Appendix B

Review of Past Video Inspection November 1999



MEMORANDUM

TO: Pete Clark, Tony Hayes - Town of

DATE:

September 26, 2007

Falmouth

FROM:

Paul Birkel, Kattie Collins - W-P

PROJECT No.:

10876B

SUBJECT:

Falmouth on the Green

Review of Television Inspection of Sanitary Sewer Lines

Introduction

As requested we have reviewed past video tapes of the Falmouth on the Green (FOG) collection system and the associated logs and this memo serves as a summary of our findings. The television inspection of the system was performed by Eastern Pipe Services, Inc. in 1999 and in 2003 at the request of Dirigo Management Company. The following is a summary of our findings listed by street and video number. Abbreviations used in this memo follow those outlined in the November 1999 log. Bold text indicates that an item was not included in the original logs.

Findings

- In general, the logs accurately showed the location of most house service laterals, although there were a few that were not identified in the report (i.e. see Muirfield Road between SMH 2.17 and SMH 2.18).
- The following portions of the television inspection did not have a corresponding Television Inspection Log form:
 - Hazeltine Drive, SMH 3.3 to SMH 3.4;
 - All sections from April 2000, Tape 6 (includes portions of Hazeltine Dr., Muirfield Rd. and Inverness Rd.);
 - Baltusrol Circle, SMH 1.15 to SMH 1.16; and
 - Inverness Road, SMH 7 to SMH 6.

The above-mentioned areas were fairly typical to the system with the exception of one area. The section of pipe in Inverness Road from SMH 7 to SMH 6 revealed three severely offset and broken joints within a five foot length of pipe.

• In general, the original logs did not reflect that *there are* a number of joints that are separated, offset or at least questionable (i.e. portion of Inverness Road between Medinah and Baltusrol Circles). These defects represent a potentially significant source of groundwater infiltration during periods when the groundwater table is above the pipeline.

09/26/07 Page 2

• In general, there was more sludge and debris in the collection system than was reported in the logs. There were a number of locations, especially on Baltusrol and Medinah Circles where there were large rocks and pieces of brick in the line.

• In general, precipitation records indicate that amount of precipitation in the month leading up to and also during the television inspection was either fairly close to average or below average. This may be an indication of a low groundwater table, and therefore, it is possible that there are more defective or leaking service laterals that were not noted during inspection.

Recommendations

- Perform manhole inspections of all manholes in the collection system.
- Perform instantaneous flow monitoring during a rainstorm in the spring to assess the relative quantities of flow coming from each area of the collection system.
- Perform spot cleaning and television inspection of the mainline sewer as well as several service laterals based on the information gathered from the previous television inspection logs, the manhole inspections and the flow monitoring efforts.

Light cleaning and television inspection is currently estimated at \$1.25 per linear foot of 8-inch PVC sewer with an additional \$300 for mobilization and demobilization. Service laterals are estimated at about \$300 each. An estimated 1,000 linear feet of mainline sewer could be inspected per day.

	HAZ	ELTINE DRIVE	SMH 3.7			
		1000		5'	J	
	Tap	ne 4, Nov. 1999		8'	J	
				1'	J	
SMH 3.3 to S		Clean line, clean water	1	4'	J	
15'	\boldsymbol{J}	Separated	}	7'	J	Separated
28'	\boldsymbol{J}	Questionable	l .	1'	J	
41'	$oldsymbol{J}$		l	3'	J	
<i>54'</i>	$oldsymbol{J}$	Questionable, sediment	I	.06'	J	
67'	$oldsymbol{J}$	Separated	1	17'	S/C	Small amount of water
<i>80'</i>	$oldsymbol{J}$	-				flowing
93'	\boldsymbol{J}		1.	.30'	J	
106'	\boldsymbol{J}		1	43'	J	
119'	\boldsymbol{J}		1	56'	J	Separated
			1	69'	J	
SMH 3.4 to S	MH 3.5		1	82'	J	Separated
15'	J	-	1	195'	J	Separated
28'	J		2	208'	J	Separated
41'	J		2	221'	J	
54'	J		2	234'	J	
67'	J					
80'	J				Tar	pe 6, April 2000
92'	S/C	tap in, seal seems fine,			•	· -
72	Di C		SMH 3.	.1 to S	SMH 3.	2 Minimal flow, sludge buildup
		constant flow, 1gpm,	<u>SMH 3.</u>	.1 to S	SMH 3.	2 Minimal flow, sludge buildup in bottom of line
93'	J			.1 to S		2 Minimal flow, sludge buildup in bottom of line
93' 107'	$_{ m J}$		1	15'	J	in bottom of line
93'	J		1 2	15' 28'	J J	2 Minimal flow, sludge buildup in bottom of line Separated
93' 107'	J J J	constant flow, 1gpm,	1 2 4	15' 28' 41'	Ј Ј Ј	in bottom of line
93' 107'	J J J		1 2 4	15' 28' 41' 54'	J J J	in bottom of line Separated
93' 107' 120'	J J J	constant flow, 1gpm, 5, November 1999	1 2 4 5 6	15' 28' 41' 54' 67'	J J J J	in bottom of line
93' 107' 120' SMH 3.7 to S	J J J Tape	constant flow, 1gpm, 5, November 1999	1 2 4 5 6 8	15' 28' 41' 54' 67' 80'	J J J J	in bottom of line Separated Separated
93' 107' 120' SMH 3.7 to S	J J Tape SMH 3. J	constant flow, 1gpm, 5, November 1999	1 2 4 5 6 8 8 9	15' 28' 41' 54' 67' 80'	J J J J J	in bottom of line Separated
93' 107' 120' SMH 3.7 to S 19' 21'	J J Tape SMH 3. J	constant flow, 1gpm, 5, November 1999	1 2 4 5 6 8 9 1	15' 28' 41' 54' 67' 80' 93'	J J J J J	in bottom of line Separated Separated Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34'	J J Tape SMH 3. J J J	constant flow, 1gpm, 5, November 1999	1 2 4 5 6 8 9	15' 28' 41' 54' 67' 80' 93' 106'	J J J J J J	in bottom of line Separated Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47'	J J Tape SMH 3. J J J J	constant flow, 1gpm, 5, November 1999	1 2 4 5 8 8 9	15' 28' 41' 54' 67' 80' 93' 106' 118'	J J J J J J	in bottom of line Separated Separated Separated Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60'	J J Tape SMH 3. J J J J	constant flow, 1gpm, 5, November 1999	1 2 4 5 6 8 9	15' 28' 41' 54' 67' 80' 93' 106' 118' 132'	J J J J J J J J S/C	in bottom of line Separated Separated Separated Separated dirty line
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73'	J J J Tape SMH 3. J J J J J J J	constant flow, 1gpm, 5, November 1999	1 2 4 4 5 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140'	J J J J J J J S/C S/C	in bottom of line Separated Separated Separated Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86'	J J J Tape SMH 3. J J J J J J J	constant flow, 1gpm, 5, November 1999	1 2 4 4 5 5 6 6 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143'	J J J J J J J S/C S/C	in bottom of line Separated Separated Separated Separated dirty line
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100'	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999 6	1 2 4 4 5 5 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156'	J J J J J J J S/C S/C J	in bottom of line Separated Separated Separated Separated dirty line dirty line
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100' Drop	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999	1 2 4 4 5 5 6 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156' 169'	J J J J J J S/C S/C J J	in bottom of line Separated Separated Separated dirty line dirty line Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100'	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999 6	1 2 4 5 5 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156' 182' 194'	J J J J J J S/C S/C J J J	in bottom of line Separated Separated Separated Separated dirty line dirty line
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100' Drop	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999 6	1 2 4 4 5 5 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156' 169' 182' 194' 208'	J J J J J J S/C S/C J J J J	in bottom of line Separated Separated Separated dirty line dirty line Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100' Drop	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999 6	1 2 4 4 5 5 6 6 8 6 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156' 169' 182' 194' 208'	J J J J J J S/C S/C J J J	in bottom of line Separated Separated Separated dirty line dirty line Separated
93' 107' 120' SMH 3.7 to S 19' 21' 34' 47' 60' 73' 86' 100' Drop	J J J J J J J J S/C	constant flow, 1gpm, 5, November 1999 6	1 2 4 5 5 6 8 8 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15' 28' 41' 54' 67' 80' 93' 106' 118' 132' 140' 143' 156' 169' 182' 194' 208'	J J J J J J S/C S/C J J J J	in bottom of line Separated Separated Separated dirty line dirty line Separated

Memo to: Pete Clark, Tony Hayes 09/26/07

Page 4

	261'	J			<u>M</u>	ERION WAY
	274' 285'	J End o	f line		Tap	pe 5, Nov. 1999
SMH	3.2 to S	SMH 3.	3Same condition	SMH 3.7 to S	SMH3.9	Two fist sized rocks dragged
***	9'	S/C	Whitish buildup in the bottom, steady flow			from manhole, sludge in line off and on, minimal flow
	23'	J	bottom, steady 110 W	16'	J	Questionable
	37'	J		29'	${f J}$	_
	49'	J		42'	${f J}$	Separated
	62'	$\dot{\mathbf{J}}$		55'	${f J}$	Separated
	76'	\mathbf{J}	Separated	68'	${f J}$	Separated
	90'	J	1	81'	\mathbf{J}	Separated
	102'	${f J}$		94'	J	
	115'	J		108'	${f J}$	
	128'	J				
	142'	J		SMH 3.9 to S	SMH 3.1	
	155'	${f J}$				flow, some sludge
	167'	J		SMH	[-9'	Dip in line
	180'	J		28'	${f J}$	
	194'	${f J}$	Questionable, separated	41'	J	
	207'	S/C	Whitish buildup in bottom	54'	J	
	212'	End	of line, lots of sludge, camera	67'	J	Separated
		had t	rouble getting through	72'	S/C	
			0 0	85'	J	Separated
SMH	3.1 to	SMH 3	.6 Lots of sediment buildup all	98'	J	
			around line, some sludge buildup	114'-	126'	Dip in line, ½" water to 2" water
	16'	J		111'	${f J}$	
	29'	${f J}$		124'	J	
	42'	${f J}$		126'	S/C	
	56'	${f J}$		138'	${f J}$	
	68'		to stop because of sludge in line	153'	${f J}$	
			•	166'	J	
				179'	J	
				192'	J	
				205'	${f J}$	
				218'	J	•
				231'	J	
				244'	J	
				257'	J	Separated
				270'	J	
				284'	S/C	

BIRKDALE ROAD	100' J Questionable, separated? 113' J
Tape 1, Nov. 1999	113 J 126' J 139' J
SMH 2.1 to SMH 2.2 Walls very dirty, debris in	153' S/C 167' J
line, line noted as flat	180' J
29' J Questionable, separated, camera had trouble	192' J 205' J
42' J Camera had trouble 43'-58' Dip in pipe, water over	220' J 232' J
camera	245' J Leaking
55' J	Had to stop and flush line to get a rock out
58'-70' Water still high enough to	260' J 274' J
partially block camera	274 J 288' J
68' J 81' J	200
94' J	SMH 2.3 to SMH 2.4
107' J	16' J
120' J	29' J
133' J	42' J
147' J Camera had trouble	55' J
159' J	68' J
171' J	81' J 94' J
184' J	107' J
198' J	120' J
211' J 223' J	133' J
237' S/C	146' J
251' J	158' J Separated
263' J	172' J
276' J	186' J Questionable, separated?
289' J	199' J
303' S/C	211' J 223' S/C
1000	223' S/C 226' S/C
Tape 2, Nov. 1999	220 SiC
SMH 2.3 to SMH 2.2	SMH 2.4 to SMH 2.5
2' J	15' J
21' J	28' J
34' J	41' J
47' J	54' J Questionable, leak
60' J	67' J
73' J	80' J
86' S/C	93' J

107'	J	Separated	133'	J
120'	$\overline{\mathbf{J}}$	Беригисси	139'	S/C
133'	J		153'	J
146'	J		166'	J
159'	J		179'	J
172'	\mathbf{J}		192'	J
185'	J		205'	S/C
198'	Ĵ		219'	J
199'	S/C		232'	J
201'	S/C		245'	J
213'	\mathbf{J}		258'	J
226'	J		271'	J
239'	J		285'	J
20)	Ū		298'	J
SMH 2.6 to S	SMH 2.5		310'	J
6'	J			
18'	J		SMH 2.9 to S	MH 2.8
29'	S/C		8'	J
32'	\mathbf{J}		18-20'	Questionable Dip in line?
45'	$\ddot{\mathbf{J}}$		22'	J
58'	J		35'	J
71'	J	Questionable	48'	\mathbf{J}
85'	J	Questionali	62'	J
98'	J		75'	J
110'	J		88'	\mathbf{J}
110	Ū		101'	J
SMH 2.7 to 5	SMH 2.6	6 Recently cleaned	111'	J
2'	J		125'	S/C
- 17'	\mathbf{J}		134'	S/C
30'	J		155'	J
43'	${f J}$		168	J
56'	${f J}$		181'	J
70'	J		194'	J
82'	$\mathbf{L}\mathbf{J}$	•	207'	\mathbf{J}
			220'	J
SMH 2.7 to 3	SMH 2.8	8	233'	J
15'	J	_	246'	\mathbf{J}
28'	\mathbf{J}			
41'	\mathbf{J}			
55'	$\ddot{\mathbf{J}}$			
67'	J			
80'	J			
93'	J			
107'	J			
107 120'	J			
120	J		I	

09/26/07 Page 7

Tape 4, Nov. 1999	Tape	4,	Nov.	1999
-------------------	------	----	------	------

SMH 2.27 to \$	SMH 2.	<u>1</u>
14'	J	Questionable
28'	J	Questionable
41'	J	Questionable
54'	J	
67'	J	
80'	J	Separated
91'	Drop c	onnection into manhole

*Length of line wrong in report

SMH 2.2
J
J
J
J
J
J
J
J
S/C
S/C

88'

SMH 2.33 to SMH 2.32				
20'	J			
33'	J			
41'	Begin sludge on and off			
46'	J			
59'	J			
72'	J			
80'	Begin dip			
84'	J			
87'	End dip			

Broken pieces of brick

SMH 2.32	to SN	ин 2.28	Some sludge
11			
24		ſ	
37			
	,		
	']		
76			
89			
	2'		
			at end of line
-1-			
SMH 2.33	3 to S	MH 2.3	4 Some sludge and
			broken bricks
6']	Piece of	f pipe in line
12	? ' ,	J	
25	5 ' ,	-	Questionable, separated?
39)' ,	J (Questionable, separated?
52	2' .	J	
64	!' .	J	
78	3'	J	
91	! '	J	Separated
10)4'	J	
11	17'	J	
13	30'	S/C	
14	43'	J	
13	56'	J	
10	69'	J	
13	83'	J	Questionable, separated?
	89		Some rocks and broken brick
	96'	J	
SMH 2.3	4 to S	SMH 2.3	<u>35</u>
1	5'	J	Separated
2	8'	J	Questionable, separated?
4	1'	J	
5	4'	J	
6	7'	J	Broken piece of something in
			line
8	30	J	Separated
8	3'	S/C	Dirty line
8	35'	S/C	Dirty line
1			

09/26/07 Page 8

SMH 2.35 to SMH 3.36

15'	${f J}$	Separated
28'	J	Questionable
41'	J	Separated
54'	J	
67'	${f J}$	
80	J	Questionable
93'	J	Separated
97'	S/C	

PRESTWICK CIRCLE

Tape 4, Nov. 1999

SMH 2.33 to	SMH 2	2.37
15'	J	 Questionable
28'	J	
41'	${f J}$	
54'	J	Separated
80'	$\mathbf{L}\mathbf{J}$	
93'	J	Separated
106'	J	Questionable
120'	J	Separated
133'	J	
146'	J	
159'	${f J}$	
172'	J	Very Separated

SMH 2.37 to S	SMH 2.	Sludge in line
15'	J	
28'	J	Questionable
41'	J	
54'	J	
67'	J	Questionable
80'	J	
87'	S/C	
94'	J	
107'	J	
120'	J	
133'	${f J}$	
146'	\mathbf{J}	Separated
159'	J	
SMH	S/C	Empties into the manhole

09/26/07 Page 9

HOYLAKE CIRCLE

Tape 4, Nov. 1999

SMH 2.28 to SMH 2.29 13' J Questionable 28' J 41' J 54' 67' J 80' J 93' J 106' J J 119' 132' J

SMH 2.29 to SMH 2.30

15'	J	
28'	J	
41'	J	
54'	${f J}$	
67'	J	Questionable
69'	S/C	
71'	S/C	Running clear water with
		soap (washer running)
		•

SMH 2.30 to SMH 2.31 Voice over noted that both manholes are leaking

Clear water

		S
15'	${f J}$	
28'	J	Questionable
41'	J	
54'	J	Questionable
67'	J	
80'	J	
93'	${f J}$	
106'	J	
119'	\mathbf{J}	
132'	${f J}$	
145'	J	
158'	${f J}$	
171'	J	
173'	S/C	Separated joint

MUIRFIELD ROAD

Tape 2, Nov. 1999

MH 2.1	<u>0</u>
J	
J	
J	
J	
J	
J	
J	
J	
J	
J	
S/C	Whitish buildup in service
	line
J	
J	
J	
J	
J	
J	
J	
${f J}$	
273'	Questionable, gap in tape, dip in flow
J	
	J J J J J J J J J J J J J J J J J J J

SMH 2.10 to SMH 2.11 16' J 41' J 54' J 67' J 78' S/C 86' S/C Whitish buildup in service

line

27' 40' 53' 67' 80' 93' 106'	MH 2.12 J J Questionable J J J J J J J	SMH 2.15 to 10' 22' 35' 48' 61' 74' 87'	J J J J	Questionable se 3, Nov. 1999
25' 38' 51' 64' 77' 90' 103' 116' 129' 142' 156' 169' 182' 195' SMH 2.14 to S 6' 19' 32' 46' 59' 72' 78' 82' 95'	J J J J J J J J J J J J J J J J S/C J Questionable, offset? J J J S/C Whitish buildup in service line S/C J J J	SMH 2.16 to 7' 10' 17' 31' 44' 57' 70' 83' 96' 109' 122' SMH 2.17 to <10' 20' 32' 45' 59' 72' 85' 98' 111' 124' 137' 150'	S/C S/C J J J J J S/C J J J J J J J J J J J J J J J J J J J	sediment around them Below spring line of pipe Questionable
95' 109'	J J			

SMH 2.17 to			SMH 2.21 to	SMH 2.	.20 Very dark looking wastewater
15'	J	Questionable	7'	S/C	Stab in, questionable
28'	\mathbf{J}		/	S/C	condition
41'	J		10'	S/C	Tee?
54'	J		12'	\mathbf{J}	100.
67'	\mathbf{J}		26'	J	Questionable
79'	S/C		28'	J	Separated, mineral deposits
92'	J		52'	J	Separateu, minerar deposits
118'	J		65'	J	
131'	J		78'	J	Questionable
144'	J		91'	J	Questionable
154'	S/C		104'	S/C	
	G) (TT 0	10	104	\mathbf{J}	
SMH 2.18 to		<u>19</u>	109	J	
9'	$ar{\mathbf{J}}$	G	135'	J	
29'	J	Separated, caught camera	149'	J	
42'	J		156'		iderable amount of sludge from
55'	J		130		to manhole including brick
68'	J	Questionable		piece	
81'	J			piece	S
94'	\mathbf{J}_{-}		CMIL 2 22 to	SMII 3	2.21 Considerable amount
107'	J	Questionable	SMH 2.22 to) SWIII 2	of dark residue on
120'	J				bottom of pipe,
133'	J	Separated, leaking?			different than other
146'	J				sections, joints have
159'	J				residue around the
					whole perimeter, get's
SMH 2.19 to		<u>2.20</u>			cleaner around 70'
15'	J				from SMH 2.22
28'	${f J}$		121	т	II OIII SIVIII 2.22
41'	J		12'	J J	
54'	J		25'		
67'	J		38'	J	
80'	J	Questionable, separated?	51'	J	
93'	J	Questionable, separated?	64'	J	
98'	S/C	Whitish buildup in service	77'	J	
107'			90'	J	
120'		Questionable, separated?	103'		
133'			117'		Occastionable
146'			130'		Questionable
159'	J		143'	J	

09/26/07 Page 12

SMH 2.23 to 3	SMH 2.2	<u>22</u>
9'	J	
35'	J	!
48'	J	
	J	Questionable
	J	
0.	\mathbf{J}	
100'	J	
113'	J	
120'	S/C	looks like an 8x8 tee, some mortar showing at top of joint, service itself looks very clean
140'	S/C	looks like a tee
	J	
163'	\mathbf{J}	
177'	J	
Conc	rete in i	nvert of SMH 2.22

Line appears to be very SMH 2.24 to SMH 2.23 clean and in good condition 18' J

31' J 44' J J 57' J 70' 83' \mathbf{J} questionable joint 95' S/C 97' J 110' J J 123' J 136'

SMH 2.24 to SMH 2.25

J

J

149'

162'

14' J 27' J 40' J J 53' J 66' 29' J 32' J 103' S/C SMH 2.25 to SMH 2.26 14' J 27' J J 40' \mathbf{J} 53' 66' \mathbf{J} 79' J J 92' 105' J J 118' J 132' J 144' 157' \mathbf{J} \mathbf{J} 171' 184' J 197' J S/C 206'

Tape 6, April 2000

SMH 2.18 to		2.17 Lots of buildup
6'	S/C	
17'	J	
30'	${f J}$	
43'	${f J}$	Separated
55'	J	Questionable
69'	J	
82'	S/C	Dirty service
94'	${f J}$	
107'	J	
120'	J	
132'	${f J}$	
148'	-SMH	Sag in line
158'	End	of line

SMH 2.17 to	o SMH 2				BALTUSRO	OL CIRCLE
401	~	flow moving	swiftly		Tane 3 N	Nov. 1999
19'	J				Tape 3, 1	107. 1777
32'	J	D:		SMH 1.13 to	SMH 1 12	Lots of sludge and
43'	S/C	Dirty	7	5WIII 1.15 to	DIVILI 1.12	broken bits of brick
59'	J	Questionable				and rocks throughout
71'	J			19'	J	and rocks throughout
85'	Ĵ			32'	\mathbf{J}	
98'	J			32 45'	J	
111'				43 58'	\mathbf{J}	
124'				36 71'	J	
136'				84'	J	
149'		0.74		97'	J	
162'	End o	of line				stionable separated
	~> ===	- 4 M		110' 123'	Fist sized r	
SMH 2.16 t				123 124'		arated
5' 	S/C	Dirty		137'	ј зера Ј	ai aicu
7'	S/C	Dirty		157 150'	-	nto manhole
15'	$\mathbf{J}_{ar{ar{J}}}$			130	Diop inici ii	nto mannoic
28'	J	Questionable		CMII 1 14 to	CMII 1 12	
41'	J	Questionable		SMH 1.14 to 6'		8" tee, clean water
53'	J	Questionable		O		ning steady
66'	J			NT - 4		
79'	J				-	idge after the service, all
91'	J				water	
104'		Flow increased aga	in	13'	J	
117				27'	J	
130	End	of line		40	J	
				53'	J	
	Ta	ape 1, May 2003		66'	J	
		_	0.1	79'	J	
SMH 2.14 t			l l	92'	J	
76'	S/C	Constant flow from	service,	101'	Questional	ble
		House 22		105'	J	
70'	S/C	Could leak, House 1	15	118'	J	
57'	J			132'	LJ	
42'	${f J}$			145'	$ar{\mathbf{J}}$	
35'	J			158'	J	
30'				168'	Broken br	
16'				172'		8" tee, clean line
5'	S/C	Some leakage		172'	OSJ	

09/26/07 Page 14

SMH	1.14 to	SMH	[1.15 Minimal flow
	14'	J	Questionable
	27'	\mathbf{J}	Separated
	40'	\mathbf{J}	Questionable
	53'	${f J}$	
	67'	\mathbf{J}	Questionable
	80'	J	Questionable
	84'-1	47'	Lots of sludge'
	92'	J	
	106'	J	
	119'	\mathbf{J}	
	132'	J	
	145'	\mathbf{J}	Fist sized rock

Two 4" lines are piped SMH 1.15 to SMH 1.16 into SMH 1.16. Separated 15' J 28' J **Separated Ouestionable** 54' J Separated 67' J Separated 80' J Separated 93' J Separated 106' J J Questionable 119 Questionable 133' J

<u>4" Service Lateral from Tank to Line, No. 2 Baltusrol Circle</u>

145'

12'

J

J

Black sediment in bottom of line, joints don't look like push-on joints

3 gpm estimate

J 25' 38' J Stack/cleanout 62' 78' J 89' J J 103' J 115' 130' J J 144' Offset joint or pinched seal?, 156' LJ

MEDINAH CIRCLE

Tape 1, Nov. 1999

SMH 1.1 to S	MH 1.2	
10'?	J	Offset joint
23'	J	
26'	J	
49'	J	
62'	J	Questionable
75'	S/C	
77'	J	
91'	J	
93		sing water
98	debris	s in line and more water
104'	J	questionable, possible source of water and debris, no debris after joint, camera had trouble getting by joint higher water continues
130	${f J}$	

SMH 1	.2 to S	MH 1.3	clean walls, lots of debris in bottom, higher water continues
	6'	S/C	water from line is
			backing into service
	12'	S/C	water from line is backing
			into service, camera had
			trouble getting through service
			due to debris

Water increases to a few inches

Reversed set up

higher water continues but less than before 6' S/C 18' J 31' J 45' J Questionable, camera had trouble getting over joint 57' J 71' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line. SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line.	SMH 1 3	to SM	TH 1 2	clean walls, debris in bottom,	190	J	Questionable
less than before 6 S/C 18' J 31' J 45' J Questionable, camera had trouble getting over joint 57' J 71' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 44' J Separated 50' Questionable, leaking? 57' J 44' J Separated 50' Questionable, leaking? 57' J 84' J Separated 50' Questionable 51' J Separated 51' J Questionable 51' J Quest	5111111.5	to SIV	111 1.2	higher water continues but	203'	${f J}$	
6' S/C 18' J Questionable, camera had trouble getting over joint 57' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 59' S/C 1166' J Questionable 110' S/C 1166' J Questionable 1110' S/C 1124' J 1138' J Separated 151' J Questionable 152' J Questionable 1520' J Questionable 153' J Questionable 154' J Questionable 156' J Questionable 157' J Questionable 158' J Separated 159' Questionable 159' Questionable 150' Camera blocked by sludge dug up from rock 229' J Camera completely blocked by sludge 14' J J Separated 14' J J Separated 16' J Separated 114' J J Separated 119' J Separated 119' J Separated 119' J Separated 119' J Separated 158' J Separated 158' J Separated 158' J Questionable 159' Questionable 151' J Questionable 151' J Questionable 151' J Questionable 151' J Separated 151' J Separated 151' J Separated 151' J Separated 1520' J Questionable 1520' J Questionable 158' J Separated 159' Questionable 159' Questionable 159' Questionable 159' Questionable 159' Questionable 159' Questionable 159' J Questionable 159' Questionable 159' J Questionable 159' J Questionable 159' J Questionable 159' Qu				less than before	200'		
18' J Questionable, camera had trouble getting over joint 57' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station the line SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 884' J Separated 50' Questionable, leaking? 57' J 884' J Separated 110' S/C 1106' J Questionable, leaking? 57' J Questionable, leaking? 57' J Questionable 110' S/C 1106' J Questionable 1110' S/C 1124' J Questionable 115' J Questionable 110' S/C 116' J Separated 117' J Questionable 118' Piece of broken pipe in the line 28' J 41' J Questionable 54' J Questionable 15' J Questionable	6'	, ,	S/C	less than belot			debris (rocks or concrete)
31' J Questionable, camera had trouble etting over joint 57' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J Separated 50' Questionable, leaking? 57' J Gamera completely blocked by sludge SMH 1.4 to SMH 1.3 Lots of dark debris, appears to have settled out to the bottom, surrounding water is clear 14' J Separated 106' J Separated 106' J Separated 119' J Separated 132' J Questionable 150' Camera starts dragging sludge, camera mostly blocked 158' J Questionable, possible leak at top of pipe 54' J Questionable 15' J Questionable 16' J Separated 15' J Separated 16' J Separated 17' J Separated 18' J Questionable 18' J Questionable 19' J Separated					316'	J	
45° J Questionable, camera had trouble getting over joint 57° J 71° J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84° J Questionable, silt all around joint, camera had trouble 94° S/C 107° J Questionable, silt all around joint camera had trouble 112° S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4° S/C water backing up into pipe 6'-16' No tape 31° J Separated 50° Questionable, leaking? 31° J Separated 50° Questionable, leaking? 118° J Separated 50° J Questionable, leaking? 51° J Questionable 110° S/C 5/C 51° J Questionable 111° S/C 5/C 51° J Questionable 110° S/C 5/C 51° J Questionable 110° S/C 5/C 5/C 5/C 5/C 5/C 5/C 5/C 5/C 5/C 5					220'		Camera blocked by sludge
trouble getting over joint 57' J 71' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 884' J Separated 50' Questionable, leaking? 116' J Questionable 110' S/C 1106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 151' J Questionable 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 152' J Questionable 151' J Questionable 151' J Separated 152' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 155' J Questionable 151' J Separated 152' J Questionable 153' J Questionable 154' J Questionable 155' J Questionable 157' J Questionable 158' J Questionable 159' Questionable 150' Questionable 150' Questionable 151' J Separated 151' J Separated 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 153' J Questionable 155' J Questionable 157' J Questionable 158' J Questionable 159' Questionable 159' Questionable 150' Questionable 15				Questionable camera had			
57' J 71' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J Separated 92' S/C 106' J Questionable 110' S/C 1124' J 138' J Separated 151' J Separated 152' J Questionable 153' J Questionable 154' J Questionable 156' Fist size granite rock in line 157' J Questionable 158' J Questionable 159' Questionable 150' Questionable 150' Questionable 151' J Separated 151' J Separated 151' J Separated 152' J Questionable 153' J Questionable 154' J Questionable 155' Questionable 156' Fist size granite rock in line	4.	3	J				up from rock
71' J Questionable, offset? Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 152' J Questionable 153' J Questionable 154' J Questionable 156' Fist size granite rock in line, lots of sparated lots of separated lots of	5'	71	т	trouble getting over joins	229'	\mathbf{J}	•
Operator noted that the pump station has been down after mentioning the amount of sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J Separated 92' S/C 106' J Questionable 110' S/C 1124' J 138' J Separated 151' J Separated 151' J Separated 151' J Questionable 155' Fist size granite rock in line 166' Fist size granite rock in line 167' J Separated 168' J Questionable 169' Fist size granite rock in line 170' J Separated 181' J Questionable 181' J Questionable 182' J 183' J Separated 181' J Questionable 181' J Questionable 182' J 183' J Separated 181' J Questionable 181' J Questionable 182' J 183' J Separated 181' J Questionable 181' J Questionable 182' J 183' J Questionable 183' J Questionable 184' J Questionable 185' J 186' J 186' J 186' J 187' Questionable 188' J Questionable 189' J 180' J 180' SEPARATED 180' J 180' Camera starts dragging sludge, camera mostly blocked 158' J 180' J 1				Questionable offset?	232'-	-302'	Camera completely blocked
been down after mentioning the amount of sludge SMH 1.4 to SMH 1.3 Lots of dark debris, appears to have settled out to the bottom, surrounding water is clear 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J Separated 50' Questionable, leaking? 57' J 84' J Separated 50' Questionable, leaking? 57' J 50' J 51' Questionable 515' J Questionable 515' J Questionable 515' J Questionable 516' J Questionable 510' Separated 5110' S/C 51' Questionable, possible leak at top of pipe 54' J 67' J 54' J 67' J 54' J 67' J 55' J Questionable 67-16' J 54' J 67' J 55' J Questionable 67-16' J 58MH 1.5 to SMH 1.4 Lots of dark debris 515' J Questionable 515' J Questionable 515' Questionable 515' J Questionable 516' J Questionable 517 J Questionable 518' Piece of broken pipe in the line 54' J 67' J 67' J 67' J 78' J 79'							
sludge 84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 84' J Separated 50' Questionable, leaking? 18' Piece of broken pipe in the line 28' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Questionable 152' J Separated 153' J Questionable 151' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 157' J Questionable 158' Piece of broken pipe in the line 28' J 41' J 67' J 81' J Questionable 107' J Separated 107' J Separated 108' J Separated 119' J Separated 119' J Separated 119' J Questionable 118' Piece of broken pipe in the line 28' J 41' J 67' J 81' J Questionable 110' S/C 124' J 138' J Separated 110' J Separated 110' J Questionable 110' J Separated 110' J Questionable 110' J Separated 110' J Questionable	h	oon d	own a	fter mentioning the amount of			•
84' J Questionable, silt all around joint, camera had trouble 94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J Separated 50' Questionable, leaking? 57' J 84' J Separated 50' Questionable, leaking? 57' J 84' J Separated 50' Questionable 110' S/C 1124' J 138' J Separated 151' J Separated 151' J Separated 151' J Separated 151' J Separated 152' J Questionable 154' J Questionable 156' Fist size granite rock in line 150' Lamera starts dragging sludge, camera mostly blocked 155' Lots of dark debris 15' J Questionable 15' J Questionable 15' J Questionable 16' J Questionable 110' S/C 1124' J Questionable 110' S/C 1124' J Separated 110' S/C 1124' J Questionable 1151' J Separated 1151' J Separated 1100' J Separated 1100' J Separated 1100' S/C 1124' J Questionable 1107' J Separated			омп а	itel mentioning the amount of	SMH 1.4 to	SMH ₁	.3 Lots of dark debris, appears
Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, and the state of t-16' No tape 31' J Separated 50' Questionable, leaking? 31' J Separated 57' J 31' J Separated 57' J 31' J Separated 57' J 31' J Separated 58' J Separated 5			т	Questionable silt all around			to have settled out to the
94' S/C 107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 106' J Questionable 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 1106' J Questionable 110' S/C 1124' J 1138' J Separated 159' Questionable 150' Questionable 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 1124' J 1138' J Separated 159' Questionable 110' S/C 1124' J 1138' J Separated 110' J Questionable 110' J Separated	0	-	J	ioint camera had trouble			bottom, surrounding water is
107' J Questionable, silt all around joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Questionable 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 150' Questionable 151' J Separated 152' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 153' J Separated 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 15' J Questionable 15' J Questionable 15' J Questionable 16' J 10' J Separated 100' J Questionable 110' J Separated 110' J Separated 110' J Separated 120' J Questionable	0	Λ !	S/C	Joint, camera had to allow			
joint camera had trouble 112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 1106' J Questionable 110' S/C 1124' J 138' J Separated 159' Separated 159' SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 28' J 41' J 67' J 51' Questionable, possible leak at top of pipe 54' J 138' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 54' J 67' J 138' J Separated 54' J 67' J 138' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 54' J 67' J 138' J Separated 190' J Separated 119' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J 15' J Questionable 15' J Questionable 15' J Questionable 119' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J 15' J Questionable 15' J Questionable 15' J Questionable 119' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J 16' J Questionable 15' J Questionable				Questionable, silt all around	14'	J	
112' S/C Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 1106' J Questionable 110' S/C 1124' J 1138' J Separated 151' J Questionable 151' J Separated 152' Questionable 151' J Separated 152' Questionable 151' J Separated 151' J Separated 152' J Questionable 153' J Questionable 154' J Questionable 157' J Separated 159' J Questionable 150' Questionable 151' J Separated 151' J Separated 152' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 156' J Separated 159' J Questionable 165' Fist size granite rock in line	1	.07	J		27'	J	
Couldn't finish due to the amount of sludge in the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 1124' J 138' J Separated 159' Separated 159' Separated 159' Separated 159' J Questionable 110' S/C 1124' J 138' J Separated 159' Separated 159' Questionable 150' Camera starts dragging sludge, camera mostly blocked 155' J Questionable 155' J Questionable 156' J Questionable 151' J Separated 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 155' J Questionable 156' Fist size granite rock in line	1	12'	S/C	Joint camera nau trousze	40'	${f J}$	
the line Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 159' J Questionable 110' S/C 124' J 138' J Separated 159' J 66' J 80' J 93' J Separated 119' J Separated 119' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 15' J Questionable 15' Questionable 15' J Questionable 16' J 80' J 80' J 80' J 81' J Separated 110' J Separated 110' J Separated 110' J Separated 110' J Separated 120' J Questionable 120' J Questionable				h due to the amount of sludge in	53'	J	
Tape 3, Nov. 1999 Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 152' J Questionable 151' J Questionable 151' J Separated 152' J Questionable 154' J Questionable 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 153' J Questionable 151' J Separated 152' J Questionable 151' J Separated 152' J Questionable 153' J Separated 154' J Questionable 155' Fist size granite rock in line				if due to the amount of stange in			
Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 93' J Separated 119' J Separated 132' J 145' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 51' Questionable, possible leak at top of pipe 54' J 138' J Separated 190' J Separated 119' J Separated 132' J Separated	u	ne mie	,		1	J	
Still having difficulty with pump station SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 119' J Separated 112' J Separated 115' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 106' J Questionable 150' Camera starts dragging sludge, camera mostly blocked 158' J Questionable 15' J Questionable 15' J Questionable 15' J Questionable 15' J Questionable 110' S/C 124' J 138' J Separated 19' J Separated 190' J Separated 190' J Separated 110' J Questionable			Тат	ne 3 Nov 1999		J	Separated
SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 157' J Separated 158' J 158' J Questionable 158' J Questionable 159' J Questionable 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 150' Camera starts dragging sludge, camera mostly blocked 158' J 168' J Questionable 150' SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 18' J Questionable 18' J Questi			1 4	pc 3, 1404. 1999	106'	${f J}$	Separated
SMH 1.3 to SMH 1.2 Lots of fist sized rocks in line, lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 150' Camera starts dragging sludge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 151' J Separated 94' J 107' J Separated 120' J Questionable 120' J Questionable	Still hox	vina d	ifficult	ty with numn station	119'	J	Separated
lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 1106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 151' J Separated 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 151' J Separated 151' J Questionable 151' J Questionable 151' J Questionable 152' J Questionable 153' J Questionable 155' Fist size granite rock in line	Still liav	ving u	micun	y with pump source	132'	J	
lots of separated joints 4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 110' S/C 1124' J 138' J Separated 150' Camera starts dragging studge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 151' J Separated 151' J Questionable 151' J Separated 152' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 157' J Separated 158' J Questionable 159' Camera starts dragging studge, camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 67' J 81' J Questionable 194' J 107' J Separated 107' J Separated 120' J Questionable	SMH 1	3 to \$1	MH 1.3	2 Lots of fist sized rocks in line,	145'	J	Separated
4' S/C water backing up into pipe 6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 1106' J Questionable 110' S/C 1124' J 138' J Separated 151' J Separated 152' Separated 153' J Questionable 154' J Questionable 155' Fist size granite rock in line camera mostly blocked 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 165' Fist size granite rock in line	DIVILL 1	<u> </u>	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	lots of separated joints	150		88 8
6'-16' No tape 31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 1106' J Questionable 110' S/C 124' J 138' J Separated 158' J SMH 1.5 to SMH 1.4 Lots of dark debris 15' J Questionable 18' Piece of broken pipe in the line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 138' J Separated 151' J Separated 151' J Questionable 151' J Separated 151' J Separated 151' J Separated 151' J Questionable 152' J Questionable 153' J Questionable 154' J Questionable 155' Fist size granite rock in line	4	4'	S/C	water backing up into pipe		can	nera mostly blocked
31' J 44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 110' S/C 124' J 138' J Separated 15' J Questionable 151' J Separated 15' J Questionable 151' J Separated 164' J Questionable 165' Fist size granite rock in line SMH 1.5 to SMH 1.4 Lots of dark debris Questionable 18' Piece of broken pipe in the line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 81' J Questionable 94' J 107' J Separated 107' J Separated 110' J Separated 110' J Questionable 120' J Questionable					158	J	
44' J Separated 50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 110' S/C 1124' J 138' J Separated 15' J Questionable 151' J Separated 15' J Questionable 151' J Separated 15' J Questionable 151' J Separated 15' J Separated 164' J Questionable 165' Fist size granite rock in line							
50' Questionable, leaking? 57' J 70' J 84' J Separated 92' S/C 110' S/C 124' J 138' J Separated 15' J Questionable 18' Piece of broken pipe in the line 28' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 54' J 67' J 81' J Questionable 94' J 164' J Questionable 165' Fist size granite rock in line				Separated	SMH 1.5 to	SMH	1.4 Lots of dark debris
57' J 70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 18' Piece of broken pipe in the line 28' J 41' J 92' S/C 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 94' J 107' J Separated 1107' J Separated 1107' J Separated 1107' J Separated 1107' J Questionable			-				
70' J 84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 28' J 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 94' J 107' J Separated 110' J Questionable 120' J Questionable			J		1		ce of broken pipe in the line
84' J Separated 92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 41' J 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 94' J 107' J Separated 1107' J Separated 1107' J Separated 1107' J Questionable					28'		
92' S/C 106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 51' Questionable, possible leak at top of pipe 54' J 67' J 81' J Questionable 94' J 107' J Separated 1107' J Separated 1107' J Separated 1107' J Questionable				Separated	1		
106' J Questionable 110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line pipe 54' J 67' J 81' J Questionable 107' J Separated 107' J Separated 120' J Questionable				•	51'	Qu	estionable, possible leak at top of
110' S/C 124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 54' J 67' J 81' J Questionable 94' J 107' J Separated 120' J Questionable				Questionable		pip	e
124' J 138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 67' J 81' J Questionable 94' J 107' J Separated 120' J Questionable				_	1		
138' J Separated 151' J Separated 164' J Questionable 165' Fist size granite rock in line 81' J Questionable 94' J 107' J Separated 120' J Questionable					i i	${f J}$	
151' J Separated 164' J Questionable 165' Fist size granite rock in line 94' J 107' J Separated 120' J Questionable				Separated	i		Questionable
164' J Questionable 107' J Separated 165' Fist size granite rock in line 120' J Questionable				•			_
165' Fist size granite rock in line 120' J Questionable				<u>-</u>	l .		
1 1221 I			-		1		Questionable
			J	<u> </u>	133	3' J	

09/26/07 Page 16

146' 159' 172' 185' 188'	J J J S/C	Separated
194'	S/C	

Tape 4, Nov. 1999

SME	I 1.3 to S	<u>MH 1.2</u>	\mathbf{Re} - \mathbf{TV} (not noted),
			Underwater for first 30',
			pump station backing up
	?	S/C	
	56'	J	
	69'	J	
	82'	J	
	92'	S/C	
	105'	${f J}$	Separated
	110'	S/C	Small amount of clean water running
	123'	J	Questionable
	136'		Separated
	149'	J	Separated
	162'	J	Questionable
	175'	${f J}$	Questionable
	188'	J	Separated
	202'	J	_
	215'	${f J}$	
	228'	${f J}$	Separated
	241'	${f J}$	Separated
	254'	${f J}$	Separated
	267'	J	Questionable
	280'	J	Separated
	293'	S/C	Small amount of clear
			water running
	2081	S/C	

INVERNESS ROAD

Tape 1, Nov. 1999

		rap	6e 1, 1999
	SMH 3 to SM	<u>1H 2</u>	Fairly clean line
l	15'	\mathbf{J}	
	41'	CJ	
	55'	CJ	Two cracks
	68.5		Separated
	85'	S/C	There is a lot of dark debris
l	95'	т	in the service Ouestionable
	95' ~10'	J	Missed a section of the line
	~10		due to technical issues with
			the video
			the video
	SMH 2 to SN	<u>/IH 1</u>	Heavy, dark sediment in the bottom of the line
	54'	J	Questionable
	80'	J	Separated
	00	Ü	Sopuration
	SMH 3 to SM	<u>ИН 4</u>	Evidence of dark buildup on the sides of the line (appears
			to be soil), clear water in SMH 3
	41'	J	
	53'	CJ	
	55'	J	
	65'	OSJ	Slight
	67'	J	Separated and leaking
	68'	CJ	Sheer break at joint (per
			voice over)
	SMH 4 to SI	MH 5	Evidence of dark buildup on
			the sides of the line (appears to be soil)
	13'	S/C	
	32'	J	
	45'	J	
	58'	J	
	71'	J	

SMH 5	to SM	<u>H 6</u>	Evidence of dark buildup on the sides of the line (appears to be soil), debris in SMH 5	<u>SMH 7 t</u>	o SM	<u>IH 6</u>	Same condition, less flow again, no record of this section included in the report
	13'	S/C	, ,	10	6'	J	
	20'	S/C	Service connection below the	28	8'	J	
			spring line of the pipe		2'	J	
	27'	J	1 0	5	1'	CPC	Completely broken and offset,
	39'	J					voice over called it an offset
	52'	J					joint
	57'	CPC	Questionable	l .	2'	S/C	
	65'	J	-	_	4'	J	Bad offset, 1 ½"
	78'	J		į.	4.5	J	Offset
				1	8'	\mathbf{J}_{\parallel}	
SMH 8	to SM	H 7	Same condition, more flow	1	1'	J	
	15'	J			∠ine i	is 85' lo	ng
	20'	From	this point on, the video is				
			derably blocked by a leave	SMH 8 7			Same condition
	28'	${f J}$	-	1	.3'	J	
	41'	J			27'	J	
	54'	J		4	10'	J	
	67'	J			15'	CPC	Questionable
	81'	${f J}$		5	52'	J	
	93'	${f J}$					
	107'	${f J}$	Separated	<u>SMH 9 1</u>			Same condition
	119'	S/C	-	5	5'	S/C	Service below the spring line of
	134'	J					the pipe
	147'	${f J}$	Questionable	1	7'	S/C	
	160'	${f J}$	_	1	21'	J	
	173'	${f J}$		3	33'	CJ	Questionable upper right,
	186'	${f J}$					sediment buildup in the
	199'	J					bottom of the joint
	212'	${f J}$]	Lots	of sedin	nent buildup at SMH 10
	225'	${f J}$	Separated				~
			_	<u>SMH 10</u>			Same condition
				1	11'	J	
				1	23'	S/C	
				i	28'	J	Offset
				1	42'	J	
				1	E	T	

15' 28' 41'	Ј Ј Ј	Same condition		277' 290' 292'	J J S/C	Some standing water in service
55' 68' 81' 94' 107'	J J J J		<u>SMH</u>		<u>MH 13</u>	More flow, lots of debris at end of line in manhole, line is varies between very clean and lots of dark debris
120' 133' 146' 159' 172'	J J J J			15' 11' to 28'	J 20' J	Dark silty/mulchy debris in line, Potential sag in line or backup from PS
185' 198' 211' 225'	J J J			41' 39' to	J • 60'	Dark silty/mulchy debris in line, Potential sag in line or back up from PS
237' 251' 260	J J S/C	Tap-in, protruding ½", seal seems ok, main line looks ok Where does this go?		54' 67' 80' 78 to	J J 85	Amount of water in pipe decreases considerably Mineral deposits around joint, Dark silty/mulchy debris in
SMH 13 to Si 15' 28'	MH 12 J J	Very dirty all around pipe		93' Lots	J of debri	line s in SMH 13
42' 55' 68'	J J J		SMH	1.5 to 5	•	pe 3, Nov. 1999 Same type of settled debris as in Medinah with clear water
80' 94' 107' 120'	J J J			18' 32'	J	Broken pieces of brick? in line Separated
133' 146' 158'	յ յ յ	Questionable		44' 45'	J	y less water Brick in line Separated
173' 186' 199' 212'	J J J			58' 71' 84' 97'	Ј Ј Ј	Questionable
225' 238' 251' 264'	J J J					- conversation about finding a aven't found one yet, could be

	why there is so much less water here than in the Medinah line		Tape 4, November 1999			
	123'		ime	SMH 1 8 to S	MH 1.9 Per voiceover, they did heavy	
		J 544	on increase to sludge depth	514111 1.0 to 5	cleaning in these three line	
	123'		en increase to sludge depth		sections, removed about 3-4	
	131'	_	ge going back down		yds. sand and gravel. Still	
	136'	J	Separated		noted a considerable amount	
	143'	Sludg	ge slows and picks up again		of sludge and rocks/bricks	
SMH	1.6 to S	MH 1.	7 Little flow	10'	J	
	27'	J	Separated	23'	J	
	41'	J	Separated	36'	J	
	54'	${f J}$	Questionable	49'	J	
	64'	J?	Questionable	62'	${f J}$	
	67'	J	Separated	75'	J	
	80'	J	Questionable	83'	Piece of plastic pipe	
	93'	J	Separated	88'	J	
	97'		alt and brick in line	99'	Two smaller pieces of plastic pipe	
	106'	J		101'	J	
	119'	J		115'	${f J}$	
	132'	J	Separated	128'	\mathbf{J}	
	132	U	Separateu	141'	\mathbf{J}	
SMH	1.7 to S	MH 1	Q	150'	S/C Running clean water ~1 gpm?	
SIVIII	13'	J	<u>o</u>	154'	S/C	
	26'	J	Separated			
	40'	\mathbf{J}	Separated Separated	SMH 1.9 to S	SMH 1.10	
	53'	J	Very Separated	10'	J	
	66'	J	Separated Separated	23'	J	
	00 29'	J	Separated Separated	35'	J	
	29 92'		Separated Separated	40'	Two fist sized rocks	
		J		54'	Sludge, rock and brick buildup,	
	105'	J	Separated Separated	34	blocked line for a bit	
	118'	J	Separated	61'	J	
	131'	J	Separated	88'	\mathbf{J}	
	144'	J		105'	Rock	
	157'	J	Comments d	103	Rock or concrete	
	170	J	Separated	103	J	
	183'	J	Separated	į	J	
	196'	J	Separated	139'		
	209'	J	Questionable	145'	Sludge tapers off, mostly clean line	
	222'	J	Separated	153'	J	
	236'	J	Separated			
	249'	J				
	245'-		Increase in sludge			
	248'	${f J}$				
	261'	${f J}$	Separated			
	275'	J	Separated			

09/26/07 Page 20

SMH 1	.10 to	SMH 1.12			
	21'	J			
	32'	Fist Sized			
	39'	Camera sludge	completely	blocked	by

Tape 6, April 2000

SMH 1.6 to SMH 1.7 Sludge buildup 14' J 27' \mathbf{J} J 42' Separated 55' J Separated 68' J Separated 81' J 95' J Separated J 106' Separated J 120' Separated 132' J

Tape 4, Nov. 1999

End of Line

146'

154'

S/C

SMH 1.8 to SMH 1.9 Re-TV'd after cleaning 11' J 24' J 37' J 50' J Questionable, leaking just J 63' before? 76' J 89' J 102' J J 115' 128' J 141' J 151' S/C

SMH ₁	.9 to	SMH 1.10
	10'	J
	23'	J
	36'	J
	49'	J
	62'	J
	75'	${f J}$
	88'	J
	101'	J
	114'	\mathbf{J}
	128'	J
	141'	J
	154'	J

SMH	1.10	S/C?
9'	J	
22'	J	
35'	J	
49'	J	
61'	J	
74'	J	
88'	J	
101'	J	
114'	J	
127'	${f J}$	
140'	J	