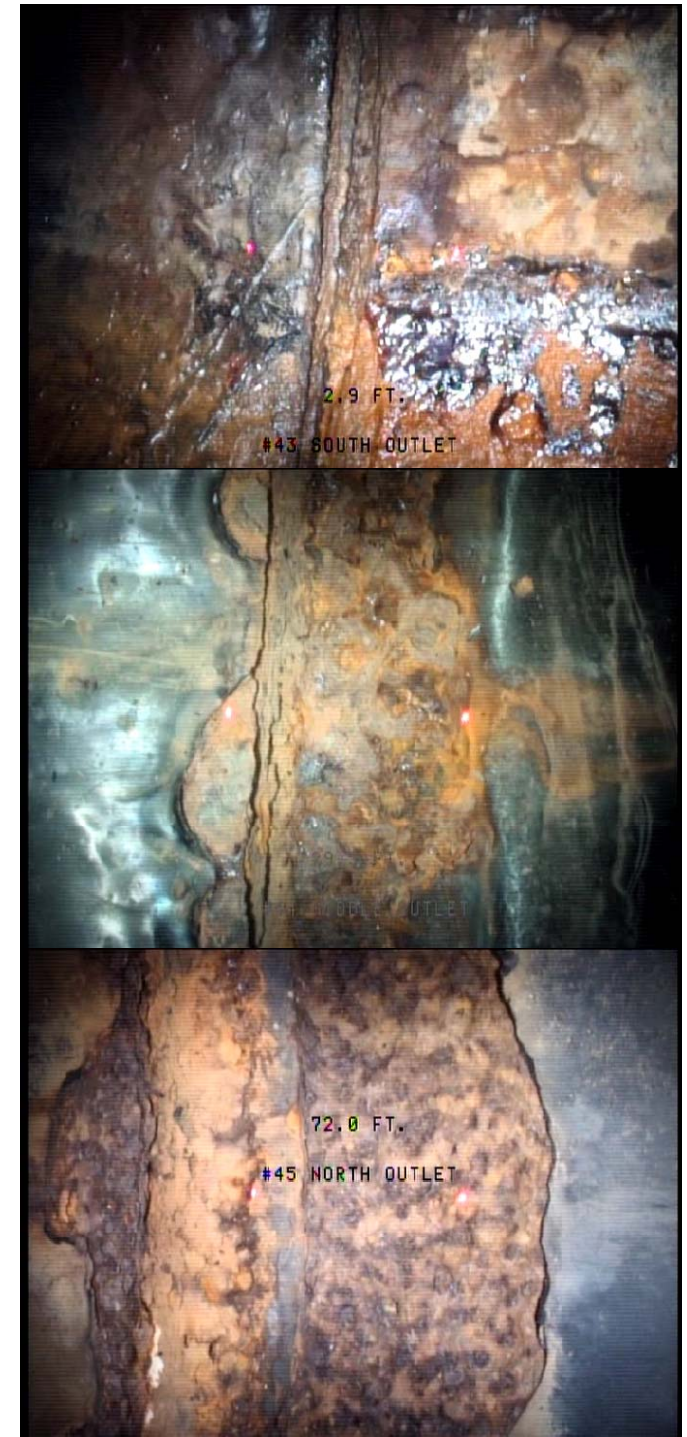
PIPE NO: Arch Avenue Pump Pipes (43, 44, 45) PIPE SIZE: 24" LENGTH INSPECTED: 85 ft.
PROJECT: Massillon Levee TYPE: CIP INSPECTION DATE: 9/14/09

OVERALL CONDITION: NASSCO Grade 4: Pipe will probably fail in 5 to 10 years. Pipe rated at a more serious condition due to that it is a pump line going through a levee.

GENERAL INSPECTION FINDINGS: All three pipes have moderate to severe corrosion at the joints. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints.

MAJOR DEFECTS

Feet	Defect
0-85 ft	All three pipes have moderate to severe corrosion at the joints. Missing protective coating and corrosion was also noted in flat areas and sharp bends. It appears in some sections that point repairs have been made on the protective coating. Recommend air pressure testing to verify integrity of the joints.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

Massillon, Ohio
Arch Avenue Pump Station
Pipe #43 (South Pipe)

=== INSPECTION SETUP ===

SECTION: W91237-09-P-0133

09/14/09

ID: ARCH AVE PUMP STATION

MH START: SOUTH OUTLET

MH STOP: PUMP STATION

LOCATION: 102+60

PIPE: 24" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 59:52

ONSCREEN:

#43 SOUTH OUTLET

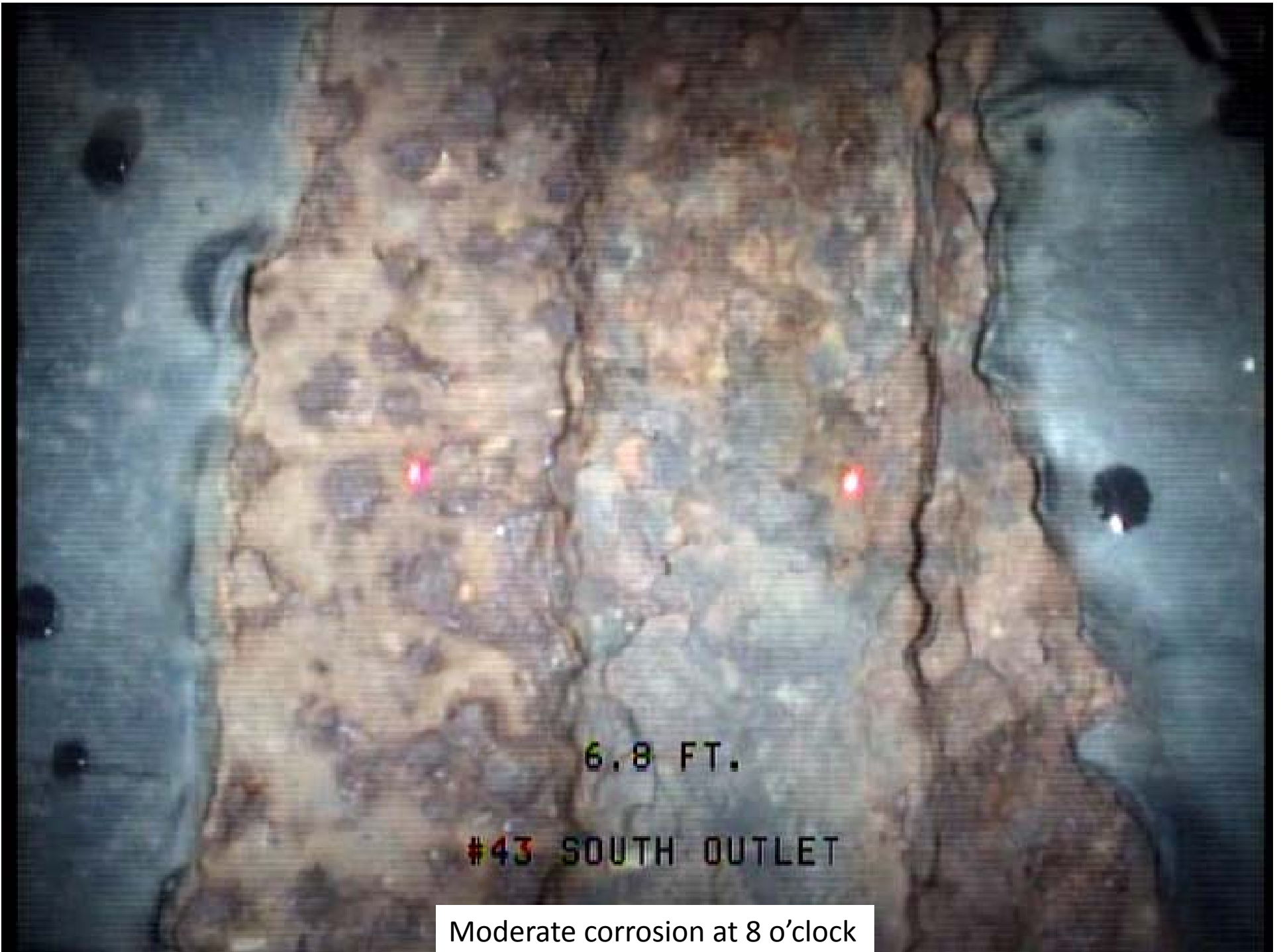
Arch Ave. Pump Pipe #43



2.9 FT.

#43 SOUTH OUTLET

Moderate to severe corrosion
Looking at 4 o'clock



Moderate corrosion at 8 o'clock



29.2 FT.

#43 SOUTH OUTLET

Deterioration of lining



38.3 FT.

#43 SOUTH OUTLET

Looking up grade at top of pump pipe



44.1 FT.

The image shows a vertical metal structure, possibly a pipe or part of a ship's hull, with significant corrosion. The surface is covered in a thick, brownish-orange rust. Two small red markers are visible on the structure, one near the top and one near the bottom. The background is dark and murky, suggesting an underwater environment.

#43 SOUTH OUTLET

Minor corrosion at 9 o'clock



63.7 FT.

#43 SOUTH OUTLET

Looking downgrade at level
pipe toward pump station



69.6 FT.

#43 SOUTH OUTLET

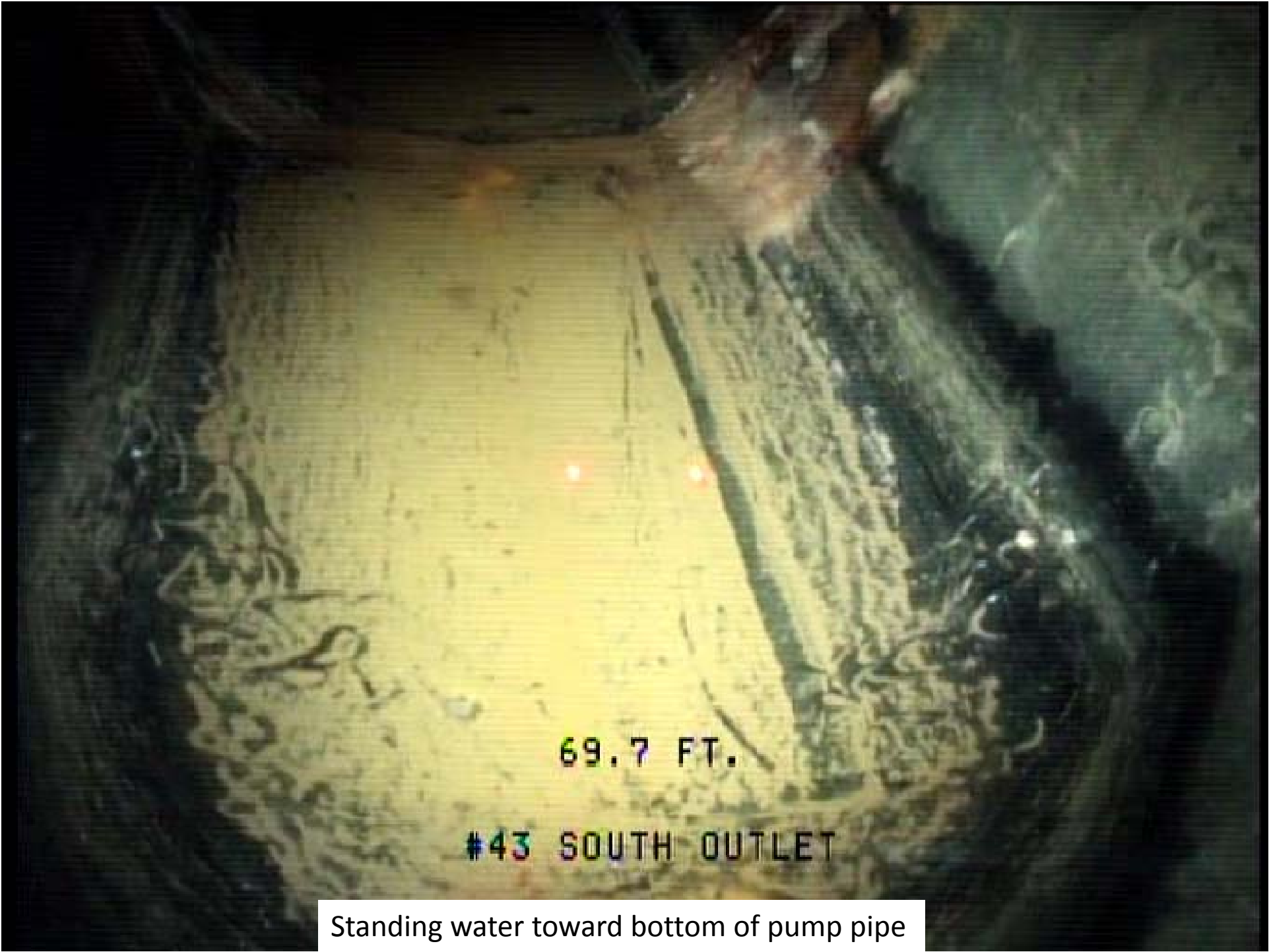
Moderate corrosion at 3 o'clock



69.6 FT.

#43 SOUTH OUTLET

Severe corrosion at invert



69.7 FT.

This is an underwater photograph taken from a submersible. The scene shows a large, vertical, cylindrical structure, likely a pump pipe, which is covered in a thick layer of white, fibrous material, possibly algae or biofouling. The water is dark and murky, with some light reflecting off the surface of the pipe. The overall lighting is dim, with a few small, bright spots of light visible on the pipe's surface.

#43 SOUTH OUTLET

Standing water toward bottom of pump pipe



74.1 FT.

#43 SOUTH OUTLET

Corrosion of joint , moisture at 4 o'clock



74.1 FT.

#43 SOUTH OUTLET

View of pump



84.3 FT.

#43 SOUTH OUTLET

Severe corrosion

Massillon, Ohio
Arch Avenue Pump Station
Pipe #44 (Center Pipe)

=== INSPECTION SETUP ===

SECTION: W91237-09-P-0133

09/14/09

ID: ARCH AVE PUMP STATION

MH START: MIDDLE OUTLET

MH STOP: PUMP STATION

LOCATION: 102+60

PIPE: 24" CIP

OPERATOR: JOHN

TAPE ID: MASSILON

START: 29:56

ONSCREEN:

#44 MIDDLE OUTLET

Arch Ave. Pump Pipe #44



2.6ft

Moderate to severe corrosion , 3 o'clock

7.2ft

Moderate to severe corrosion

22.1ft

22.1 FT.

#44 MIDDLE OUTLET

Looking up grade at top of Siphon Breaker



29.0ft

Severe corrosion of joint at invert



45.4ft

45.4 FT.

MIDDLE OUTLET



54.4ft

54.4 FT.

MIDDLE OUTLET



67.2ft 67.2 FT.

#44 MIDDLE OUTLET

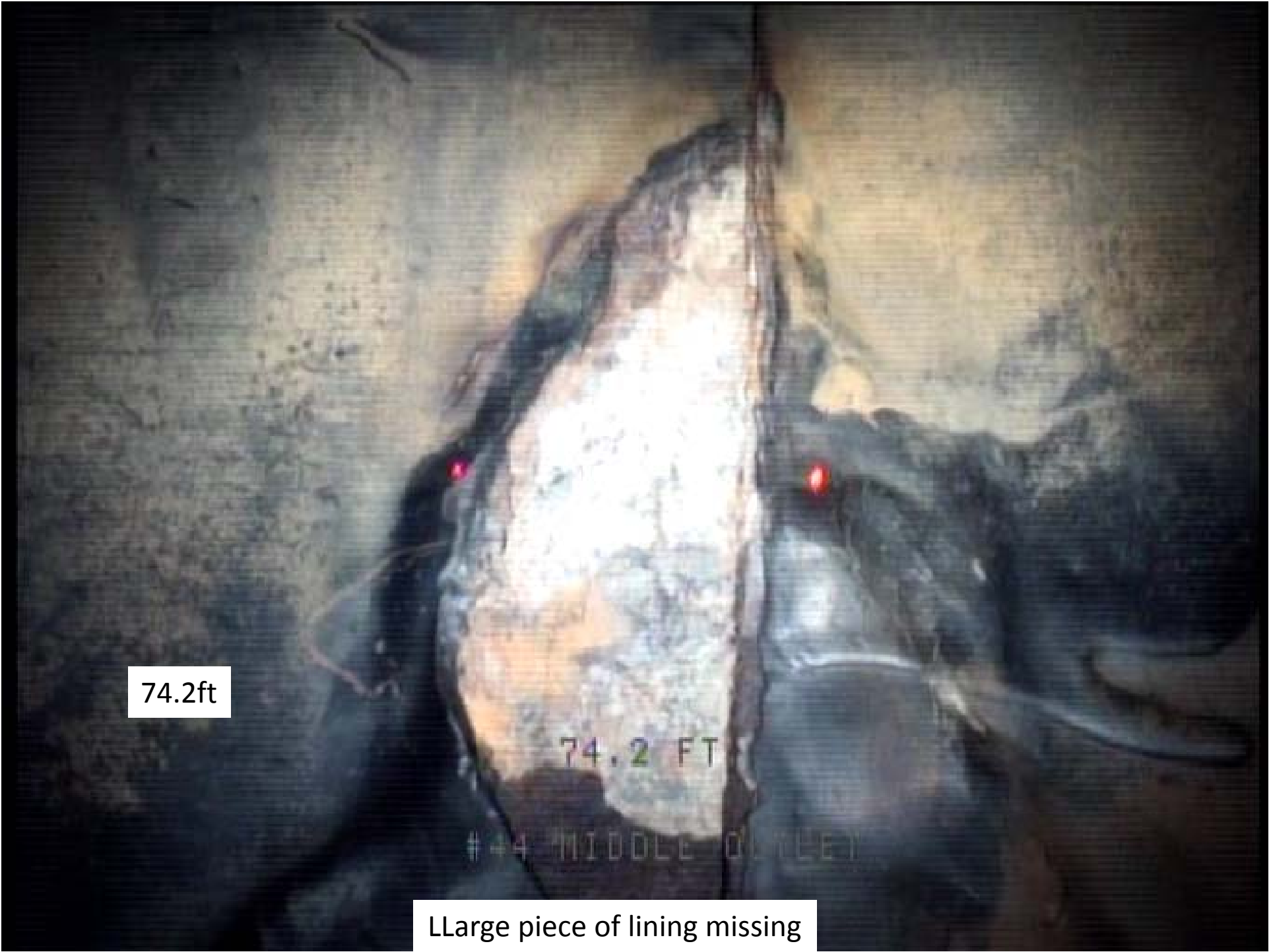
Looking downgrade



72.0ft

This is an underwater photograph showing a metal joint, likely part of a ship's hull or a large pipe. The joint is heavily corroded, with a large, irregular, brownish-orange rusted area visible. The surrounding metal surface is dark and textured. A metal bracket or fitting is attached to the right side of the joint. Two red laser pointers are visible, one on the left and one on the right, illuminating the corroded area. The text '72.0ft' is overlaid in the upper left corner.

Moderate corrosion of
Joint, 5 o'clock



74.2ft

74.2 FT

#44 MIDDLE QUEEN

LLarge piece of lining missing



76.8 FT.

76.8ft

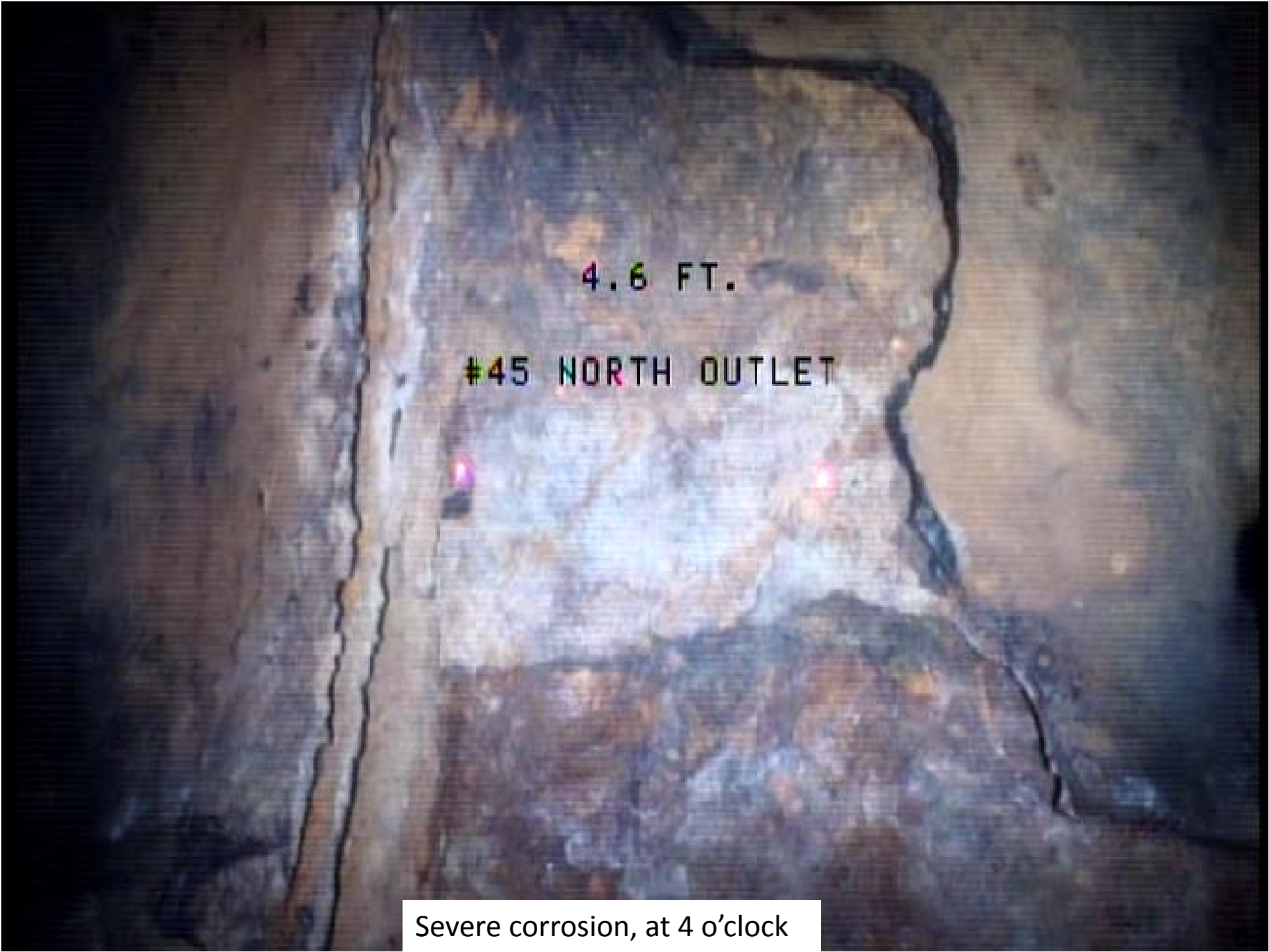
#44 MIDDLE OUTLET



Massillon, Ohio
Arch Avenue Pump Station
Pipe #45 (North Pipe)



Arch Ave. Pump Pipe #45 start



4.6 FT.

#45 NORTH OUTLET

Severe corrosion, at 4 o'clock



7.8 FT.

#45 NORTH OUTLET

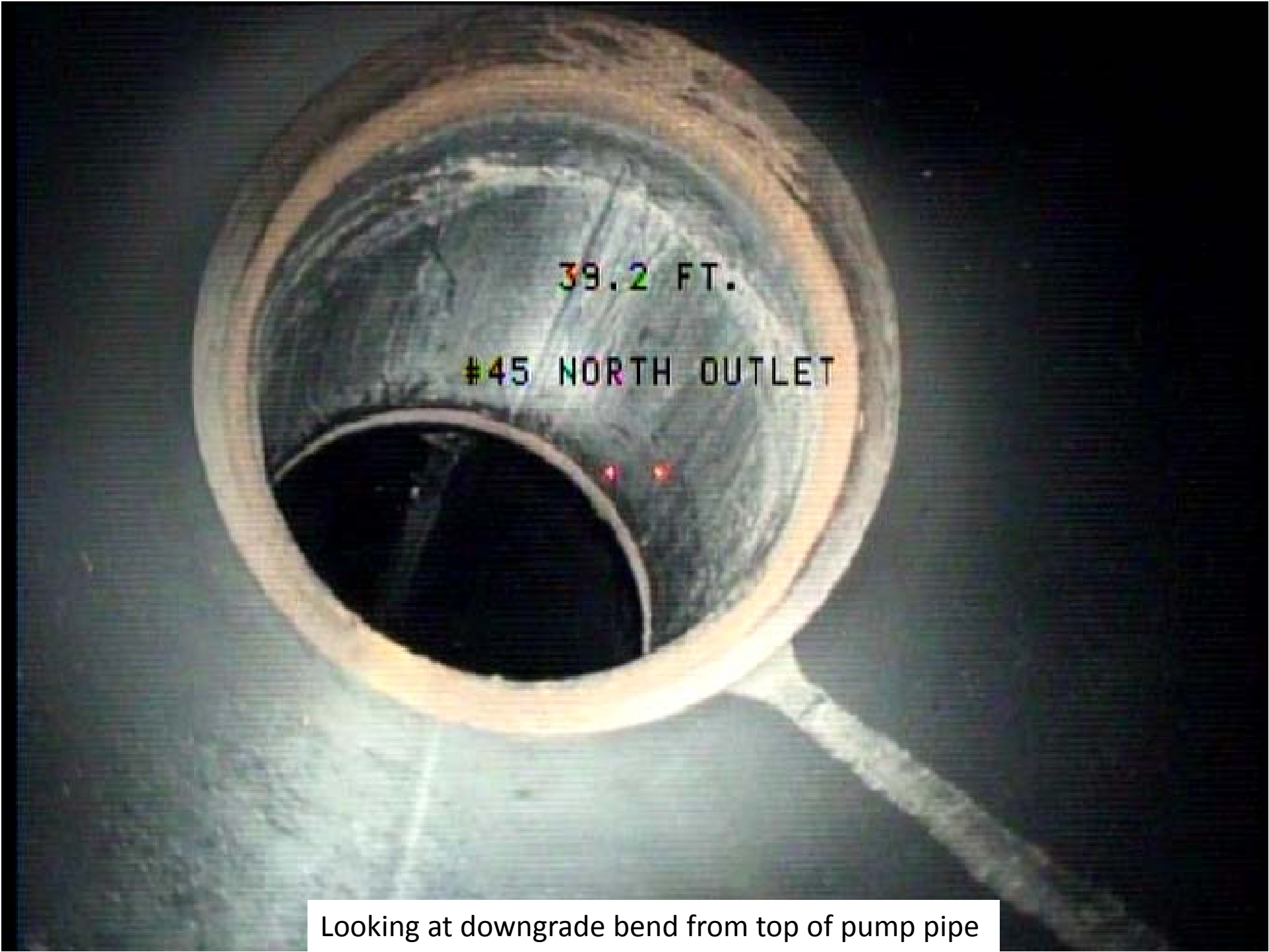
Moderate to severe corrosion at joint



24.9 FT.

#45 NORTH OUTLET

View upgrade



39.2 FT.

#45 NORTH OUTLET

Looking at downgrade bend from top of pump pipe

62.0 FT.

#45 NORTH OUTLET





72.0 FT.

#45 NORTH OUTLET

Severe corrosion at invert



75.8 FT.

#45 NORTH OUTLET

Severe corrosion, 3 o'clock



82.1 FT

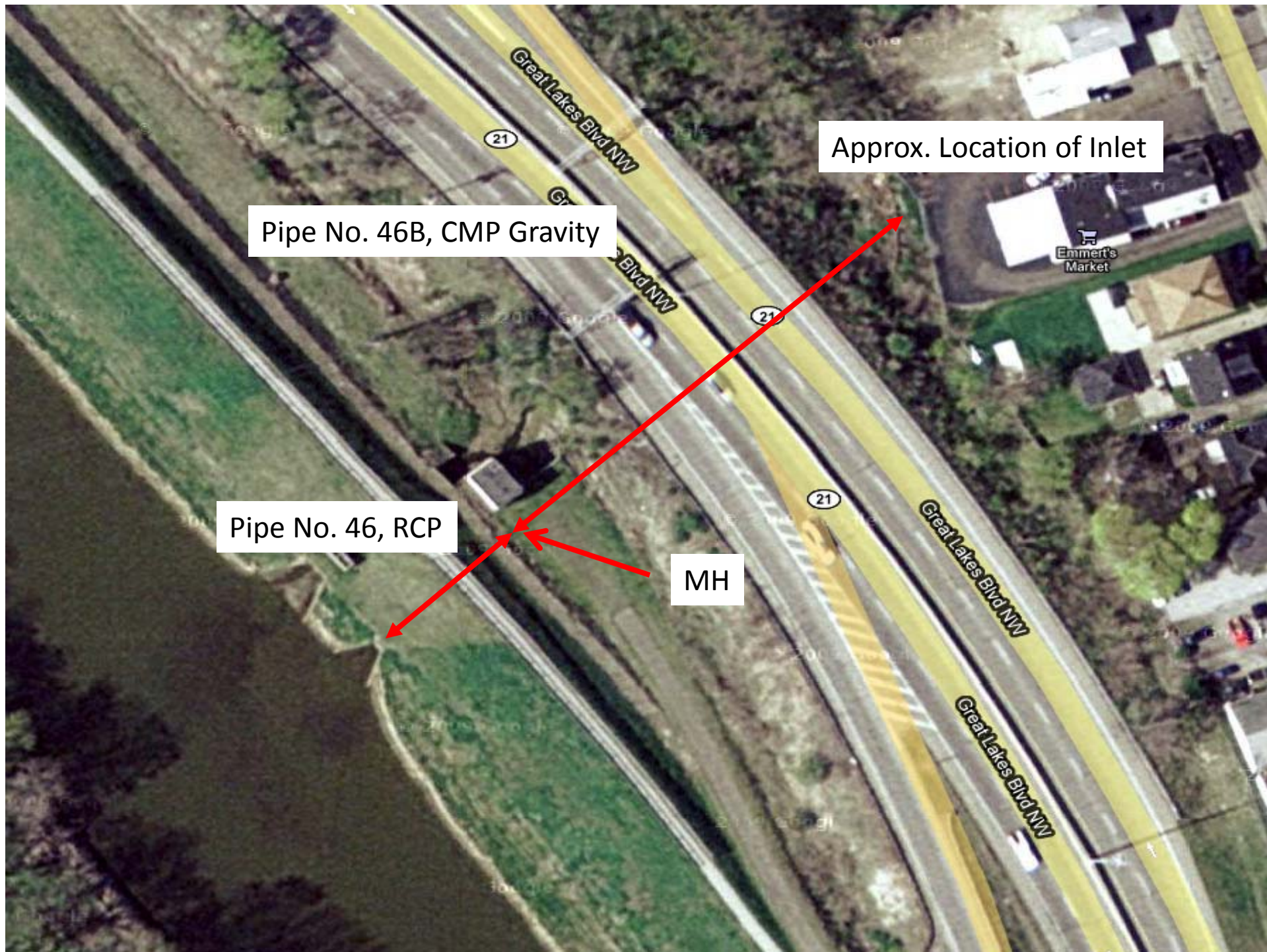
#45 NORTH OUTLET

Massillon, Ohio
Arch Avenue Gravity-RCP
Pipe #46
(MH downgrade through levee)



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Siphon-Conduit-Tuscarawas River



Approx. Location of Inlet

Pipe No. 46B, CMP Gravity

Pipe No. 46, RCP

MH

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Arch Avenue Pipe #46 PIPE SIZE: 48" LENGTH INSPECTED: 90 ft.

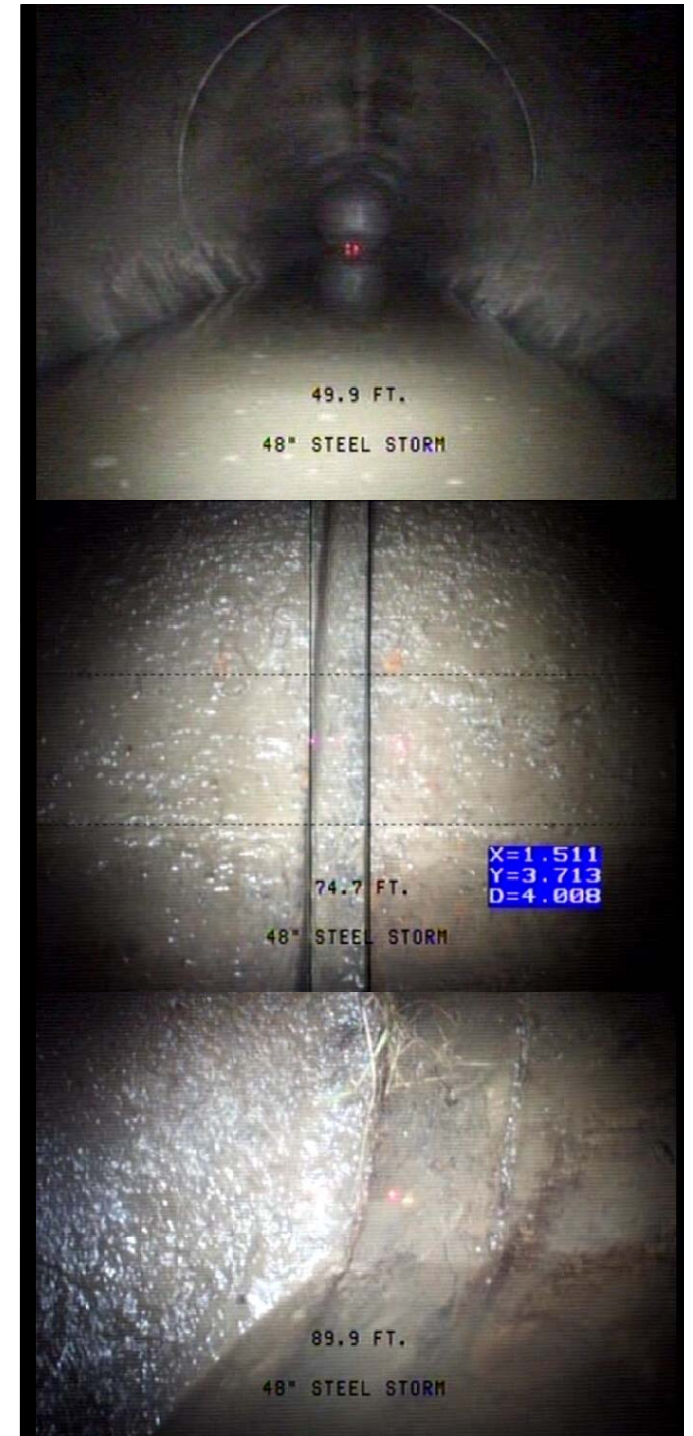
PROJECT: Massillon Levee TYPE: RCP INSPECTION DATE: 9/29/09

OVERALL CONDITION: NASSCO Rating 3: Moderate defects that will continue to deteriorate.

GENERAL INSPECTION FINDINGS: Some of the joints appear to be wider at the bottom, indicating the pipe may have settled some.

MAJOR DEFECTS

Arch Avenue Pipe #46 (MH to Gatewell/Outlet)	
Feet	Defect
0ft-90ft	Several joints appear to be wider at the bottom, indicating that the line has some slight settlement.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)		A There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



Storm Drain Outlet - #46

=== INSPECTION SETUP ===

SECTION: PROJECT#U91237-09-P-0133

09/29/09

ID: MASSILLON LEVEE

MH START: MH1 UPSTREAM

MH STOP: FLAP OUTLET

LOCATION: ARCH ST PUMP 102+60

PIPE: 48" STEEL

OPERATOR: KEVIN

TAPE ID: MASSILLON

START: 0+003

:

ONSCREEN:

48" STEEL STORM

Pipe #46 MH to outlet (flap)

Looking downstream toward gate

17.7 FT.

48 -inch RCP Storm





27.4 FT.

48 -inch RCP Storm



49.9 FT.

48 -inch RCP Storm



58.7 FT.

48 -inch RCP Storm



63.8 FT.

48 -inch RCP Storm

Joint looking at approx. 3o'clock (1.5" joint sep.)

74.7 FT.

X=1.511
Y=3.713
D=4.008

48 -inch RCP Storm

Looking at closed flap

78.9 FT.

48 -inch RCP Storm





Water coming in past flap at approx. 4o'clock

This is an underwater video showing a large, vertical, brownish pipe structure. A red arrow points to a specific location on the pipe where water is leaking. The water is dark and turbulent. The background is dark and murky. The text '89.9 FT.' is visible on the pipe, and '48 -inch RCP Storm' is written at the bottom.

89.9 FT.

48 -inch RCP Storm

Water coming in past flap at approx. 4o'clock

89.9 FT.

48 -inch RCP Storm





Water coming in past flap at approx. 7o'clock

This is an underground inspection photograph of a 48-inch RCP storm pipe. The pipe is surrounded by water, and a red arrow points to a specific location where water is entering past a flap at approximately 7 o'clock. The depth is marked as 89.9 FT. The image is dark and grainy, typical of an inspection video frame.

89.9 FT.

48 -inch RCP Storm



Arch Avenue Storm manhole upstream of levee

Massillon, Ohio
Arch Avenue Gravity-CMP
Pipe #46b
(From MH going upstream under road)

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY
PIPES UNDER LEVEES

PIPE NO: Arch Avenue Pipe #46b PIPE SIZE: 48" LENGTH INSPECTED: 317 ft.

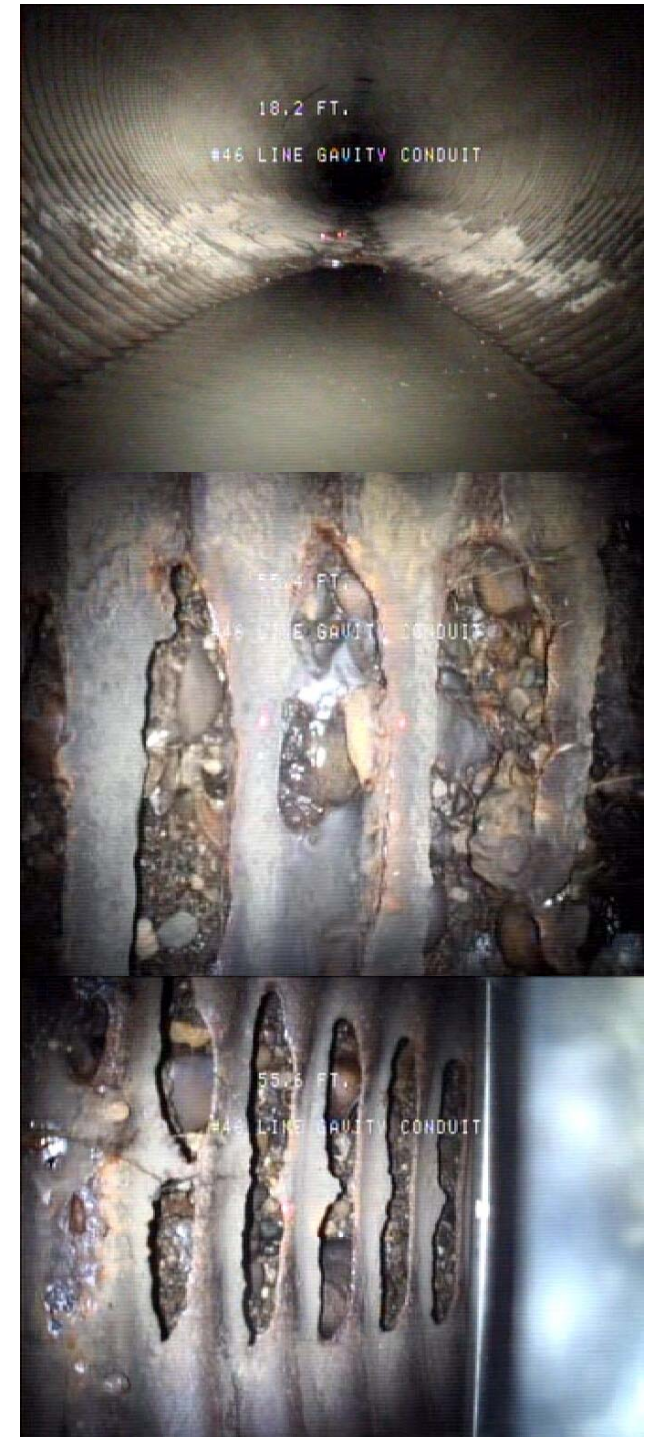
PROJECT: Massillon Levee TYPE: CMP INSPECTION DATE: 11/10/09

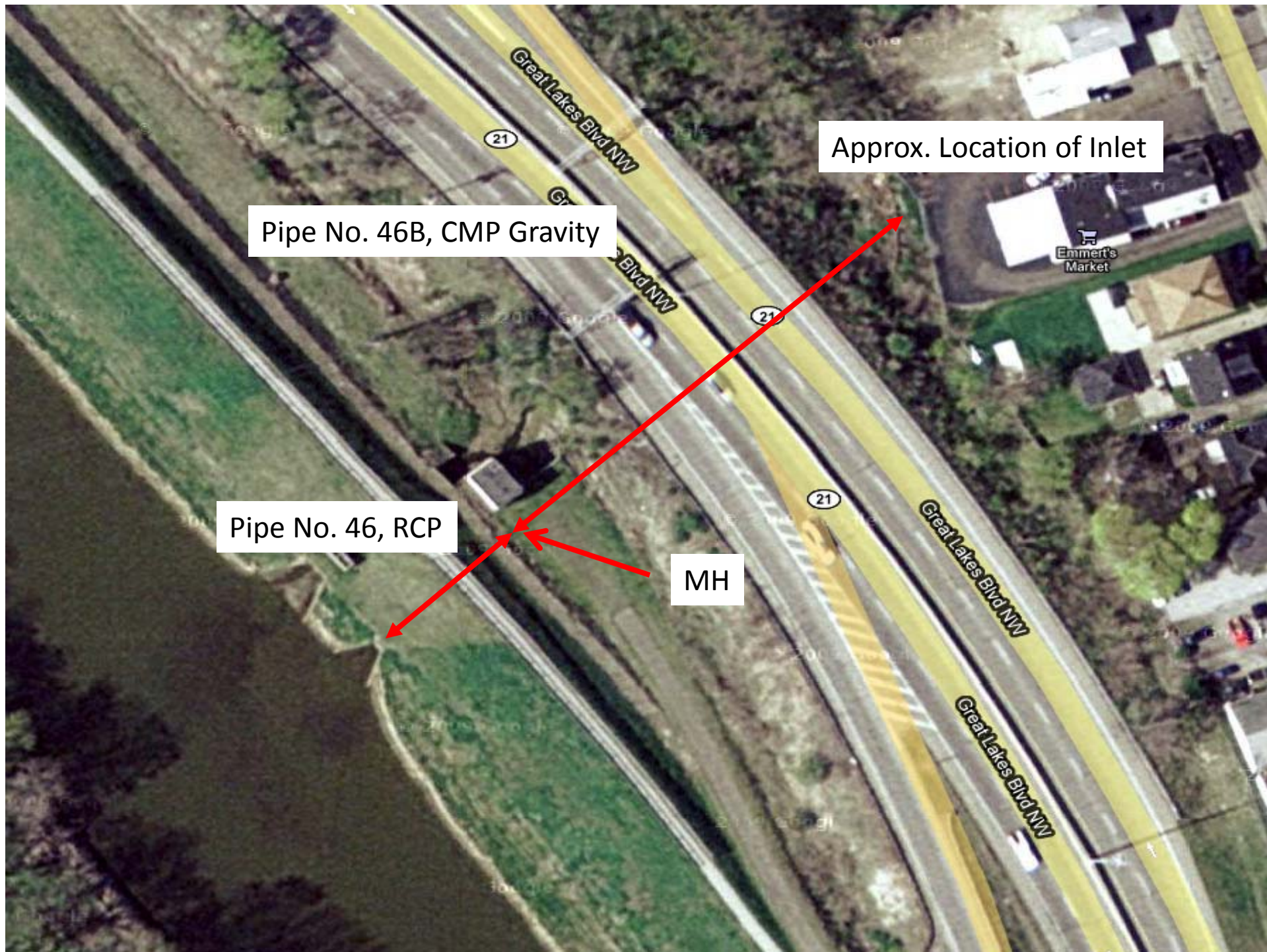
OVERALL CONDITION: NASSCO Rating 5: Pipe is failing, requires immediate attention.

GENERAL INSPECTION FINDINGS: Invert is missing in several areas, starting to deflect in areas.

MAJOR DEFECTS

Arch Avenue Pipe #46B (MH Upgrade)	
Feet	Defect
0ft-317ft	Invert is rusted completely through in several areas throughout the pipe, starting to deflect and buckle in areas.





Approx. Location of Inlet

Pipe No. 46B, CMP Gravity

Pipe No. 46, RCP

MH

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
8. Monolith Joints	A	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
	M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
	U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
	N/A	There are no monolith joints in the interior drainage system.	
9. Culverts/Discharge Pipes ¹	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

Interior Drainage System

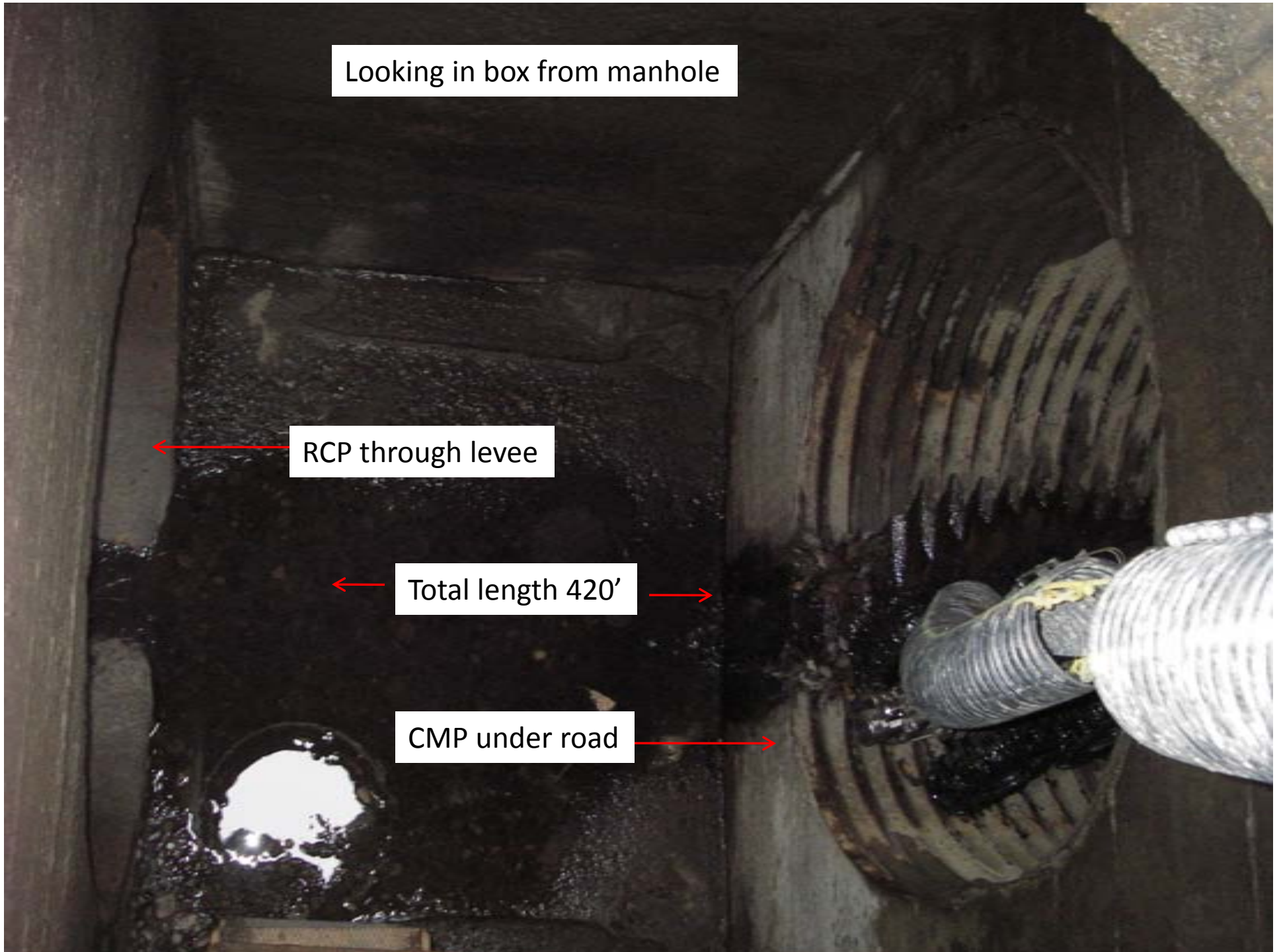


Looking in box from manhole

RCP through levee

Total length 420'

CMP under road





Entrance into MH/Box

INSPECTION SETUP ==

SECTION: V91237-89-P-0133

05/17/89

ID: ARCH AVE PUMP STATION

MH START: MH UPSTREAM

MH STOP: OUTLET DOWN

LOCATION: 102+90

PIPE: 48" STEEL CORN

OPERATOR: JOHN

TAPE ID: MASSILON

START: 0:00

PIPE GOING EAST UNDER RD.

ONSCREEN:

#46 LINE GRAVITY CONDUIT

Pipe #46b CMP upstream

2.8 FT.

#46 LINE GRAVITY CONDUIT





Looking upstream, Arch Ave. CMP (#46b)



Invert rusted out, entire length of pipe. Joint at 41 ft



Joint separated in crown,
crown flattened- 41ft



Separation of joint 2.5in- 52ft







18.2 FT.

#46 LINE GRAVITY CONDUIT

Looking at end of belly



28.0 FT.

#46 LINE GRAVITY CONDUIT

Invert severely corroded

43.7 FT.

#46 LINE GRAVITY CONDUIT





55.4ft invert rusted out



55.6ft

46 INCH 6040101T

55.6 FTH

#46 LINE SANDT CONDUIT

55.6ft



55.6ft invert rusted out



55.6 FT

645 LINE 2447 CONDUIT

55.6ft

90.1 FT.

#46 LINE GRAVITY CONDUIT

SPKR-
MIKE-----

MUTED \-----

Invert rusted through and heaved

92.9 FT.

48" CMP ARCH AVE GRAVITY CONDUIT



103.8

46 LINE 103.8 CONDUIT

103 ft



Pipe rusted through in valleys of corrugations

130.1 FT.

48" CMP ARCH AVE GRAVITY CONDUIT



Pipe rusted through in valleys of corrugations

157.3 FT.

48" CMP ARCH AVE GRAVITY CONDUIT

Pipe rusted through in valleys of corrugations

176.8 FT.

48" CMP ARCH AVE GRAVITY CONDUIT



Pipe rusted through in valleys of corrugations

130.1 FT.

48" CMP ARCH AVE GRAVITY CONDUIT

Pipe rusted through in valleys of corrugations



272.4 FT.

48" CMP ARCH AVE GRAVITY CONDUIT

Pipe rusted through in valleys of corrugations

274.7 FT.

18" CMP ARCH AVE GRAVITY CONDUIT



Pipe rusted through in valleys of corrugations

297.1 FT.

48" CMP ARCH AVE GRAVITY CONDUIT



Upstream MH

317.2 FT.

48" CMP ARCH AVE GRAVITY CONDUIT

Massillon, Ohio
Brookfield and Wooster
Sanitary Sewer Siphons



Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River



Brookfield Siphon inlet

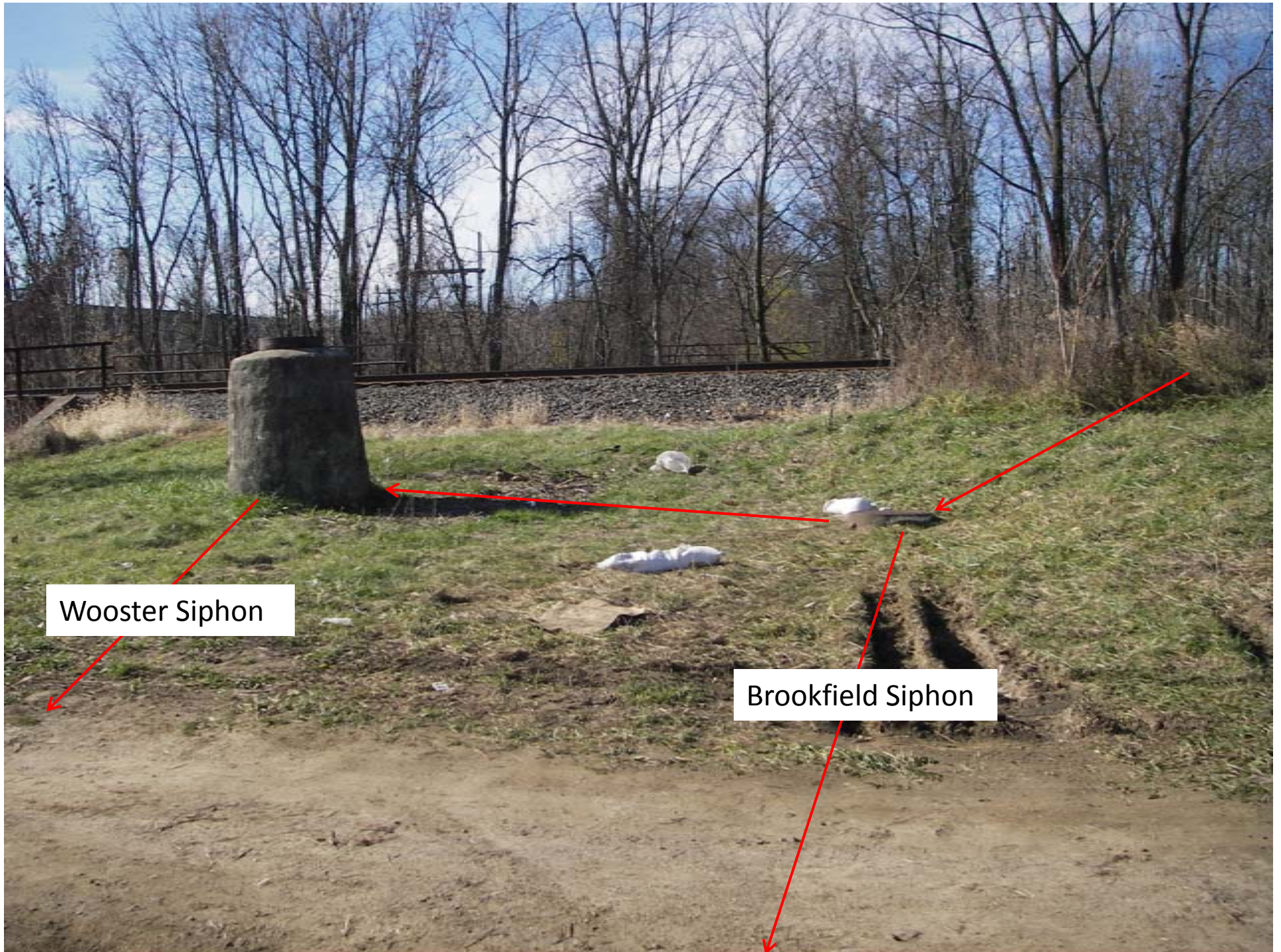
Wooster Siphon inlet



Inlet to Brookfield Siphon



Wooster inlet to siphon



Wooster Siphon

Brookfield Siphon



Manhole where flow was diverted



Flow diversion

Massillon, Ohio
Brookfield Sanitary Sewer Siphons
Pipe #47, 48, 49

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCP	120	Sippo Avenue Pump Station
38	24	CIP	5	Discharge from Sippo Avenue Pump Station
39	24	CIP	10	Discharge from Sippo Avenue Pump Station
40	24	CIP	20	Discharge from Sippo Avenue Pump Station
41	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River



Brookfield Sanitary Sewer Siphon outlet box

Massillon, Ohio
Brookfield Sanitary Sewer Siphon
Pipe #47, 24-inch DIP

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCP	120	Sippo Avenue Pump Station
38	24	CIP	5	Discharge from Sippo Avenue Pump Station
39	24	CIP	10	Discharge from Sippo Avenue Pump Station
40	24	CIP	20	Discharge from Sippo Avenue Pump Station
41	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCP	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

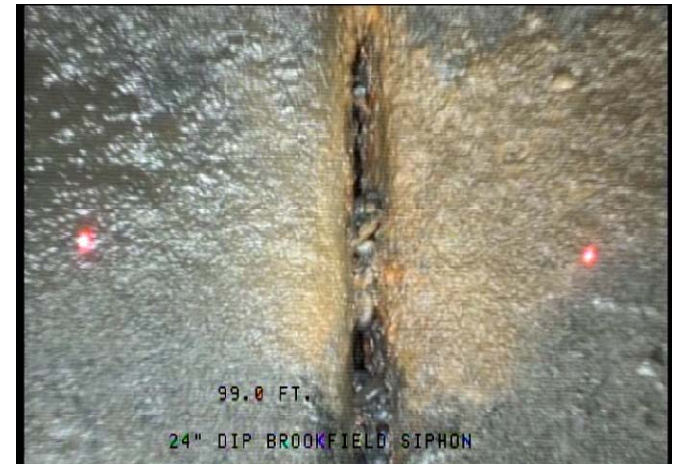
PIPE NO: Brookfield Siphon #47 PIPE SIZE: 24" LENGTH INSPECTED: 400ft
PROJECT: Massillon Levee TYPE: DIP INSPECTION DATE: 10/27/09

OVERALL CONDITION: NASSCO Grade 3: Moderate defects that will continue to deteriorate

GENERAL INSPECTION FINDING: Sheets of the liner coming off in several areas. Some corrosion noted in areas where coating was missing. No gate valves on inlet or outlet. Pipe slopes up on constant grade from inlet to outlet.

MAJOR DEFECTS

Brookfield Siphon 24"- Outlet	
Feet	Observation/Defect
10ft	Corroded joint at crown
28ft	Approx. 1" joint separation at 7 o'clock, Corroded joint in crown
45.6ft	Tear in lining at approx. 4o'clock
78.7ft	Lining peeling away from pipe walls at haunches
99ft	Rust coming from joint at crown
134.7ft	Rusting of joint at crown
146.8ft	Large piece of lining detached from pipe wall
170.5ft	Minor joint corrosion at crown
200.7ft	Lining peeling away from pipe wall along joint
241.7ft	Minor joint separation at approx. 4 o'clock
273.6ft	Lining peeling away from pipe walls at invert
277.1ft	Corrosion of joint/ small tear in lining
330.5ft	Minor joint separation >1/2"



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

=== INSPECTION SETUP ===

SECTION: PRO NO. W91237-09-P-0133

10/27/09

ID: MASSILLON OHIOANSAS

MH START: BROOKFIELD-UPSTREAM

MH STOP: BROOKFIELD-DOWNSTREAM

LOCATION: BROOKFIELD SIPHON 24"

PIPE: 24" SANITARY DIP?

OPERATOR: KEVIN

TAPE ID: MASS. SIPHON

START: 0:00

:

ONSCREEN:

24" DIP BROOKFIELD SIPHON

*Pipe video inspected from outlet to inlet

Brookfield Siphon-24" outlet





28.0 FT.

24" DIP BROOKFIELD SIPHON

28ft – 7o'clock

SPKR-
MIKE-----

MUTED

22.5 FT.

24" DIP BROOKFIELD SIPHON

22.5ft looking towards inlet



28.0 FT.

24" DIP BROOKFIELD SIPHON

28.0 ft corrosion in joint at crown



45.6 FT.

24" DIP BROOKFIELD SIPHON

Tear in lining 4o'clock

An underwater video frame showing a dark, murky environment. A vertical, textured structure, likely a siphon lining, runs down the left side. A bright, yellowish light source illuminates a section of the lining, revealing a tear. A small, bright pinkish-red light is visible to the right of the tear. The overall scene is dimly lit with a greenish-blue tint.

45.6 FT.

24" DIP BROOKFIELD SIPHON

Tear in lining 4o'clock 45.6ft



78.8 FT.

24" DIP BROOKFIELD SIPHON

Lining peeling away from pipe walls at haunches 78.7ft



99.0 FT.

24" DIP BROOKFIELD SIPHON

Possible open joint in left haunch at 99ft



134.7 FT.

24" DIP BROOKFIELD SIPHON

Corrosion in joint 134.7ft



146.8 FT.

This is an underwater photograph showing a large, curved, and detached piece of pipe lining. The piece is dark and appears to be made of a flexible material, possibly rubber or plastic. It is positioned in the center of the frame, with a bright light source illuminating it from below. The background is dark and murky, suggesting an underwater environment. The text '146.8 FT.' is overlaid on the image, indicating the depth at which the photo was taken.

24" DIP BROOKFIELD SIPHON

This text is overlaid on the image, providing information about the location and type of the siphon. '24" DIP' likely refers to the diameter of the pipe, and 'BROOKFIELD SIPHON' identifies the specific structure. The text is in a bold, sans-serif font and is colored in a mix of blue and red.

Large piece of lining detached from pipe wall-146.8ft

This text is a caption for the image, describing the main subject. It is written in a simple, black, sans-serif font and is located at the bottom of the image.



Lining detached from pipe wall at joint-149.2ft



170.5 FT.

The photograph shows a vertical concrete joint in a structure, likely a siphon. The concrete is dark and textured. A vertical line runs down the center, representing the joint. There are significant orange and yellow deposits, likely rust or corrosion, concentrated along the joint and on the surrounding concrete. Two red laser pointers are visible, one on the left and one on the right, illuminating the joint area. The overall lighting is dim, typical of an underwater inspection.

24" DIP BROOKFIELD SIPHON

Moderate to severe corrosion at joint-right haunch-170.5ft



170.5 FT.

24" DIP BROOKFIELD SIPHON

Moderate corrosion in joint-crown-170.5ft



200.7 FT.

24" DIP BROOKFIELD SIPHON

Lining detached from pipe wall at joint-200.7ft



241.7 FT.

24" DIP BROOKFIELD SIPHON

Minor joint separation 4o'clock-241.7ft



273.6 FT.

24" DIP BROOKFIELD SIPHON

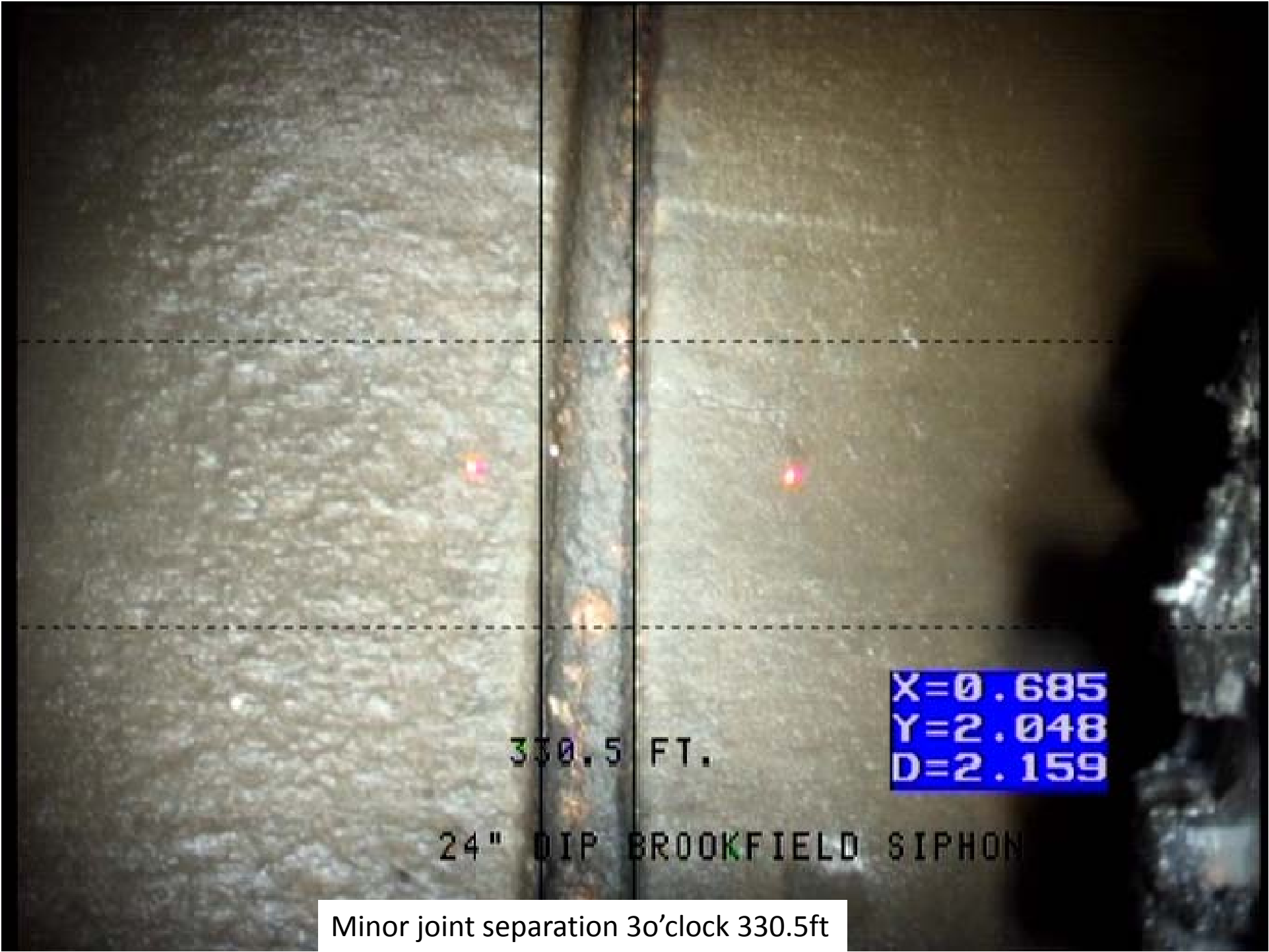
Lining peeling away from pipe wall-invert-273.6ft



277.1 FT.

24" DIP BROOKFIELD SIPHON

Corrosion of joint right haunch-277.1ft

A photograph of a concrete pipe joint. A vertical crack runs down the center of the pipe. Two red laser points are visible on the pipe surface, one on each side of the crack. A vertical line and two horizontal dashed lines are overlaid on the image for measurement purposes.

330.5 FT.

X=0.685
Y=2.048
D=2.159

24" DIP BROOKFIELD SIPHON

Minor joint separation 3o'clock 330.5ft



400.8 FT.

24" DIP BROOKFIELD SIPHON

Looking at end of run at inlet of siphon.

Massillon, Ohio
Brookfield Sanitary Sewer Siphon
Pipe #48, 14-inch DIP

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

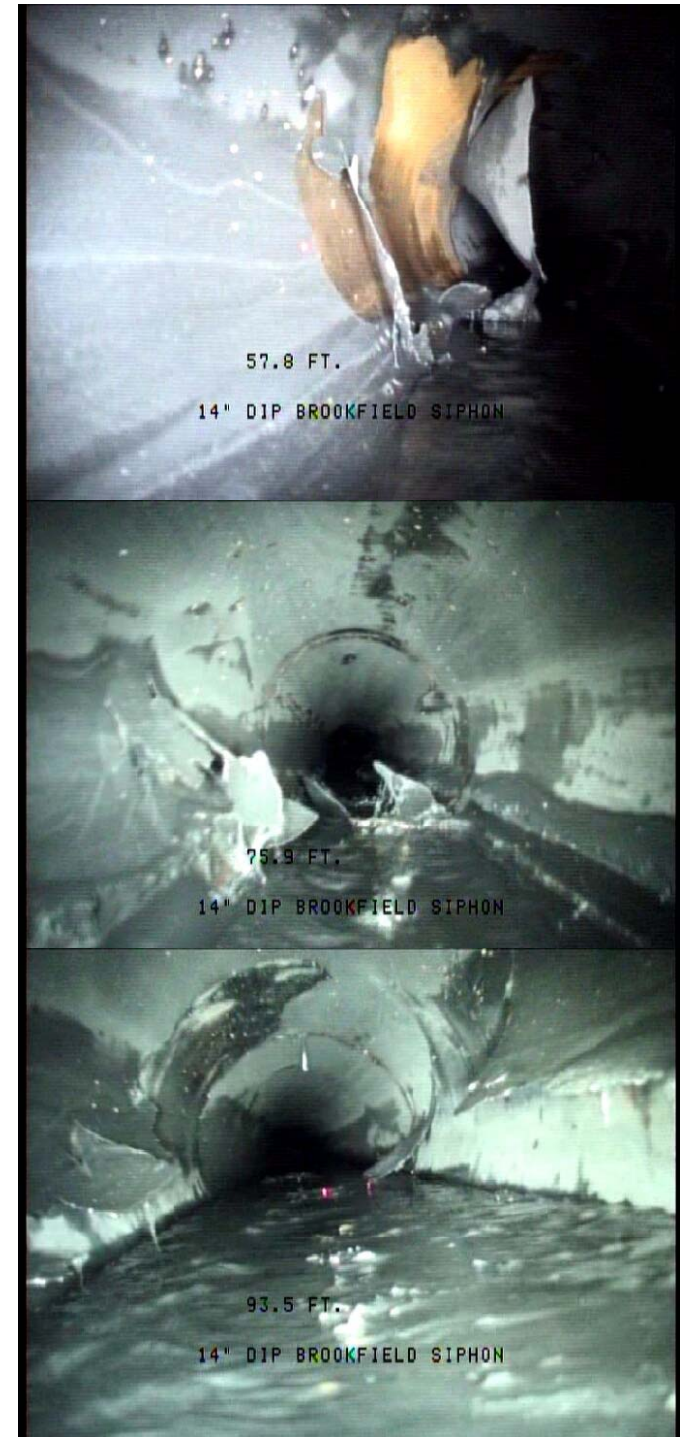
PIPE NO: Brookfield Siphon #48 PIPE SIZE: 14" LENGTH INSPECTED: 93ft
PROJECT: Massillon Levee TYPE: DIP INSPECTION DATE: 11/09/09

OVERALL CONDITION: NASSCO Grade 3: Moderate defects that will continue to deteriorate

GENERAL INSPECTION FINDING: Large sections of protective coating coming off in several areas.
No gate valves on inlet or outlet. Pipe slopes up on constant grade from inlet to outlet.

MAJOR DEFECTS

Brookfield Siphon 14" – Outlet	
Feet	Remarks/Defects
58ft	Large sections of protective coating coming off
75ft	Protective coating coming off
78ft	Protective coating coming off
93ft	Protective coating coming off
93ft	Debris level to high to continue, inspection discontinued.



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)		A There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.



View from outlet



13.0 FT.

14" DIP BROOKFIELD SIPHON

Going towards inlet



29.7 FT.

This is an underwater photograph taken from inside a siphon. The view is looking down the length of the structure. The walls of the siphon are dark and appear to be made of a rough material, possibly concrete or stone. The water is dark and murky. In the center of the frame, there is a bright, white, cylindrical object that appears to be a piece of equipment or a light source. The floor of the siphon is covered in a layer of sediment, which is visible as a lighter, textured area at the bottom of the frame.

14" DIP BROOKFIELD SIPHON

Sediment in invert

An underwater photograph showing the interior of a siphon. The top half of the image is dominated by a large, dark, curved structure with concentric, ribbed patterns, likely the siphon's lining. Below this, the floor is covered in light-colored, silty sediment. A bright light source, possibly a diver's flashlight, illuminates a patch of sediment in the center. Overlaid on the image is a depth reading and a label.

34.4 FT.

14" DIP BROOKFIELD SIPHON

Sediment in invert



42.7 FT.

14" DIP BROOKFIELD SIPHON



55.3 FT.

14" DIP BROOKFIELD SIPHON

Protecting coating coming off



57.8 FT.

The image shows an underwater scene with a siphon structure. A bright orange protective coating is visible on parts of the siphon, which is peeling and flaking off, revealing a greyish-white material underneath. The background is dark and murky, with some light reflecting off particles in the water.

14" DIP BROOKFIELD SIPHON

Protecting coating coming off

An underwater photograph showing a large, dark, cylindrical siphon structure. The surface of the siphon is heavily corroded, with a white, flaking protective coating peeling away in several areas. The surrounding water is murky and greenish. A diver's arm and part of a white protective suit are visible on the left side of the frame, reaching towards the siphon. The overall scene depicts significant structural degradation of the underwater infrastructure.

75.9 FT.

14" DIP BROOKFIELD SIPHON

Protecting coating coming off



78.8 FT.

14" DIP BROOKFIELD SIPHON

Protecting coating coming off



93.5 FT.

The image is an underwater photograph showing a large, dark, cylindrical pipe structure. The pipe has a lighter-colored, possibly metallic or painted, section in the center. The surrounding water is murky and filled with various pieces of debris, including what looks like plastic and other unidentifiable objects. A diver is visible near the pipe, and the overall scene suggests a deep-sea inspection or maintenance operation.

14" DIP BROOKFIELD SIPHON

Protecting coating coming off, inspection stopped due to debris and water level

Massillon, Ohio
Brookfield Sanitary Sewer Siphon
Pipe #49, 20-inch DIP

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

PIPE NO: Brookfield Siphon #49 PIPE SIZE: 20" LENGTH INSPECTED: 216ft
PROJECT: Massillon Levee TYPE: DIP INSPECTION DATE: 11/09/09

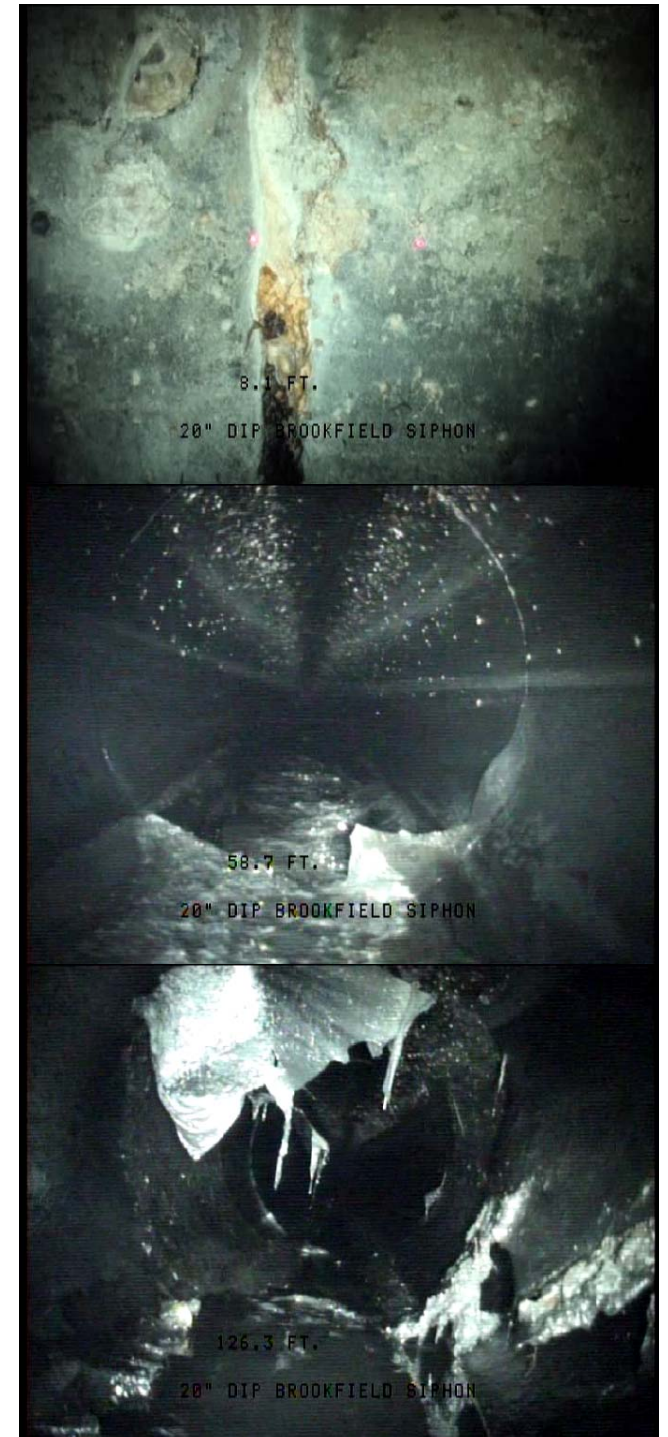
OVERALL CONDITION: NASSCO Grade 3: Moderate defects that will continue to deteriorate

GENERAL INSPECTION FINDING: Minor rust at joints, large sections of protective coating coming off in several areas. Not gate valves on inlet or outlet. Pipe slopes up on constant grade from inlet to outlet.

MAJOR DEFECTS

Brookfield Siphon 20" - Outlet	
Feet	Observation/Defect
8.1ft	Minor rusting of joint at crown
37.9ft	Lining missing from pipe walls
58.7ft	Lining peeling away from invert of pipe
94.9ft	Small piece of lining starting to peel away from right wall
126.3ft	Large section of damaged lining
165.3ft	Lining peeling from left haunch
216.9ft	Pipe becomes full of debris

*Inspected from outlet to inlet



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

=== INSPECTION SETUP ===

SECTION: PRO NO. W91237-09-P-0133

10/28/09

ID: MASSILLON OHIO ANSAS

MH START: BROOKFIELD-UPSTREAM

MH STOP: BROOKFIELD-DOWNSTREAM

LOCATION: BROOKFIELD SIPHON 20"

PIPE: 20" SANITARY DIP?

OPERATOR: KELLY

TARE: 10.000 SIPHON

STARTED: 10:00

:

ONSCREEN:

20" DIP BROOKFIELD SIPHON

Brookfield Siphon 20"-outlet

Possible open joint in crown-8.1ft

8.1 FT.

20" DIP BROOKFIELD SIPHON



37.9 FT.

20" DIP BROOKFIELD SIPHON

Lining missing from pipe wall-37.9ft



58.7 FT.

This is an underwater photograph taken from inside a large-diameter pipe. The water is dark and murky. In the center, a bright light source, likely a diver's lamp, illuminates a section of the pipe's interior. The lining of the pipe is visible and appears to be peeling or flaking away from the invert (bottom) of the pipe. The overall scene is dimly lit, with the primary light source creating a strong contrast and highlighting the texture of the peeling lining.

20" DIP BROOKFIELD SIPHON

Lining peeling from invert of pipe-58.7ft

Coating coming off at joint

94.9 FT.

20" DIP BROOKFIELD SIPHON



122.2 FT.

This is an underwater photograph showing a large, irregularly shaped piece of white, damaged material, likely a siphon lining, suspended in a dark, murky water environment. The material appears to be torn and fragmented. The background is dark and indistinct, suggesting an underwater setting. The text '122.2 FT.' is overlaid on the image, indicating the depth of the scene.

20" DIP BROOKFIELD SIPHON

Large section of damaged lining 122.2ft



126.3 FT.

20" DIP BROOKFIELD SIPHON

Large section of lining damaged-126.3ft

An underwater video frame showing a siphon structure. A bright, irregularly shaped object, likely the siphon, is visible on the left side of the frame. The background is dark and murky. A curved, light-colored line, possibly a pipe or structure, is visible on the right side of the frame. Text is overlaid on the bottom of the frame.

165.3 FT.

20" DIP BROOKFIELD SIPHON

Lining peeling from left haunch 165.3ft

216.9 FT.

20" DIP BROOKFIELD SIPHON

Pipe becoming too full to continue

Massillon, Ohio
Wooster Siphons
Pipe #50, 51, 52

Gate valve in pipe 51 and 52 were
frozen mid way, pipes could not be inspected.

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River



Wooster Siphon Gate valve



Cleaning of Wooster Siphon
At Outlet





Ladders rusted out in Wooster outlet box

Massillon, Ohio
Wooster Sanitary Sewer Siphons
Pipe #50, 18" DIP

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
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38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
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46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

PIPE NO: Wooster Siphon #50 PIPE SIZE: 18" LENGTH INSPECTED: 108ft
PROJECT: Massillon Levee TYPE: DIP INSPECTION DATE: 11/11/09

OVERALL CONDITION: NASSCO Grade 4: Severe defects that will become grade 5 in the near future.

GENERAL INSPECTION FINDING: Pipe is severely corroded above the waterline. Gate valve severely corroded. Was very difficult to move.

MAJOR DEFECTS

Wooster Siphon 18" - Outlet	
Feet	Observation/Defect
2.0ft	Broken bell at crown
3.5ft	Severely corroded out gate valve
3.5ft-108ft	Pipe above water line is severely corroded
7.5ft	Joint separation 1.75-inches
20.0ft	Joint separation approximately 1.75-inches
108ft	Vertical offset at joint in crown viewable from 108 ft.
108ft	Inspection discontinued



Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
11. Culverts/ Discharge Pipes ¹ (This item includes both concrete and corrugated metal pipes.)	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
	U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/11/09

ID: MASSILLON SIPHON WOOSTER

MH START: 18" WOOSTER OUTLET

MH STOP: 18" WOOSTER INLET

LOCATION: WOOSTER SIPHON 18"

PIPE: 18" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON OH,

START: 0:00

:

DNSCREEN:

18" DIP WOOSTER SIPHON #50







3.5 FT.

18" DIP HOOPER SIPHON #50

3.5ft looking up at severely corroded gate valve





Possible pin holing through pipe wall





12.4ft looking down barrel severe corrosion above waterline



12.4ft looking down grade/towards inlet, severe corrosion above waterline



20.8 ft. approximately 1.75" joint separation







Severe corrosion in crown

44.9 FT.

18" DIP UDOSTER SIPHON #50



80.4 FT.

The image shows an underwater scene. At the top, there is a large, irregularly shaped rock formation or ceiling, illuminated by a bright light source, possibly a diver's flashlight. Below this, the water is dark and murky. In the center, there is a dark, vertical structure that appears to be a siphon or a pipe. The overall environment is dimly lit, with some light reflecting off the water surface and the rock ceiling.

18" DIP WOOSTER SIPHON #50

80.4ft water beginning to back up



85.0 FT.

18" DIP WOOSTER SIPHON #50

Severe corrosion in crown



Massillon, Ohio
Wooster Siphons
Pipe #51 and 52
10" and 15" DIP

Pipes could not be inspected due to the gate valves being froze mid way.

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
29	30	CIP	100	Discharge from James Avenue Pump Station
30	30	CIP	100	Discharge from James Avenue Pump Station
31	30	CIP	100	Discharge from James Avenue Pump Station
32	60	RCP	135	Federal Avenue Pump Station Outlet
33	60	RCP	135	Federal Avenue Pump Station Outlet
34	30	CIP	141	Discharge from Federal Avenue Pump Station
35	30	CIP	141	Discharge from Federal Avenue Pump Station
36	30	CIP	141	Discharge from Federal Avenue Pump Station
37	15'X10'	RCB	120	Sippo Creek Pump Station
38	24	CIP	5	Discharge from Sippo Creek Pump Station
39	24	CIP	10	Discharge from Sippo Creek Pump Station
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41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
46b	48	CMP	317	Gravity Conduit MH upstream of Levee
47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

PIPE NO: Wooster Siphon #51-52 PIPE SIZE: 10-15" LENGTH INSPECTED: 0ft
PROJECT: Massillon Levee TYPE: DIP INSPECTION DATE: 11/11/09
OVERALL CONDITION: NASSCO Grade 5: Gate valves frozen

GENERAL INSPECTION FINDING: Gate valves were frozen, pipe 50 showed signs of severe corrosion above water line.

MAJOR DEFECTS

Wooster Siphon Pipe No. 51 and 52	
Feet	Observation/Defect
0.0	Gate valves frozen, could not be moved



Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
17. Intake and Discharge Pipelines	A	Intake and discharge pipelines have no corrosion and paint is intact, except for minor touch up required. Pipe couplings and anchors have no leakage or corrosion.	
	M	Intake and discharge pipelines have minor corrosion and repair and painting is required. Pipe coupling with anchors have minor leakage, corrosion and require bolts to be tightened.	
	U	Intake and discharge pipelines have major corrosion and replacement is required. Pipe coupling with anchors have major leakage and is heavily corroded and requires replacement.	
18. Sluice/ Slide Gates ¹	A	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
	M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
	U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
	N/A	There are no sluice/ slide gates.	
19. Flap Gates/ Flap Valves/ Pinch Valves ²	A	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
	M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
	U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
	N/A	There are no gates on discharge lines from pump station.	
20. Cranes ²	A	Cranes operational and have been inspected and load tested in accordance with applicable standards within the last year. Documentation is on hand.	
	M	Cranes have not been inspected or operationally tested within the past year, or there are visible signs of corrosion, oil leakage, etc, requiring maintenance.	
	U	Cranes are not operational, and this may prevent the pump station from functioning as required. No documentation available on cranes.	
	N/A	There are no cranes.	
21. Other Metallic Items (Equipment, Ladders, Platform, Anchors, etc)	A	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
	M	Corrosion seen on metallic parts appears to be maintainable.	
	U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
	N/A	There are no other significant metallic items.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

² Proper operation of this item must be demonstrated during the inspection.

Massillon, Ohio
Tuscarawas Sanitary Sewer Siphon
Pipe #53 and 54



Imagery Date: Apr 18, 2006

Image © 2009 DigitalGlobe
40°47'34.00" N 81°31'35.28" W elev. 282 m

©2009 Google

Eye alt 643 m

Pipes Inspected, Massillon Levee

Pipes	Size (Inches)	Material	Length (Feet)	Location
23	18	RCP	103	West of RR with Flap Gate
24	12	RCP?	175	Could not locate/unknown/does not exist
25	42	RCP	95	Culvert through West Bank Levee opposite of Croose Avenue
26	66	RCP	93	Culvert through East Bank Levee near control weir
27	42	RCP	360	At inlet to siphon control weir
28	48	RCP	97	James Avenue Pump Station Gravity Outlet
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33	60	RCP	135	Federal Avenue Pump Station Outlet
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39	24	CIP	10	Discharge from Sippo Creek Pump Station
40	24	CIP	20	Discharge from Sippo Creek Pump Station
41	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
42	6'X6'	RCB	87	Gravity Arch Avenue Pump Station
43	24	CIP	85	Discharge from Arch Avenue Pump Station
44	24	CIP	85	Discharge from Arch Avenue Pump Station
45	24	CIP	85	Discharge from Arch Avenue Pump Station
46	48	RCP	90	Gravity Conduit through levee
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47	24	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
48	14	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
49	20	DIP	460	Sanitary Siphon-Conduit-Brookfield Interceptor
50	18	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk
51	10	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
52	15	DIP	460	Sanitary Siphon-Conduit-Wooster Trunk (Could not be inspected)
53	8	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River
54	10	VCP	450	Sanitary Siphon-Conduit-Tuscarawas River

Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
17. Intake and Discharge Pipelines	A	Intake and discharge pipelines have no corrosion and paint is intact, except for minor touch up required. Pipe couplings and anchors have no leakage or corrosion.	
	M	Intake and discharge pipelines have minor corrosion and repair and painting is required. Pipe coupling with anchors have minor leakage, corrosion and require bolts to be tightened.	
	U	Intake and discharge pipelines have major corrosion and replacement is required. Pipe coupling with anchors have major leakage and is heavily corroded and requires replacement.	
18. Sluice/ Slide Gates ¹	A	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
	M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
	U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
	N/A	There are no sluice/ slide gates.	
19. Flap Gates/ Flap Valves/ Pinch Valves ²	A	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
	M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
	U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
	N/A	There are no gates on discharge lines from pump station.	
20. Cranes ²	A	Cranes operational and have been inspected and load tested in accordance with applicable standards within the last year. Documentation is on hand.	
	M	Cranes have not been inspected or operationally tested within the past year, or there are visible signs of corrosion, oil leakage, etc, requiring maintenance.	
	U	Cranes are not operational, and this may prevent the pump station from functioning as required. No documentation available on cranes.	
	N/A	There are no cranes.	
21. Other Metallic Items (Equipment, Ladders, Platform, Anchors, etc)	A	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
	M	Corrosion seen on metallic parts appears to be maintainable.	
	U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
	N/A	There are no other significant metallic items.	

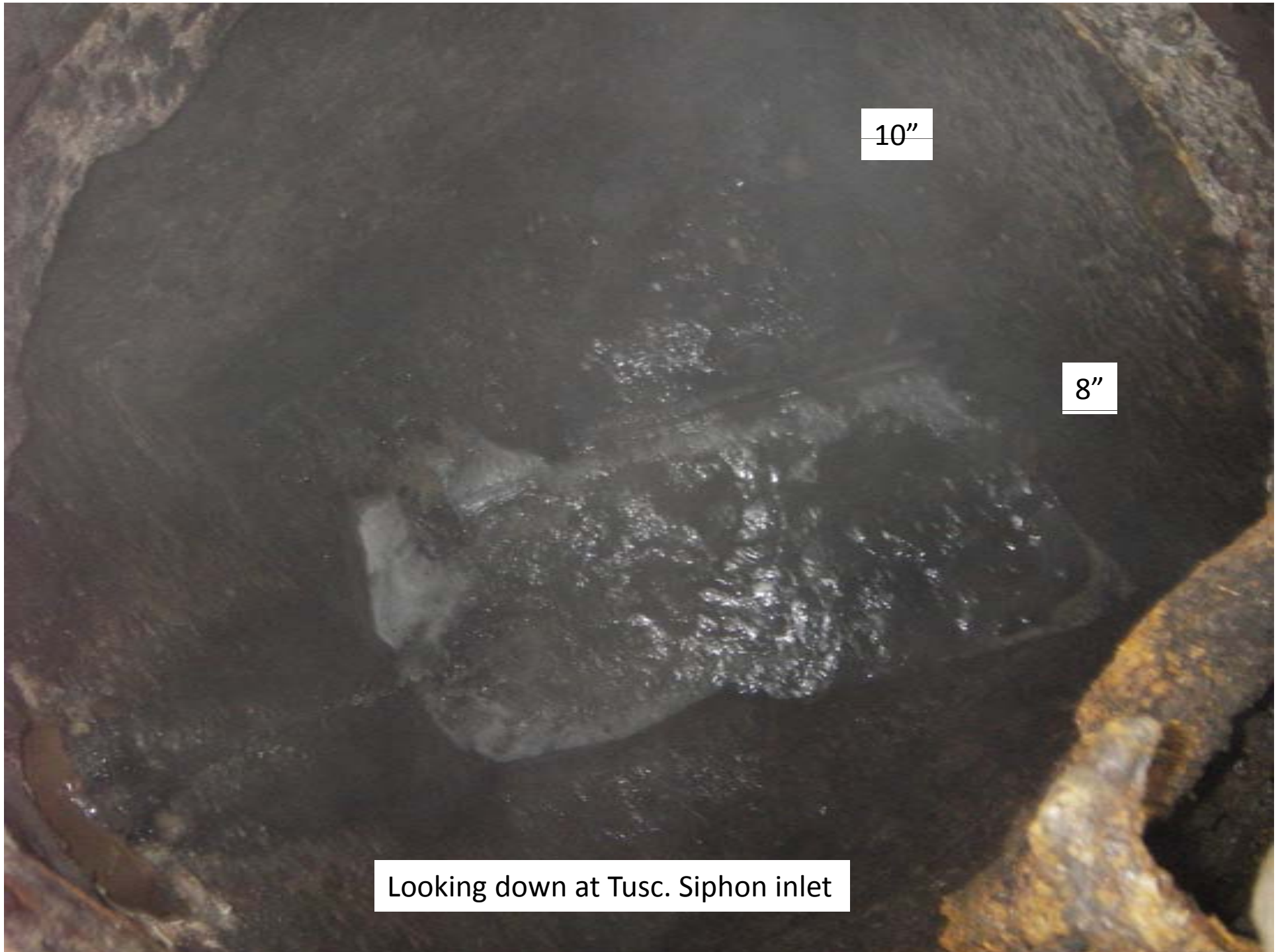
Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

² Proper operation of this item must be demonstrated during the inspection.

Siphon at Tuscarawas River- Inlet





Looking down at Tusc. Siphon inlet



Board used to divert flow/ Rotted out at bottom



Inlet overflow pipe. Approx. 15' above bottom of box



Tuscarawas Sanitary Sewer Siphon Outlet Box



Broken Gates/Valves

Tuscarawas Sanitary Sewer Siphon Outlet Box





Broken Gates/Valves



Broken valve key at Tuscarawas Siphon Outlet

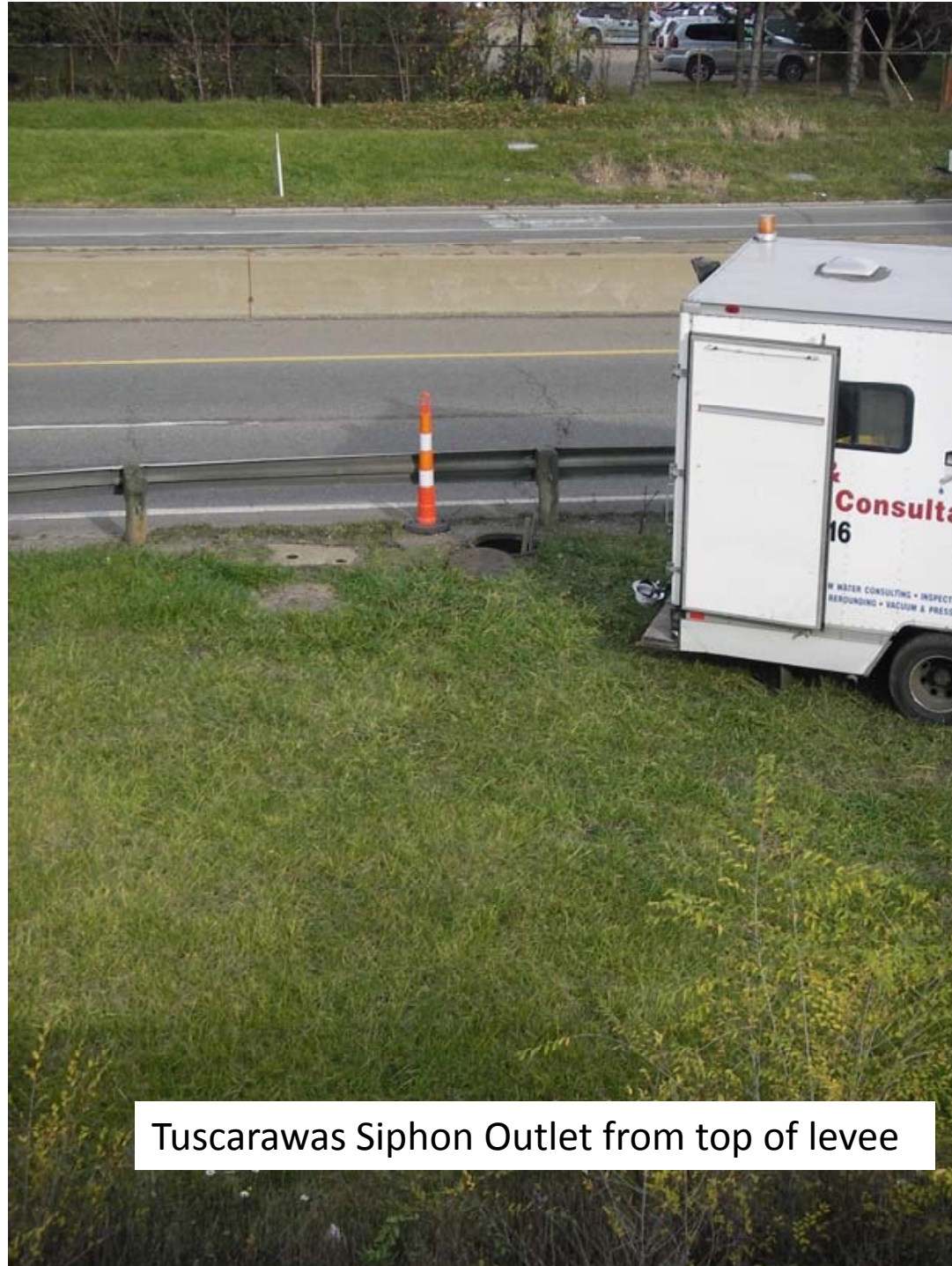




Tusc. Outlet Box manhole

Tuscarawas Sanitary Siphon Inlet





Siphon Outlets

8"

10"





Outlet End

Outlet End, 10-inch, Pipe No. 54





10"

8"

Tusc. Siphon Outlet Box

Massillon, Ohio
Tuscarawas Sanitary Sewer Siphon
Pipe #53, 8-inch VCP

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

PIPE NO: Tuscarawas Siphon #53 PIPE SIZE: 8" LENGTH INSPECTED: 5ft
 PROJECT: Massillon Levee TYPE: VCP INSPECTION DATE: 11/11/09

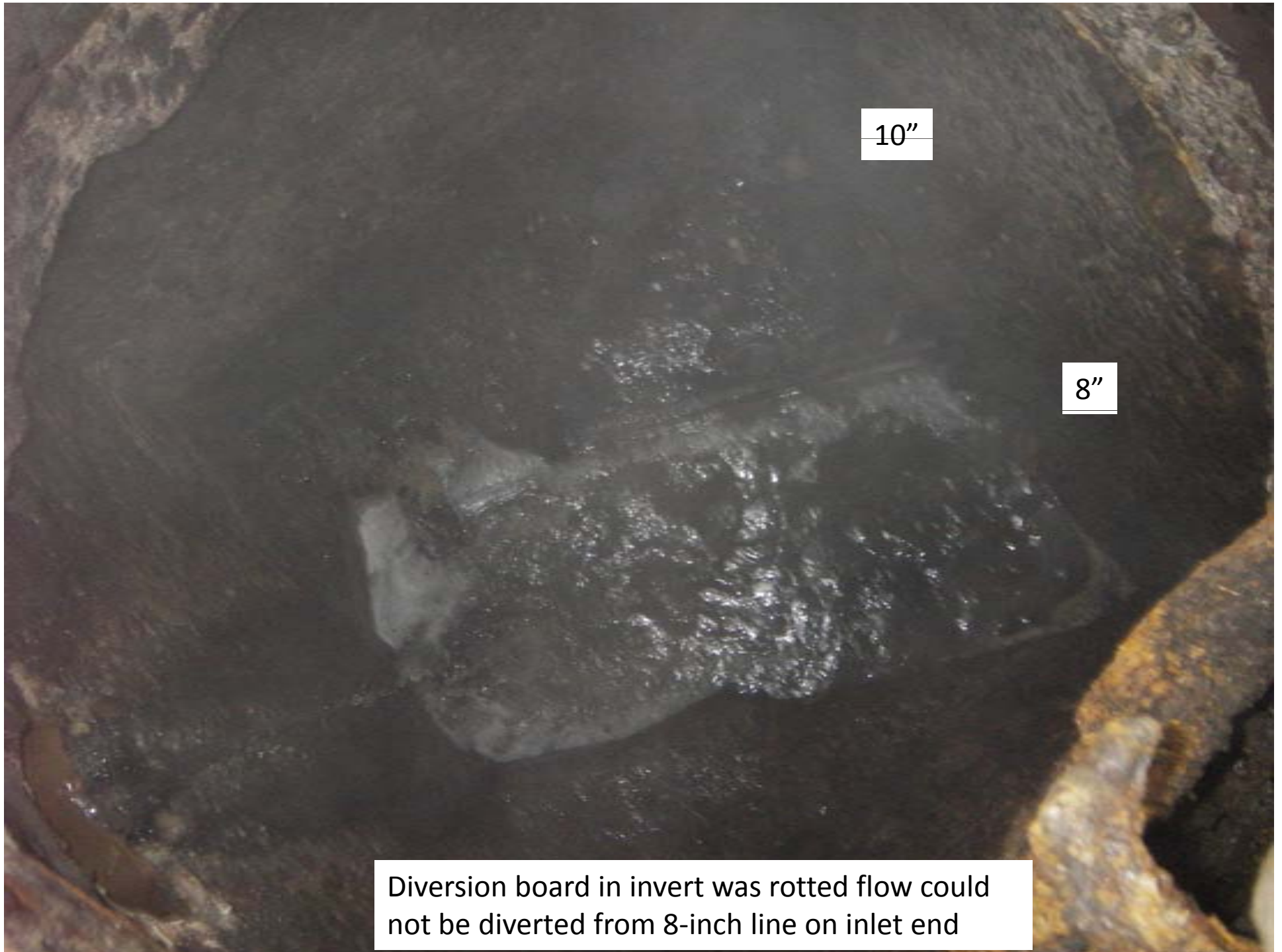
OVERALL CONDITION: NASSCO Grade 4: Several defects that will become grade 5 in the near future.

GENERAL INSPECTION FINDING: Gate valves broken and no longer in service at outlet, diversion board rotten out in inlet, ladders severely corroded/missing, severe corrosion at outlet, heavy debris, questionable severe offset joint at outlet.

MAJOR DEFECTS

Siphon Pipe No. 54	
Feet	Observation/Defect
2.0	Severe corrosion at outlet





Diversion board in invert was rotted flow could not be diverted from 8-inch line on inlet end

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/10/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS OUTLET

MH STOP: TUSCARAWAS INLETT

LOCATION: TUSCARAWAS SIPHON

PIPE: 8" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON DH

START: 0:00

:

UNSCREEN:

3" DIP TUSCARAWAS SIPHON

Severe corrosion at outlet

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/10/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS OUTLET

MH STOP: TUSCARAWAS INLETT

LOCATION: TUSCARAWAS SIPHON

PIPE: 8" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON DH.

START: 0:00

:

ONSCREEN:

8" DIP TUSCARAWAS SIPHON

View from outlet end



Severe offset joint at Tuscarawas Siphon 8" outlet

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/10/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS OUTLET

MH STOP: TUSCARAWAS INLET

LOCATION: TUSCARAWAS SIPHON

PIPE: 8" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON OH.

START: 0:00

:

ONSCREEN:

3" DIP TUSCARAWAS SIPHON

Severe offset joint at Tuscarawas Siphon 8" outlet

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/10/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS OUTLET

MH STOP: TUSCARAWAS INLETT

LOCATION: TUSCARAWAS SIPHON

PIPE: 8" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON DH.

START: 0:00

:

ONSCREEN:

8" DIP TUSCARAWAS SIPHON



-0.1 FT.

8" DIP TUSCARAWAS SIPHON

Severe corrosion at outlet

An underwater photograph showing a dark, cylindrical pipe structure. A bright pinkish-red light source is visible on the right side, illuminating the scene. The background is a grainy, light-colored surface, possibly a rock or sediment. Text is overlaid on the image.

-0.1 FT.

8" DIP TUSCARAWAS SIPHON

Possible pin holing through pipe wall

=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/10/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS OUTLET

MH STOP: TUSCARAWAS INLETT

LOCATION: TUSCARAWAS SIPHON

PIPE: 8" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON OH.

START: 0:00

:

ONSCREEN:

8" DIP TUSCARAWAS SIPHON

Severe offset joint at Tuscarawas Siphon 8" outlet



10"

8"

Tusc. Siphon Outlet Box

Massillon, Ohio
Tuscarawas Sanitary Sewer Siphon
Pipe #54, 10-inch VCP

HUNTINGTON DISTRICT
U.S. ARMY CORPS OF ENGINEERS
CONTRACT NO. W91237-09-P-0133
CCTV AND LASER PROFILE INSPECTION SUMMARY

PIPES UNDER LEVEES

PIPE NO: Tuscarawas Siphon #54 PIPE SIZE: 10" LENGTH INSPECTED: 33ft
PROJECT: Massillon Levee TYPE: VCP INSPECTION DATE: 11/11/09

OVERALL CONDITION: NASSCO Grade 4: Several defects that will become grade 5 in the near future.

GENERAL INSPECTION FINDING: Gate valves broken and no longer in service at outlet, diversion board rotten out in inlet, ladders severely corroded/missing, several offset joints, joint materials sealant missing.

MAJOR DEFECTS

Siphon Pipe No. 54	
Feet	Observation/Defect
2.0	Joint offset, possible crack in bell
13.6	Several offset joints visible down grade
15.0	Joint separation 0.91-inches
18.3	Joint separation 1.26-inches
18.3	Several offset joints visible down grade
19.7	Offset joint in invert
24.0	Pipe bends to the left/down river
32.0	Grade begins to flatten out
33.1	End inspection due to high water



=== INSPECTION SETUP ===

SECTION: PROJ NO. W91237-09-P-0133

11/09/09

ID: MASSILLON SIPHON

MH START: TUSCARAWAS INLET

MH STOP: TUSCARAWAS OUTLET

LOCATION: TUSCARAWAS SIPHON

PIPE: 10" DIP SIPHON

OPERATOR: KEVIN

TAPE ID: MASSILLON OH.

START: 0:00

:

ONSCREEN:

10" DIP TUSCARAWAS SIPHON

Tuscarawas Siphon Pipe #54 inlet



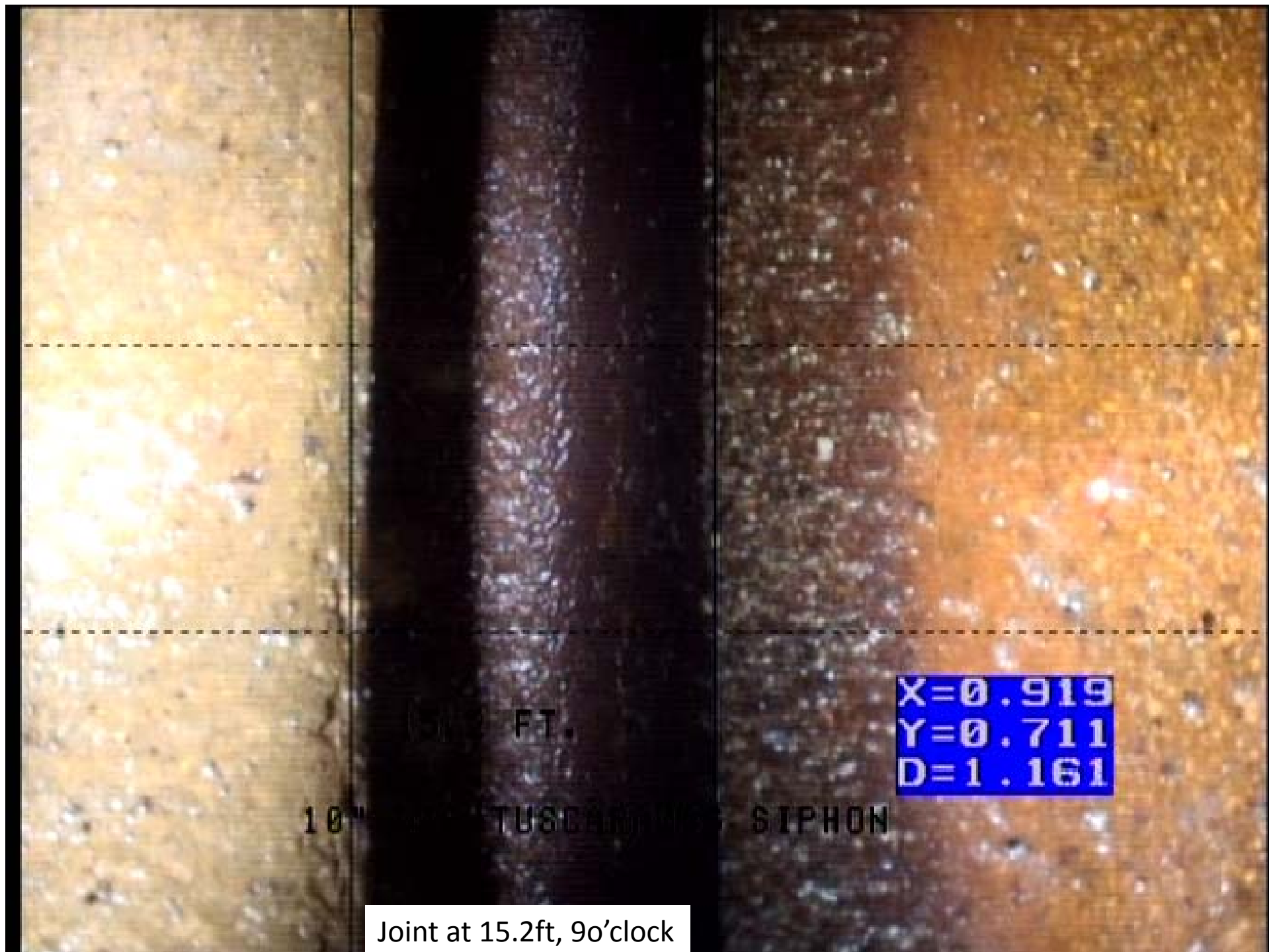
Off set joint possible crack in bell



13.6 FT.

10" DIP TUSCARAWAS SIPHON

Offset joint visible



Joint at 15.2ft, 9o'clock



15.2 FT.

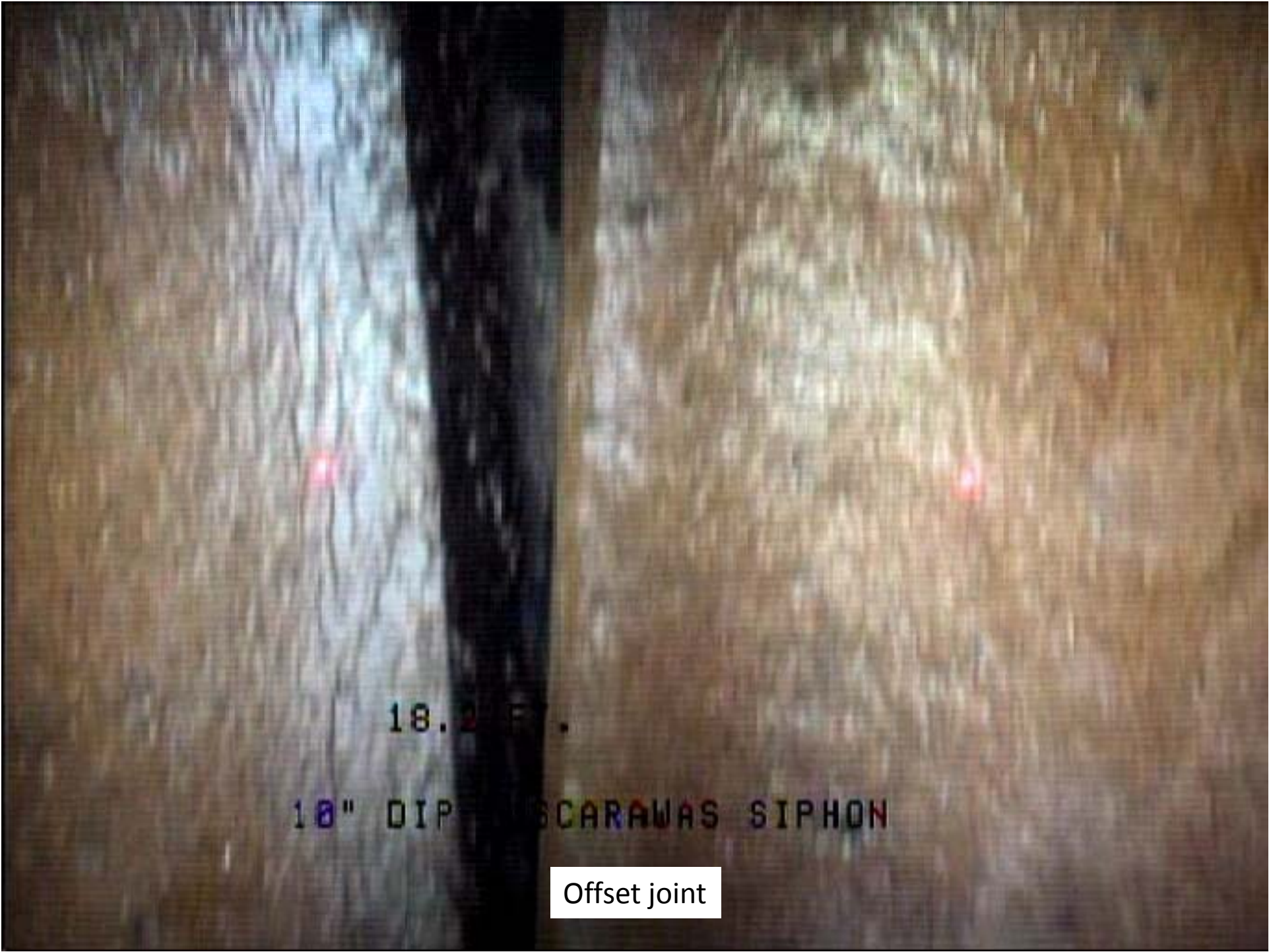
10" MP TUSCARAWAS SIPHON

Joint 15.2ft at approx. 11o'clock



18.3 FT.

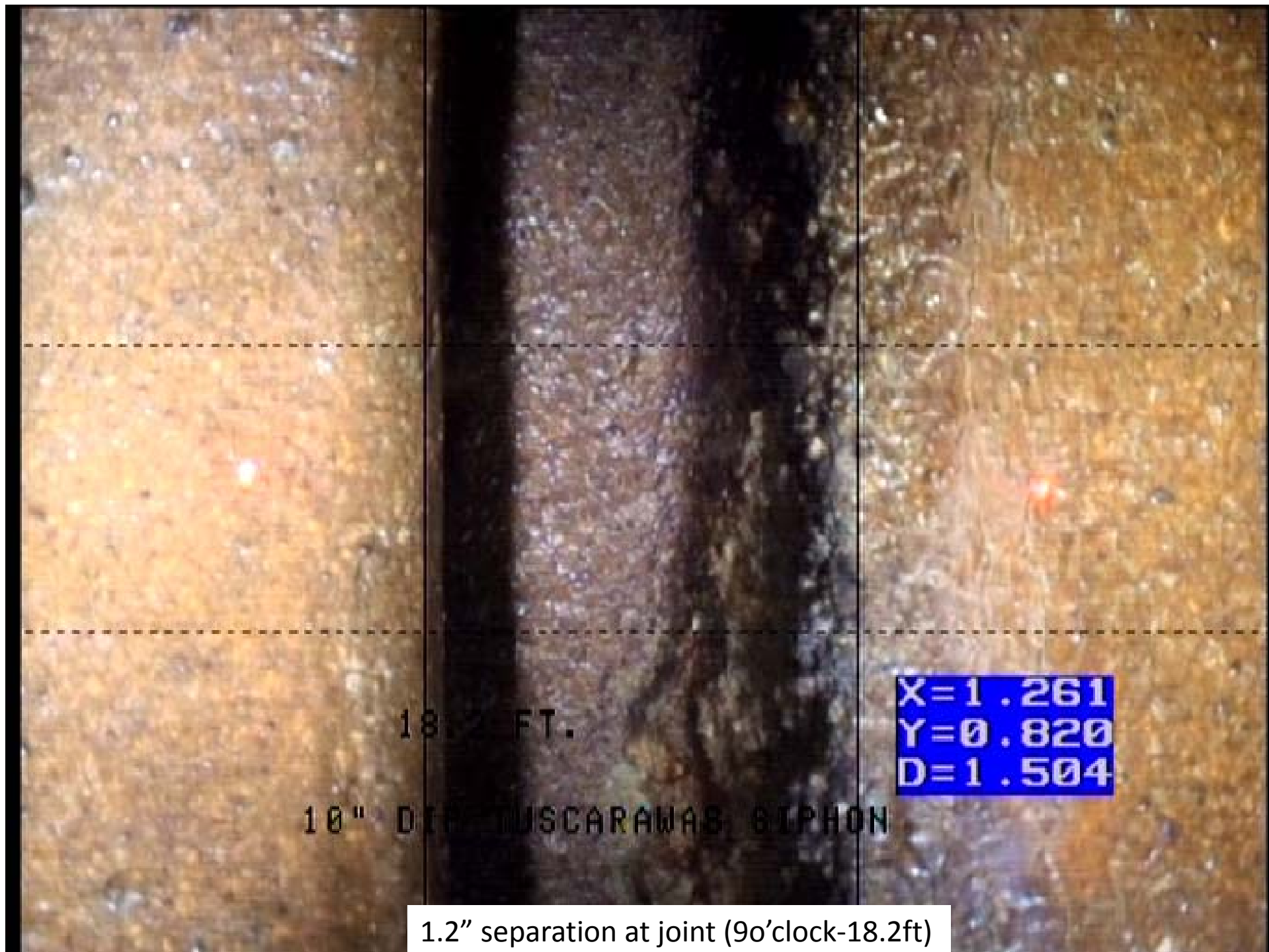
10" DIP TUSCARAWAS SIPHON



18.2 FT.

18" DIP SCARAWAS SIPHON

Offset joint



18.2 FT.

10" DIA. MUSCARAWAS SIPHON

X=1.261
Y=0.820
D=1.504

1.2" separation at joint (9o'clock-18.2ft)









21.3 FT.

10" DIP TUSCARAWAS SIPHON

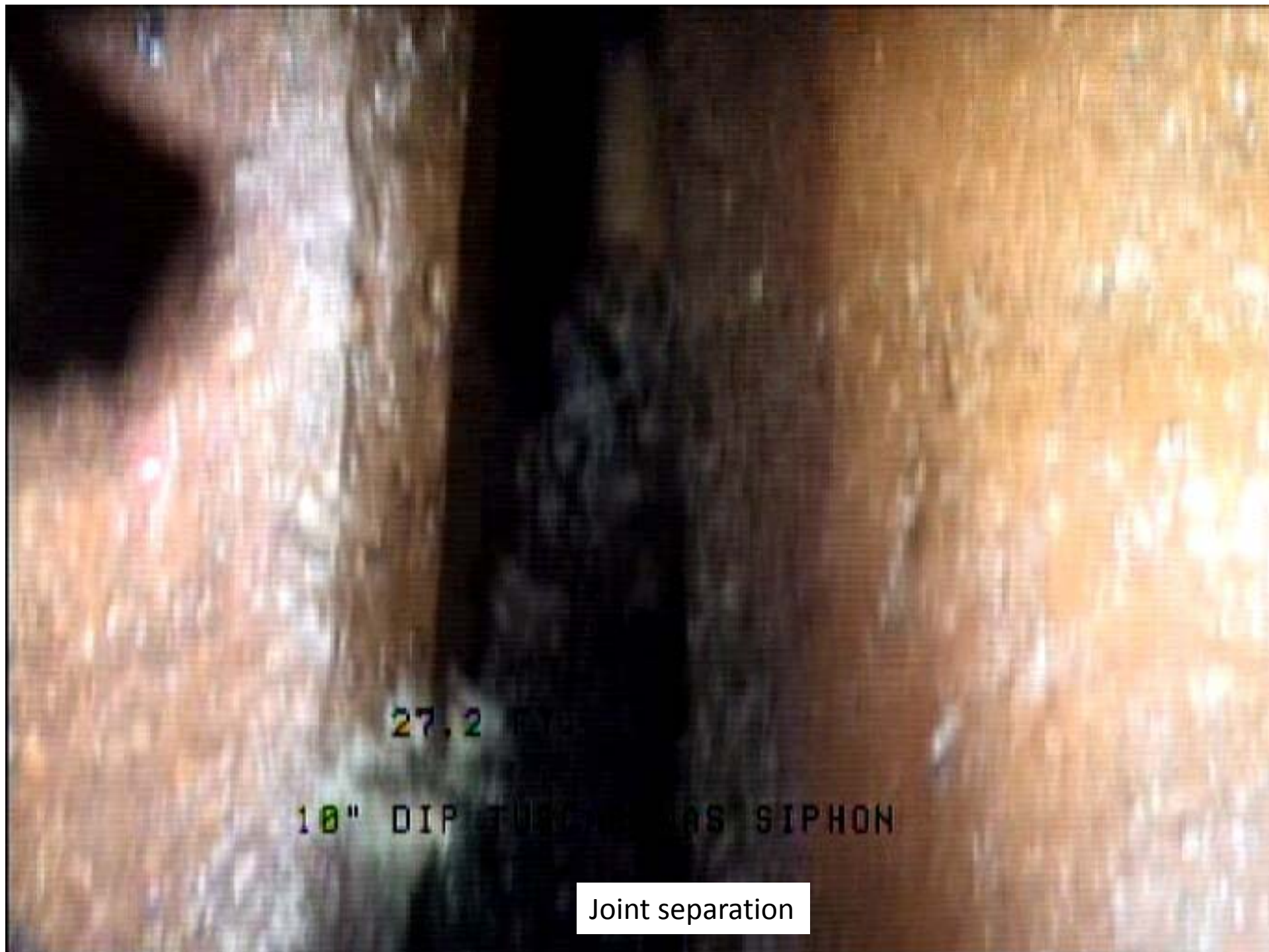
Joint separation



24.3 FT.

10" DIP TUSCARAWAS SIPHON

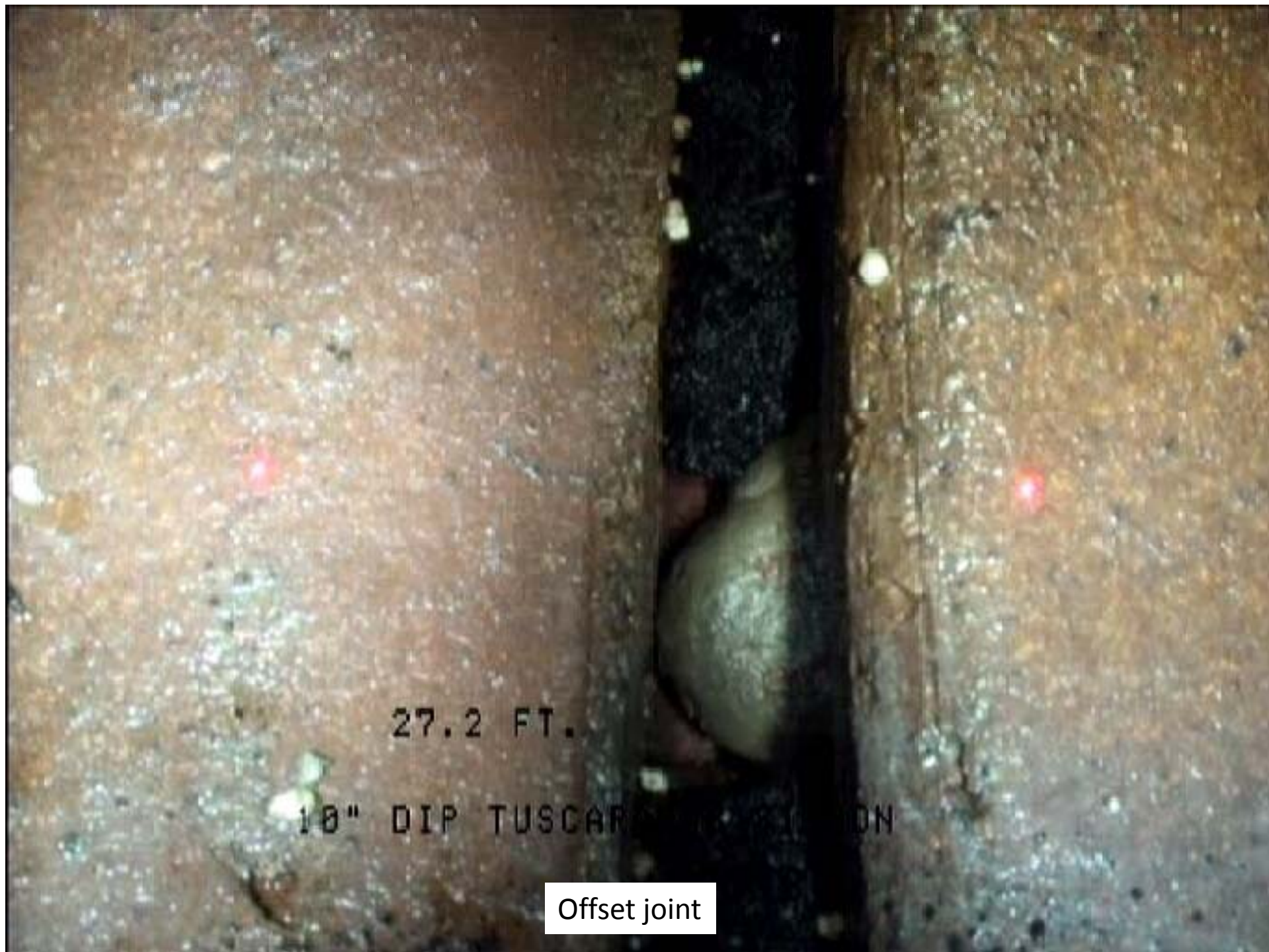
Nearing low part of siphon



27.2

10" DIP TUBE WAS SIPHON

Joint separation



27.2 FT.

10" DIP TUSCARORAS SECTION

Offset joint



27.2 FT.

10" DIP TUSCARAWAS SECTION

Possible open joint, 7o'clock-27.2ft



32.0 FT.

10" DIP TUSCARAWAS SIPHON



33.1 FT.

10" DIP TUSCARAWAS SIPHON

Line starts to flatten out below river, joint appears to be offset at the crown down grade



33.1 FT.

10" DIP TUSCARAWAS SIPHON

Inspection terminated

Appendix A

Nassco PACP Coding
Condition Grading System

NASSCO'S PIPELINE ASSESSMENT & CERTIFICATION PROGRAM (PACP)©

Section 4—Continuous Defect Coding

“TRULY”

4-1

“Truly” continuous defects run along the sewer without any interruption for more than 3 feet.

Examples:

- Longitudinal Fractures
- Cracks

“REPEATED”

4-1

“Repeated” continuous defects occur at regular intervals along the sewer. These occur at pipe joints and include:

- Encrustation
- Open Joints
- Circumferential Fractures

Section 5—Structural Defect Coding (Module 6A)

C CRACK 5-1		
CL	Longitudinal	5-2
CC	Circumferential	5-2
CM	Multiple	5-2
CS	Spiral	5-2

F FRACTURE 5-7		
FL	Longitudinal	5-7
FC	Circumferential	5-7
FM	Multiple	5-7
FS	Spiral	5-7

B BROKEN 5-15		
BSV	-Soil Visible Beyond Defect	5-15
BV	-Void Visible Beyond Defect	5-15

H HOLE 5-17		
HSV	-Soil Visible Beyond Defect	5-17
HV	-Void Visible Beyond Defect	5-17

D DEFORMED 5-19		
DV	Deformed Vertically (brick)	5-19
DH	Deformed Horizontally (brick)	5-19

X COLLAPSE 5-23		
XP	Pipe Collapse	5-23
XB	Brick Collapse	5-23

J JOINT 5-27		
JO	Joint Offset (Displaced)	5-27
JS	Joint Separated (Open)	5-27
JA	Joint Angular	5-27

S SURFACE DAMAGE 5-32		
SRI	Roughness Increased	5-32
SRIM	-Mechanical	5-33
SRIC	-Chemical Attack	5-33
SRIZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SAV	Aggregate Visible	5-32
SAVM	-Mechanical	5-33
SAVC	-Chemical Attack	5-33
SAVZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SAP	Aggregate Projecting	5-32
SAPM	-Mechanical	5-33
SAPC	-Chemical Attack	5-33
SAPZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SAM	Aggregate Missing	5-32
SAMM	-Mechanical	5-33
SAMC	-Chemical Attack	5-33
SAMZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SRV	Reinforcement Visible	5-32
SRVM	-Mechanical	5-33
SRVC	-Chemical Attack	5-33
SRVZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SRP	Reinforcement Projecting	5-32
SRPM	-Mechanical	5-33
SRPC	-Chemical Attack	5-33
SRPZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SRC	Reinforcement Corroded	5-32
SRCM	-Mechanical	5-33
SRCC	-Chemical Attack	5-33
SRCZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SMW	Missing Wall	5-33
SMWM	-Mechanical	5-33
SMWC	-Chemical Attack	5-33
SMWZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SSS	Surface Spalling	5-33
SSSM	-Mechanical	5-33
SSSC	-Chemical Attack	5-33
SSSZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SZ	Other	5-33
SZM	-Mechanical	5-33
SZC	-Chemical Attack	5-33
SZZ	-Not Evident	5-33

S SURFACE DAMAGE 5-32		
SCP	Corrosion (metal pipe)	5-33

LF LINING FAILURE 5-46		
LFD	Detached Lining	5-46
LFDE	Defective End	5-46
LFB	Blistered Lining	5-46
LFCS	Service Cut Shifted	5-46
LFAC	Abandoned Connection	5-46

LF LINING FAILURE 5-46		
(continued)		
LFOC	Overcut Service	5-46
LFUC	Undercut Service	5-46
LFBK	Buckled Lining	5-46
LFW	Wrinkled Lining	5-46
LFZ	Other	5-46

WF WELD FAILURE 5-58		
WFL	Longitudinal	5-58
WFC	Circumferential	5-58
WFM	Multiple	5-58
WFS	Spiral	5-58
WFZ	Unidentified	5-58

RP POINT REPAIR 5-64		
RPR	Pipe Replaced	5-64
RPRD	-Defective	5-64
RPP	Patch Repair	5-64
RPPD	-Defective	5-64

RP POINT (cont) REPAIR 5-64		
RPL	Localized Lining	5-64
RPLD	-Defective	5-64
RPZ	Other	5-64
RPZD	-Defective	5-64

BRICKWORK 5-70		
DB	Displaced	5-70
MB	Missing	5-70
DI	Dropped Invert	5-70

BRICKWORK 5-70		
(continued)		
MM	Missing Mortar	5-70
S	Small	5-70
M	Medium	5-71
L	Large	5-71

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NASSCO'S PIPELINE ASSESSMENT & CERTIFICATION PROGRAM (PACP)©

Section 4—Continuous Defect Coding

“TRULY”

4-1

“Truly” continuous defects run along the sewer without any interruption for more than 3 feet.

Examples:

- Longitudinal Fractures
- Cracks

“REPEATED”

4-1

“Repeated” continuous defects occur at regular intervals along the sewer. These occur at pipe joints and include:

- Encrustation
- Open Joints
- Circumferential Fractures

Section 5—Structural Defect Coding (Module 6A)

C CRACK 5-1 CL Longitudinal 5-2 CC Circumferential 5-2 CM Multiple 5-2 CS Spiral 5-2	F FRACTURE 5-7 FL Longitudinal 5-7 FC Circumferential 5-7 FM Multiple 5-7 FS Spiral 5-7	B BROKEN 5-15 BSV -Soil Visible 5-15 Beyond Defect BV -Void Visible 5-15 Beyond Defect	H HOLE 5-17 HSV -Soil Visible 5-17 Beyond Defect HV -Void Visible 5-17 Beyond Defect	D DEFORMED 5-19 DV Deformed 5-19 Vertically (brick) DH Deformed 5-19 Horizontally (brick)	X COLLAPSE 5-23 XP Pipe Collapse 5-23 XB Brick Collapse 5-23	J JOINT 5-27 JO Joint Offset 5-27 (Displaced) JS Joint Separated 5-27 (Open) JA Joint Angular 5-27
S SURFACE DAMAGE 5-32 SRI Roughness Increased 5-32 SRIM -Mechanical 5-33 SRIC -Chemical Attack 5-33 SRIZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SAV Aggregate Visible 5-32 SAVM -Mechanical 5-33 SAVC -Chemical Attack 5-33 SAVZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SAP Aggregate Projecting 5-32 SAPM -Mechanical 5-33 SAPC -Chemical Attack 5-33 SAPZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SAM Aggregate Missing 5-32 SAMM -Mechanical 5-33 SAMC -Chemical Attack 5-33 SAMZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SRV Reinforcement Visible 5-32 SRVM -Mechanical 5-33 SRVC -Chemical Attack 5-33 SRVZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SRP Reinforcement Projecting 5-32 SRPM -Mechanical 5-33 SRPC -Chemical Attack 5-33 SRPZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SRC Reinforcement Corroded 5-32 SRCM -Mechanical 5-33 SRCC -Chemical Attack 5-33 SRCZ -Not Evident 5-33
S SURFACE DAMAGE 5-32 SMW Missing Wall 5-33 SMWM -Mechanical 5-33 SMWC -Chemical Attack 5-33 SMWZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SSS Surface Spalling 5-33 SSSM -Mechanical 5-33 SSSC -Chemical Attack 5-33 SSSZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SZ Other 5-33 SZM -Mechanical 5-33 SZC -Chemical Attack 5-33 SZZ -Not Evident 5-33	S SURFACE DAMAGE 5-32 SCP Corrosion 5-33 (metal pipe)	LF LINING FAILURE 5-46 LFD Detached Lining 5-46 LFDE Defective End 5-46 LFBI Blistered Lining 5-46 LFCS Service Cut Shifted 5-46 LFAC Abandoned Connection 5-46	LF LINING FAILURE 5-46 (continued) LFOS Overcut Service 5-46 LFUC Undercut Service 5-46 LFBI Blistered Lining 5-46 LFW Wrinkled Lining 5-46 LFZ Other 5-46	WF WELD FAILURE 5-58 WFL Longitudinal 5-58 WFC Circumferential 5-58 WFM Multiple 5-58 WFS Spiral 5-58 WFZ Unidentified 5-58
RP POINT REPAIR 5-64 RPR Pipe Replaced 5-64 RPRD -Defective 5-64 RPP Patch Repair 5-64 RPPD -Defective 5-64	RP POINT (cont) REPAIR 5-64 RPL Localized Lining 5-64 RPLD -Defective 5-64 RPZ Other 5-64 RPZD -Defective 5-64	BRICKWORK 5-70 DB Displaced 5-70 MB Missing 5-70 DI Dropped Invert 5-70	BRICKWORK 5-70 (continued) MM Missing Mortar 5-70 S -Small 5-70 M -Medium 5-71 L -Large 5-71			

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NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Structural	Crack (C)	Circumferential (C)		CC	1	
		Longitudinal (L)		CL	2	
		Multiple (M)		CM	3	
		Spiral (S)		CS	2	
Structural	Fracture (F)	Circumferential (C)		FC	2	
		Longitudinal (L)		FL	3	
		Multiple (M)		FM	4	
		Spiral (S)		FS	3	
Structural	Pipe Failures (Silent)	Broken (B)		B	1 clock pos - 3, 2 clock pos - 4, >=3 clock pos - 5	
		Broken (B)	Soil Visible (SV)	BSV	5	
		Broken (B)	Void Visible (V V)	BVV	5	
		Hole (H)		H	1 clock pos - 3, 2 clock pos - 4, >= 3 clock pos - 5	
Structural	Collapse (X)	Hole (H)	Soil Visible (SV)	HSV	5	
		Hole (H)	Void Visible (V V)	HVV	5	
		Pipe (P)		XP	5	
		Brick (B)		XB	5	
Structural	Deformed (D)	(Pipe) (P)		D	<=10% - 4, >10% - 5	
		Brick (B)	Horizontally (H)	DH	5	
		Brick (B)	Vertically (V)	DV	5	
		Offset (displaced) (O)	Med (M)	JOM	1	
Structural	Joint (J)		Large (L)	JOL	2	
		Separated (open) (S)	Med (M)	JSM	1	
			Large (L)	JSL	2	
		Angular (A)	Med (M)	JAM	1	
Structural	Surface Damage Chemical (S)		Large (L)	JAL	2	
		Roughness Increased (RI)	C	SRIC	1	
		Surface Spalling (SS)	C	SSSC	2	
		Aggregate Visible (AV)	C	SAVC	3	
		Aggregate Projecting (AP)	C	SAPC	3	
		Aggregate Missing (AM)	C	SAMC	4	
		Reinforcement Visible (RV)	C	SRVC	5	
		Reinforcement Corroded (RC)	C	SRCC	5	

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Patch Repair (P)	Defective (D)	RPPD	4	
		Pipe Replaced (R)		RPR		
		Pipe Replaced (R)	Defective (D)	RPRD	4	
		Other (Z)		RPRZ		
		Other (Z)		RPRZD		
Structural	Brickwork (Silent)	Displaced (DB)		DB	3	
		Missing (MB)		MB	4	
		Dropped Invert (DI)		DI	5	
		Missing Mortar	Slight	MMS	2	
			Medium	MMM	3	
			Large	MML	3	
O&M	Deposits Attached (DA)	Encrustation (E)		DAE		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Grease (G)		DAGS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Ragging (R)		DAR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		DAZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
	Deposits Settled (DS)	Hard/Compacted (C)		DSC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Fine (F)		DSF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Gravel (G)		DSGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		DSZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
	Deposits Ingress (DN)	Fines silt/sand (F)		DNF		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Gravel (GV)		DNGV		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Missing Wall (MW)	C	SMWC	5	
		Other (Z)	C	SZC		
	Surface Damage Mechanical (M)	Roughness Increased (RI)	M	SRIM	1	
		Surface Spalling (SS)	M	SSSM	2	
		Aggregate Visible (AV)	M	SAVM	3	
		Aggregate Projecting (AP)	M	SAPM	3	
		Aggregate Missing (AM)	M	SAMM	4	
		Reinforcement Visible (RV)	M	SRVM	5	
		Reinforcement Corroded (RC)	M	SRCM	5	
		Missing Wall (MW)	M	SMWM	5	
		Other (Z)	M	SZM	N/A	
	Surface Damage Not Evident (Z)	Roughness Increased (RI)	Z	SRIZ	1	
		Surface Spalling (SS)	Z	SSSZ	2	
		Aggregate Visible (AV)	Z	SAVZ	3	
		Aggregate Projecting (AP)	Z	SAPZ	3	
		Aggregate Missing (AM)	Z	SAMZ	4	
		Reinforcement Visible (RV)	Z	SRVZ	5	
		Reinforcement Corroded (RC)	Z	SRCZ	5	
		Missing Wall (MW)	Z	SMWZ	5	
		Other (Z)	Z	SZZ	N/A	
	Surface Damage (Metal Pipes)	Corrosion (CP)		SCP	3	
Structural	Lining Failure (LF)	Detached (D)		LFD	3	
		Defective End (DE)		LFDE	3	
		Blistered (B)		LFB	3	
		Service Cut Shifted (CS)		LFCS	3	
		Abandoned Connection (AC)		LFAC		
		Overcut Service (OC)		LFOC	3	
		Undercut Service (UC)		LFUC	3	
		Buckled (BK)		LFBK	3	
		Wrinkled (W)		LFW	3	
		Other (Z)		LFZ		
Structural	Weld Failure (WF)	Circumferential (C)		WFC	2	
		Longitudinal (L)		WFL	2	
		Multiple (M)		WFM	3	
		Spiral (S)		WFS	2	
Structural	Point Repair (RP)	Localized Lining (L)		RPL		
		Localized Lining (L)	Defective (D)	RPLD	4	
		Patch Repair (P)		RPP		

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Other (Z)		DNZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Roots (R)	Fine (F)	Barrel (B)	RFB		2
			Lateral (L)	RFL		1
			Connection (C)	RFC		1
	Roots (R) at a Joint		N/A	RF		1
		Tap (T)	Barrel (B)	RTB		3
			Lateral (L)	RTL		2
			Connection (C)	RTC		2
	Roots (R) at a Joint		N/A	RT		2
		Medium (M)	Barrel (B)	RMB		4
			Lateral (L)	RML		3
			Connection (C)	RMC		3
	Roots (R) at a Joint		N/A	RM		3
		Ball (B)	Barrel (B)	RBB		5
			Lateral (L)	RBL		4
			Connection (C)	RBC		4
	Roots (R) at a Joint		N/A	RB		4
O&M	Infiltration (I)	Weeper (W)		IW		2
		Dripper (D)		ID		3
		Runner (R)		IR		4
		Gusher (G)		IG		5
O&M	Obstacles/Obstructions (OB)	Brick or Masonry (B)		OBB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Pipe Material in Invert (M)		OBM		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Protruding Thru Wall (I)		OBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Wedged in Joint (J)		OBJ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Object Thru Connection (C)		OBC		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		External Pipe or Cable In Sewer (P)		OBP		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Built Into Structure (S)		OBS		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Construction Debris (N)		OBN		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Rocks (R)		OBR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other Objects (Z)		OBZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
O&M	Vermin (V)	Rat (R)		VR		2
		Cockroach (C)		VC		1
		Other (Z)		VZ		1
Construction Features	Tap (T)	Factory Made (F)		TF		
			Capped (C)	TFC		
			Defective (D)	TFD		2
			Intruding (I)	TFI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Active (A)	TFA		
		Break-In/Hammer (B)		TB		
			Capped (C)	TBC		2
			Defective (D)	TBD		3
			Intruding (I)	TBI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Active (A)	TBA		
		Saddle (S)		TS		
			Capped (C)	TSC		
			Defective (D)	TSD		2
			Intruding (I)	TSI		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Active (A)	TSA		

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
Construction Features	Intruding Seal Material (IS)			IS		
		Sealing Ring (SR)		ISSR		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Hanging	ISSRH		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
			Broken	ISSRB		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Grout (GT)		ISGT		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
		Other (Z)		ISZ		<=10% - 2, <=20% - 3, <=30% - 4, >30% - 5
Construction Features	Line (L)	Left (L)		LL		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/UP (LU)		LLU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Left/Down (LD)		LLD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right (R)		LR		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right/Up (RU)		LRU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Right/Down (RD)		LRD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Up (U)		LU		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
		Down (D)		LD		<=10 Deg - 1, <=20 Deg 2, >20 Deg - 4
Construction	Access Points (A)					

NASSCO PACP Condition Grading System Code Matrix

Family	Group	Descriptor	Modifier	Code	Structural Grade	O&M Grade
		Cleanout (CO)		ACO		
			Mainline (M)	ACOM		
			Property (P)	ACOP		
			House (H)	ACOH		
		Discharge Point (DP)		ADP		
		Junction Box (JB)		AJB		
		Meter (M)		AM		
		Manhole (MH)		AMH		
		Other Special Chamber (OC)		AOC		
		Tee Connection (TC)		ATC		
		WW Access Device (WA)		AWA		
		Wet Well (WW)		AWW		
Other	Miscellaneous (M)	Camera Underwater (CU)		MCU		4
		Dimension/Diam/Shape Change (SC)		MSC		
		General Observation (GO)		MGO		
		General Photograph (GP)		MGP		
		Material Change (MC)		MMC		
		Lining Change (LC)		MLC		
		Joint Length Change (JL)		MJL		
		Survey Abandoned (SA)		MSA		
		Water Level (WL)		MWL		
		Water Level (WL)	(S)	MWLS		<=30% - 2, <=50% - 3, >50% - 4
		Water Mark (WM)		MWM		>=50% 4, >=75% 5
		Dye Test (Y)		MY		
			Visible (V)	MYV		5
			Not Visible (N)	MYN		3