City of Frostburg

LONG TERM CONTROL PLAN UPDATE FOR COMBINED SEWER OVERFLOWS

December 2009

WHITMAN, REQUARDT AND ASSOCIATES, LLP
BALTIMORE, MARYLAND ◆ RICHMOND, VIRGINIA ◆ FAIRFAX, VIRGINIA ◆ NEWPORT NEWS, VIRGINIA
BLACKSBURG, VIRGINIA ◆ PITTSBURGH, PENNSYLVANIA ◆ YORK, PENNSYLVANIA

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CHAPTER 1 – INTRODUCTION

1.1 Purpose and Background Information

1.1.1 The purpose of this document will be to serve as a long-term control plan update, which will be followed by the City of Frostburg, to meet the requirements of the Consent Decree No. 01-C-00-18342L **(Appendix A).** The long-term control plan update outlined in the following pages is intended to span a period of fifteen (15) years. This document will provide a summary of the completed projects and ongoing programs as well as outline the proposed projects, costs, and timeline for the implementation of those projects. The City of Frostburg wishes maintain flexibility with respect to project selection to take full advantage of possible future streetscape improvements and street upgrades, even though it may not fall within the provided schedule.

In 1985 Whitman, Requardt and Associates prepared a Sewer System Evaluation Survey (SSES) for the City of Frostburg which evaluated alternative methods of addressing combined sewer overflows. That study recommended complete separation of the combined sewer system as the most cost-effective alternative. It also identified projects and provided cost estimates for implementing the program. The plan presented in this document is based on the original recommendation of complete separation. The program presented in the SSES has been modified and updated to address projects that have been completed and to reflect current construction costs.

1.1.2 The City is situated on a ridge stemming from Big Savage Mountain, which drains into three water sheds; Jennings Run, George's Creek and Sand Spring. Sewage flow from the Jennings Run drainage area is conveyed through the newly constructed northern diversion sewer located in an abandoned railway tunnel. Flow from Jennings Run utilizes the existing sewer system to the George's Creek pump station. The George's Creek and Sand Spring drainage areas are located in the southern portion of the City. These areas also drain to the George's Creek pump station. The George's Creek pumping station discharges to the Braddock Run Interceptor, which carries this flow through Allegany County and LaVale to the City of Cumberland wastewater treatment plant.

1.1.3 Since March 2003 the City of Frostburg has completed several major projects and many smaller projects which have resulted in the removal and redirection of inflow and infiltration (I/I) out of the sanitary sewer system and into the storm system. Two of these projects were completed in conjunction with major street improvement projects located in Water Street and Broadway Street Priority Project 2.4 (see Figure 1). With the conclusion of these two projects there is now a storm interceptor in place which will carry a substantial volume of storm water away from the sanitary sewer system, thereby reducing the CSO volume at overflow locations "C", "D" and "E". The City has also teamed with Frostburg State University to complete Priority Project 2.1 which removed a overflow

The metering program within the City has been suspended at this time to present the meter data collected to date. Flow Metering data that has been collected during the joint flow metering program with the County is presented in **Appendix E.** of the formal report and a Flow Metering Supplement companion document. The data has been formatted two (2) different ways to assist the reader in identifying flows, at each meter location for Dry and Wet weather periods. The first data format is a summary of all of the meter sites in monthly tables depicting minimum and maximum flow events per day and a single average minimum and maximum value for the metering period. Also included are meter hydrographs which depict the effects of rain events at each meter location.

The remaining data presented in the Flow Metering Supplement document is a summary of each meter location for a single dry day and rain day. The specific day selected depicts the data which was the best quality. No modifications were performed on these data sets. The data will not only illuminate the system characteristics but will also be used to illustrate the success of the completed projects, and guide the City to best prioritize and schedule future projects.

1.1.8 The City has completed a Sanitary Sewer System Evaluation Survey (SSES) for the Upper Georges Creek Sanitary Sewer System (UGCSSS). The SSES findings are presented in **Appendix B.** The SSES program included TV camera observation, Smoke Testing and Manhole inspections.

The study area for the SSES is shown on page B-9, and reaches from Overflow "P" to one (1) sewer reach into the Allegany County sewer system. The CCTV and Manhole Inspection portion of the SSES was completed in February of 2009. The smoke testing portion of the SSES was completed in October of 2009. As a result of the SSES the City was able to identify Priority Projects 2.8 and 2.9 described later in the report. With the completion of the Upper Georges Creek SSES the City has smoke tested approx. 75% the City's sanitary system.

1.1.9 The State Highway Administration (SHA) outfall project has been completed, which connects the storm piping in West Main Street to an outfall to Jennings Run. With the completion of this project the western portion of Route 40 / Main Street is now separated.

1.1.10 As written in the March 2003 Long Term Control Plan, it was discovered that the railroad tunnel which was used to install a 24" sanitary sewer line as part of the North Pump Station Closure project is failing. As a result, the tunnel is becoming unsafe for entry. Also, as tunnel walls and ceiling begin to collapse, the potential for sewer system failure increases dramatically. It is recommended that corrective measures be taken immediately. A large portion of the flow from the Jennings Run drainage shed utilizes this pipeline. See the attached documentation pertaining to the Tunnel in **Appendix C.**

CHAPTER 2 – PRIORITY PROJECTS

2.1 Priority Project 2.8 – Phase VII

Phase VII is required to replace a crushed and failing 15", 18" and 24" combined sewer. A new alignment is required because a portion of the pipeline is located under a home at Maple St. The project will replace the collapsed 15" thru 24" combined sewer from a MH near Taylor St. thru a MH in Center St. with a separated system consisting of 1,000LF of new 15" storm sewer and 1,000LF of new 8" sanitary sewer. (See Fig.-1) 500LF of 8" sanitary sewer and 500LF of storm sewer will be installed from the intersection of East Mechanic St. and Maple St. and connect the new storm and sanitary lines previously mentioned. (See Figure -1) Total project cost for Phase VII is $1,254,000.

2.2 Priority Project 2.9 – Phase VIII

Phase VIII is required to replace the failed portion of the 24" combined sewer which carries flow from project Phase VII to the confluence of collection sewers at Grant and Green Streets. The project consists of a new 24" storm sewer which will carry separated storm flows from Phase VII. Two new structures are necessary to facilitate the separation of the combined system down stream of the new 24" storm sewer. Two 8" and one 18" sewer located in Grant St., Manley Alley and from Richards St. are compromised due to heavy root intrusion and debris. These sewers will be cleaned and insitu-lined to restore their carrying capacity. Lining length is equal to 1,350LF in this area. Also as part of Phase VIII the City will clean and insitu-line the portion of the Georges Creek Interceptor with in the City Limits. The lining length for this portion of the project is 720LF. For the various work locations for Phase VIII (See Figure -1) Total project cost for Phase VIII is $724,000.

2.3 Priority Project 2.10 – Phase IXA and IXB

Phase IXA and IXB consists of approximately 5,450LF of sewer separation located within Charles Street and College Street from Broadway to Center Street and within Stoyer Street from Alley 45 to Wood Street. (See Figure – 1) Total project cost for Phase IXA and IXB is $1,254,000

2.4 Priority Project 2.11 – Phase X

Phase X will consist of approximately 3,340LF of sewer separation along Mechanic Street, Washington Street, and McCulloh Street from Bowery Street to Grant Street.

2.5 Priority Project 2.12 – Phase XI

Priority Project XI will consist of approximately 3,850LF of sewer separation between Mill Street and Warns Lane from Bowery Street to Spring Street. The City is approaching the Maryland State Highway Administration in efforts to enter into a partnership project.

CHAPTER 4 – PROJECT AREAS FOR SANITARY SEWER STORM CONVERSION AND SANITARY SEWER REPLACEMENT

The 2003 LTCP Identified 15 project areas throughout the City; a substantial amount of sewer separation work has been completed to date but not necessarily by project specific areas. In most cases the priority projects and project areas where work has taken place have crisscrossed or included the previously identified work areas. The 15 original project areas have been reduced and redefined as shown in Figure 1-1. These project areas along with the identified Priority Project areas are a means by which to quantify the amount of remaining work and to predict short and long term future costs.

The estimated construction costs and a recommended implementation schedule has been updated and is presented in Table 4-1. Detailed financial information is contained in Appendix D. A total of 6 construction projects along with the Priority Projects have been identified to complete sewer separation throughout the City.

As in the original LTCP additional engineering costs are included for each year for continuation of the long term control plan, including smoke testing, flow monitoring, system modeling and mapping. All costs are in Year 2009 dollars. Project costs escalated for inflation (4%) are included in a separate column of Table 4-1.

4.1.1 Project No. 1 Phase XII: This project will consist of approximately 8667 linear feet of sanitary sewer in improved areas, 33 manholes and 66 house connections for a total project cost of $825,625.

4.1.2 Project No. 2 Phase XIII: This project will consist of approximately 9011 linear feet of sanitary sewer in improved areas, 31 manholes, 134 house connections for a total project cost of $1,009,800.

4.1.3 Project No. 3 Phase XIV: This project will consist of approximately 6067 linear feet of 8-inch sewer in improved areas, 9 manholes and 52 house connections for a total project cost of $562,976.

4.1.4 Project No. 4 Phase XV: This project will consist of 7023 linear feet of 8-inch sanitary sewer in improved areas, 17 manholes and 32 house connections for a total project cost of $596,996.

4.1.5 Project No. 5 Phase XVI: This project will consist of 7696 linear feet of 8-inch sanitary sewer in improved areas, 38 manholes and 71 house connections for a total project cost of $781,010.

4.1.6 Project No. 6 Phase XVII: This project will consist of 15,832 linear feet of 8-inch sanitary sewer in improved areas, 42 manholes and 140 house connections for a total project cost of $1,517,602.

CITY OF FROSTBURG
LONG TERM CONTROL PLAN UPDATE
FOR COMBINED SEWER OVERFLOWS
ESTIMATED TOTAL PROJECT COST[1]
TABLE 4-1

CONSTRUCTION PROJECT	BASE CONST. COST[2] ($1,000)	25% CONTIN.[3] ($1,000)	PROJECT COST[4] ($1,000)	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19	YEAR 20
VI	927	232	1,449																				
Linden St. Eng/Construction											150	222											
West College Ave. Construction										1,122	200												
VII-A	927	232	1,449																				
Eng/Admin											120	140											
Construction											1,122		721										
VII-B	621	155	971																				
Eng/Admin											116	250											
Construction												1,100	1,000										
VIII	850	213	1,329																				
Eng/Admin												260	153	153									
Construction													903	984									
IX-A	1,289	322	2,015																				
Eng/Admin														342	256	281							
Construction															1,330	2,397							
IX-B	661	165	1,033																				
Eng/Admin																224	141	141					
Construction																	987	988					
X	214	54	335																				
Eng/Admin																		279					
Construction																		681					
XI	14	4	22																				
Eng/Admin																			155				
Construction																			347				
XII	49	12	77																				
Eng/Admin																			66				
Construction																			131				
XIII	1,055	264	1,649																				
Eng/Admin																			378	241	241		
Construction																				1,063	959		
XIV	721	180	1,127																				
Eng/Admin																					330	290	
Construction																						1,238	
XV	7	2	11																				
Eng/Admin																						50	
Construction																						228	
XVI	658	165	1,029																				
Eng/Admin																						324	232
Construction																							1,380
XVII	7	2	11																				
Eng/Admin																							50
Construction																							225
ADDITIONAL ENGINEERING																							
(Note 5) Eng/Admin										50	50	50	50	50	50	40	50	50	50	50	50	50	50
Construction																							
TOTALS	7,073	1,768	11,058																				
PROJECT COST				**0**	**0**	**0**	**0**	**0**	**0**	**50**	**1,758**	**2,022**	**2,827**	**1,529**	**1,636**	**2,942**	**1,178**	**2,139**	**1,127**	**1,354**	**1,580**	**2,180**	**1,937**
PROJECTED COST WITH 4% INFLATION				**0**	**0**	**0**	**0**	**0**	**0**	**52**	**1,828**	**2,102**	**2,940**	**1,590**	**1,701**	**3,060**	**1,225**	**2,225**	**1,172**	**1,408**	**1,643**	**2,267**	**2,014**
(Note 6) **PROJECTED CUMULATIVE COST WITH 4% INFLATION**				**0**	**0**	**0**	**0**	**0**	**0**	**52**	**1,880**	**3,983**	**6,923**	**8,513**	**10,214**	**13,274**	**14,499**	**16,724**	**17,896**	**19,304**	**20,947**	**23,214**	**25,229**

(1) ALL COSTS IN 2009 DOLLARS UNLESS NOTED
(2) BASE CONSTRUCTION COSTS INCLUDES MATERIAL, LABOR, EQUIPMENT, AND CONTRACTOR OVERHEAD AND PROFIT
(3) CONTINGENCY INCLUDES POTENTIAL ADDITIONAL COSTS THAT CANNOT BE DETERMINED AT THE PRELIMINARY PLANNING PHASE
(4) TOTAL PROJECT COST INCLUDES BASE CONSTRUCTION, CONTINGENCY, ENGINEERING AND SURVEY
(5) ADDITIONAL ENGINEERING INCLUDES COSTS FOR CONTINUATION OF LONG TERM CONTROL PLAN
(6) OUTYEAR COSTS ARE BASED ON 2009 CONSTRUCTION COSTS WITH ASSUMED 4% ANNUAL INFLATION USING $ = P(1+i)^n$, WHERE P = 2002 CONSTRUCTION COSTS, n = CONSTRUCTION YEAR, i = 4%

Figure 5-1
Typical Trench Detail
8" or 10" Pipe

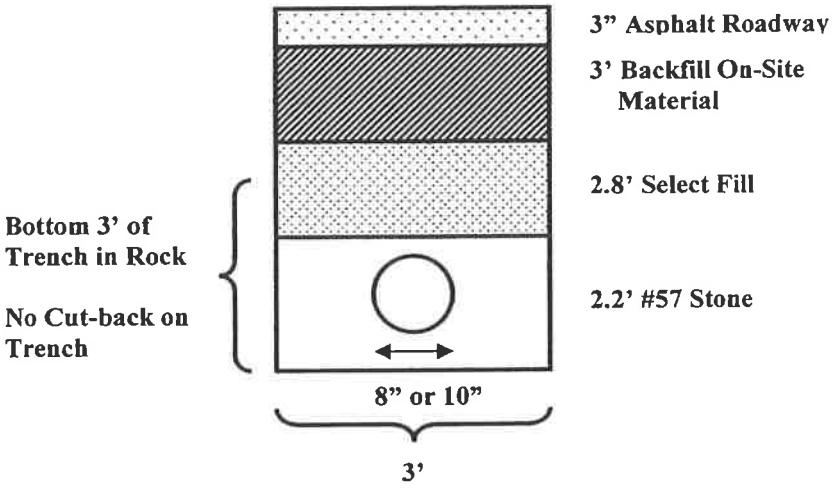
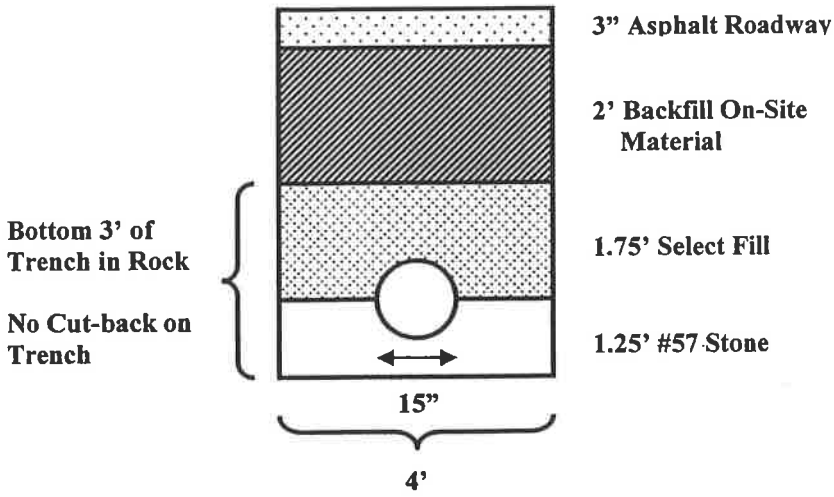


Figure 5-2
Typical Trench Detail
15" Pipe



APPENDIX A

CONSENT DECREE

IN THE CIRCUIT COURT
FOR ALLEGANY COUNTY, MARYLAND

STATE OF MARYLAND DEPARTMENT OF THE ENVIRONMENT Plaintiff, v. THE MAYOR AND CITY COUNCIL OF FROSTBURG, et al. Defendants	*	CONSOLIDATED CASE NUMBER 01-C-00-18342L

CONSENT DECREE AND JUDGMENT

The State of Maryland, Department of the Environment (the "Department or "MDE"), is empowered pursuant to the powers, duties, and responsibilities vested in and imposed upon the Secretary of the Environment by §§ 1-301 and 9-301 through 9-344, Inclusive, of the Environment Article, Annotated Code of Maryland, to implement and enforce environmental laws, including the water pollution control laws, of the State of Maryland, and, accordingly, filed these actions alleging that:

1. Each defendant in the above-captioned cases owns and/or operates a combined sanitary wastewater and storm water sewer system ("combined sewer system") that conveys waste, either directly or through one or more downstream combined sewer systems, to the Cumberland Wastewater Treatment Plant. During wet weather, these combined sewer systems overflow, discharging untreated sanitary and storm water to waters of the State.

TRUE COPY, TEST:
Dawn D. Lendsey
Clerk

a. Cumberland's discharge permit requires Cumberland to develop and implement an LTCP no later than November 1, 1998. On October 28, 1998, Cumberland submitted an LTCP to the Department for review and approval. Phase I of the plan has been approved by the Department and includes provisions for improvements to the collection system related to the C&O Canal Rewatering Project, including increasing the size of pipes and providing greater storage capacity. Phase II of the plan, which is tentative, includes providing storage in underground tanks for 10-20 million gallons of wastewater that will subsequently be metered to the Plant for treatment and final discharge. Alleging that it lacks needed information with respect to sewage flows generated from the City of Frostburg, the Allegany County Sanitary District, and the LaVale Sanitary Commission, Cumberland has not submitted a schedule for implementation of Phase II of the proposed LTCP. As such, the requirement to develop and implement an LTCP has not been satisfied.

b. Frostburg's discharge permit requires Frostburg to develop and implement an LTCP no later than July 1, 1999. Frostburg has expressed its intent to completely separate its sewer system. On January 23, 2001, Frostburg submitted a document identified as an LTCP to the Department. However, the Department responded indicating that the plan could not be approved because the plan is incomplete in that it does not provide an implementation schedule for the proposed sewer separation projects.

c. The LaVale Sanitary Commission's discharge permit requires the Commission to develop and implement an LTCP no later than June 1, 1999. LaVale submitted a draft LTCP on March 7, 2001. However, the Department responded indicating that the draft could not be approved because it does not include documentation that flows

I. COMPLIANCE SCHEDULE

Long Term Control Plans—Development and Implementation

A. Submission of LTCPs.

1. Frostburg: On or before March 31, 2003, Frostburg shall submit to the Department for review and approval, and to each other defendant for review and comment, a detailed proposed LTCP including a schedule for its implementation and completion on or before October 1, 2023.

2. Allegany County: Within sixty (60) days after receiving notice of MDE's approval of Frostburg's LTCP, Allegany County shall submit to the Department for review and approval, and to each other defendant for review and comment, a detailed proposed LTCP including a schedule for its implementation and completion on or before October 1, 2023.

3. LaVale: Within sixty (60) days after receiving notice of MDE's approval of Allegany County's LTCP, LaVale shall submit to the Department for review and approval, and to each other defendant for review and comment, a detailed proposed LTCP including a schedule for its implementation and completion on or before October 1, 2023. In the event that the LTCP approved for Frostburg or Allegany County requires substantial modification of LaVale's LTCP, LaVale may request an extension, not to exceed sixty (60) days, of the time for submitting its LTCP.

4. Cumberland: Within sixty (60) days after receiving notice of MDE's approval of LaVale's LTCP, Cumberland shall submit to the Department for review and approval, and to each other defendant for review and comment, a detailed proposed LTCP including a schedule for its implementation and completion on or before October 1, 2023.

B. Comments on LTCPs. Within ninety (90) days after receiving the proposed LTCP of another defendant jurisdiction pursuant to the above paragraphs, each defendant shall submit to the Department any comments on the proposed LTCP and schedule. The Department shall consider such comments in deciding whether to approve the proposed

1. Submit to MDE, no later than January 31 of 2002 and of each subsequent year that this Consent Decree and Judgment is in effect, a report (a) summarizing all connections to portions of the sewer system owned and/or operated by that defendant authorized during the previous calendar year and (b) setting forth the dry weather base flow of its combined sewer system on January 1 of the year in which the report is submitted. This report shall identify for each new connection what the connection serves and the number of number of equivalent dwelling units or "EDU" used. The dry weather base flow reported shall be used to determine the need for Departmental approval of new connections during the year in which the report is submitted, pursuant to subparagraphs 2 and 3, below.

2. Report to MDE, for review and approval, all proposed new connections to portions of the sewer system owned and/or operated by that defendant that are beyond the thresholds set forth in subparagraph 3 below. The report shall include all information necessary to determine if the available capacity of the combined sewer system will accommodate the proposed connections (e.g., EDU, flow, dates of construction). If upon MDE review, it is determined that the proposed connections will not adversely affect the operation of the sewer system or the Cumberland Wastewater Treatment Plant or significantly increase the frequency or severity of overflows, approval for connection will be granted. MDE shall exercise best efforts to complete its review of any request within 30 days of receipt.

3. MDE approval is required in accordance with subparagraph 2 above for each proposed new connection, regardless of its size, beyond the following annual threshold:

a. Cumberland—23,000 gallons per day;

b. Frostburg—8,000 gallons per day;

c. LaVale—5,000 gallons per day; and

submit the proposed SEP, including a schedule for implementing and completing the SEP, to the Department for review and approval. In the event that a SEP is not implemented and completed as approved by MDE within one (1) year of MDE's approval of the SEP, the Defendant shall pay the $5,000 civil penalty by check made payable to the Clean Water Fund within thirty (30) days of written demand for payment by MDE.

IV. STIPULATED PENALTIES

A. Implementation Violations. Each defendant shall pay to the Department, upon demand by the Director of the Water Management Administration, stipulated penalties for failures to meet any deadlines set forth in either this Consent Decree and Judgment or in an approved LTCP, except for those reporting deadlines identified in paragraph IV.B, below. For each missed deadline, the stated penalty shall accrue on the first day of each month of non-compliance. The stipulated penalties shall accrue as follows:

Period of Noncompliance	Penalty per Month
1st month	$1,000
2nd month	$5,000
After 2 months	$10,000

B. Reporting Violations. For the failure to meet deadlines for submission of: (1) progress report required under Section II of this Consent Decree and Judgment, (2) a monthly or annual CSO report required under each defendant's discharge permit, or (3) a dry weather discharge report as required under each defendant's discharge permit, defendants shall pay to the Department, upon demand by the Director of the Water Management Administration, stipulated penalties as set forth below. Reporting deadlines addressed in this paragraph do not include the deadline for submitting an LTCP, which shall be addressed under paragraph IV.A, above. Penalties shall accrue for each day of non-compliance. The stipulated civil penalties shall accrue as follows:

V. PAYMENTS OF PENALTIES

A. All payments of penalties set forth in Section III ("Enforcement") of this Consent Decree and Judgment shall be made payable to the Maryland Clean Water Fund, c/o the Maryland Department of the Environment, Fiscal Services Division, Cash Receipts/Advances Unit, 2500 Broening Highway, Baltimore, Maryland 21224.

B. In the event that a stipulated penalty is not paid according to the instructions in a written demand from the Department, the stipulated civil penalty shall be payable with interest from the original due date to the date of payment.

VI. PERSONS BOUND BY ORDER

This Consent Decree and Judgment shall be binding upon the Department and each defendant and their respective agents, successors and assigns.

VII. NO ADMISSIONS OR WAIVERS

This Consent Decree and Judgment is understood and intended by the parties to be without any admission of liability, and nothing in this Consent Decree and Judgment shall be considered an admission by any party in this proceedings. Nothing contained herein shall constitute a waiver of the rights of the Department to proceed in an administrative or civil action for violations of the terms of this Consent Decree and Judgment, any other terms or conditions of the Permit, or of applicable statutes or regulations, except that upon payment of a stipulated penalty assessed by the Department or waiver by the Department of any stipulated penalty, the Department shall not seek to impose or collect any other additional penalty for the violation upon which the penalty was demanded or waived . The Department may bring any action authorized by law to enforce this Consent Decree and Judgment, including an action for contempt.

VIII. NOTIFICATION

Unless otherwise specified, reports, correspondence, approvals, disapprovals, notices or other submissions relating to or required by this Consent Decree and Judgment shall be in writing and shall be sent to the following:

IX. DELAY

If any event occurs which causes or which a defendant reasonably expects to cause a delay in the achievement of any requirement imposed by this Consent Decree and Judgment, the defendant shall notify the Department, in writing, within ten (10) working days of obtaining knowledge of the occurrence of such event and of its impact on timely compliance. The notice shall identify the cause of the delay, an estimate of the anticipated length of the delay, the measures taken and to be taken by the defendant to prevent or minimize the delay and an estimate of the date by which such measures will be completed. The defendant shall promptly implement all reasonable measures to prevent or minimize any such delay and to comply with all requirements of the Consent Decree and Judgment as soon as reasonably possible. The Department may, at its sole discretion, agree to reduce or dismiss stipulated penalties that arise during the delay. The defendant may request, in writing, an extension of any deadline for any reason, at least ten (10) working days prior to such deadline. The Department may, at its sole discretion, grant an extension upon such a request. The Department's approval shall not be unreasonably withheld.

X. FORCE MAJEURE

A. Each defendant shall perform the requirements of this Consent Decree and Judgment in the manner and within the time limits set herein, unless the performance is prevented or delayed by events which constitute a force majeure. A defendant shall have the burden of proving such a force majeure. A force majeure is defined by an event or circumstance arising from causes not reasonably foreseeable and beyond the control of the defendant, which cannot be avoided or overcome by due diligence and which delays or

XI. DISPUTE RESOLUTION

A. With the exception of disputes addressed informally pursuant to paragraph C below, this Court shall retain jurisdiction of this matter for the purpose of adjudicating all disputes between the Department and each of the defendants arising from implementation of this Consent Decree and Judgment.

B. A dispute shall be considered to have arisen when one party notifies the other parties in writing of its objections. For the purposes of implementing the provisions of this Section, a defendant shall address any written notification required thereunder to the Director, Water Management Administration, Maryland Department of the Environment, 2500 Broening Highway, Baltimore, MD 21224.

C. If the dispute cannot be resolved informally by the parties within thirty (30) calendar days after notice pursuant to paragraph B above (and any additional time granted by MDE), MDE shall issue a written statement setting forth their position regarding the dispute. The defendant shall comply with the position of MDE unless it files a petition with the Court for resolution of the dispute within thirty (30) calendar days of receipt of the written statement. The petition shall set forth the nature of the dispute with a proposal for resolution of the dispute. MDE may, within thirty (30) calendar days of receipt of this petition, file a response with an alternate proposal for resolving the dispute. In any such dispute brought to the Court, the defendant shall have the burden of proving its petition is in accordance with the terms and conditions of this Consent Decree and Judgment by a preponderance of evidence or otherwise in accordance with applicable law.

D. Submission of any matter to MDE and/or the Court for resolution shall not extend any of the deadlines set forth in this Consent Decree and Judgment or waive any of

defendant of its duties to comply with the Clean Water Act, the Environment Article of the Annotated Code of Maryland, the regulations promulgated thereunder, or any applicable permits issued thereunder.

XV. SEVERABILITY

If any provision or authority of this Consent Decree and Judgment or the application of this Consent Decree and Judgment to any party or circumstance is held by any judicial or administrative authority to be invalid, the application of such provision or authority to other parties or circumstances and the remainder of this Consent Decree and Judgment shall not be affected thereby and shall remain in full force.

XVI. CONTINUING JURISDICTION

This Court shall have jurisdiction to enforce the terms and conditions of this Consent Decree and Judgment, to modify the Consent Decree and Judgment upon petition of either party, and to resolve disputes arising under this Consent Decree and Judgment.

XVII. EFFECTIVE DATE

This Consent Decree and Judgment shall become effective as of the date of entry by the Circuit Court for Allegany County and shall remain in force and effect until all obligations and terms referred to in Section I ("COMPLIANCE SCHEDULE") have been completed or satisfied.

XVIII. SIGNATORIES

The Department and each defendant hereby consent to the entry of this Consent Decree and Judgment. The signatory for each defendant certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and Judgment and to execute and legally bind the defendant to this document.

DATE: November 8, 2001

ATTESTED BY: Carol A. Jeffries

County Clerk, Allegany County

DATE: November 8, 2001

LAVALE SANITARY COMMISSION

BY: David D. Smith

DAVID D. SMITH

~~President~~ Chairman

DATE: 12/14/01

ATTESTED BY: David L. Windsor

SECRETARY - TREASURER

DATE: 12/14/01

MAYOR OF FROSTBURG AND THE CITY COUNCIL OF FROSTBURG

BY: John N. Bambacus

JOHN N. BAMBACUS

Mayor

DATE: 12/13/01

ATTESTED BY:

ANDREW P. FULGHUM

City Administrator

DATE: December 13, 2001

WILLIAM M. RUDD
County Attorney
Allegany County, Maryland

Date: 11/8/01

JEFFREY GETTY
City Attorney
City of Frostburg, Maryland

Date: 12/13/01

EDWARD CROSSLAND
~~Town Attorney~~
~~Town of LaVale and~~ LaVale Sanitary Commission

Date: 12/13/01

JACK PRICE
City Attorney
City of Cumberland, Maryland

Date: 12/13/01

APPENDIX B

GEORGES CREEK SSES SUMMARY

Table of Contents

WHITMAN, REQUARDT & ASSOCIATES, LLP
ENGINEERS · ARCHITECTS · PLANNERS
EST. 1915

February 20, 2009

Christopher Hovatter
Director of Public Works
City of Frostburg, MD
59 East Main Street
Frostburg, MD 21532

Re: Upper Georges Creek SSES

Mr. Hovatter:

Whitman Requardt and Associates, LLP. (WRA) is pleased to provide the City with documentation summarizing SSES efforts for the Upper Georges Creek Collection System (UGCCS). As you are aware Frostburg has recently completed Part-I and Part-II of the UGCCS SSES to better determine the condition of the sanitary and storm sewers in the Upper Georges Creek sewer drainage area. Smoke testing and ground water will be completed as the warmer weather approaches which is the ideal time for these activities.

The City has identified these areas as priority project areas as VII-A, VII-B and VIII. Area VII-A and VII-B is located along Mechanic St from Taylor St to Bowery St. Area VIII is located along Paul St from Bowery St to Grahmtown.

A portion of the SSES study area is located in the Georges Creek stream area, the system runs parallel and crosses the stream from Paul St, along Grant St SR-936 through Grahmtown. Special attention should be given to this portion of the system because of the habitat that exists along streams and creeks. Any sanitary contribution in these areas can be detrimental to aquatic life and vegetation. Water borne bacteria can also be harmful to humans if exposed. Georges Creek is also listed on the State of Maryland's 303(d) list submitted to the EPA as impaired by sediments, bacteria and impacts to biological communities.

As part of the City's NPDES permit for 13 overflow points the City is required to perform sampling for pollutant levels at outfall points indicated in the permit. Four (4) of these points reside in the UGCCS therefore any reduction of pollutants entering the Georges Creek Watershed will benefit the stream and assist in meeting the City's NPDES permit requirements.

The Upper Georges Creek study area reaches from Mechanics Street to Grahmtown Town just inside Allegany County limits and is comprised of two major sewer conduits, 1- 18" storm sewer and 1-24" combined storm / sanitary sewer. Major sanitary and storm flows are conveyed from the City to the Georges Creek Pumping Station thru these two trunk lines to prevent overflows within the City.

3701 Pender Drive, Suite 210, Fairfax, Virginia 22030 www.wrallp.com Phone: 703.293.9717 Fax: 703.273.6773
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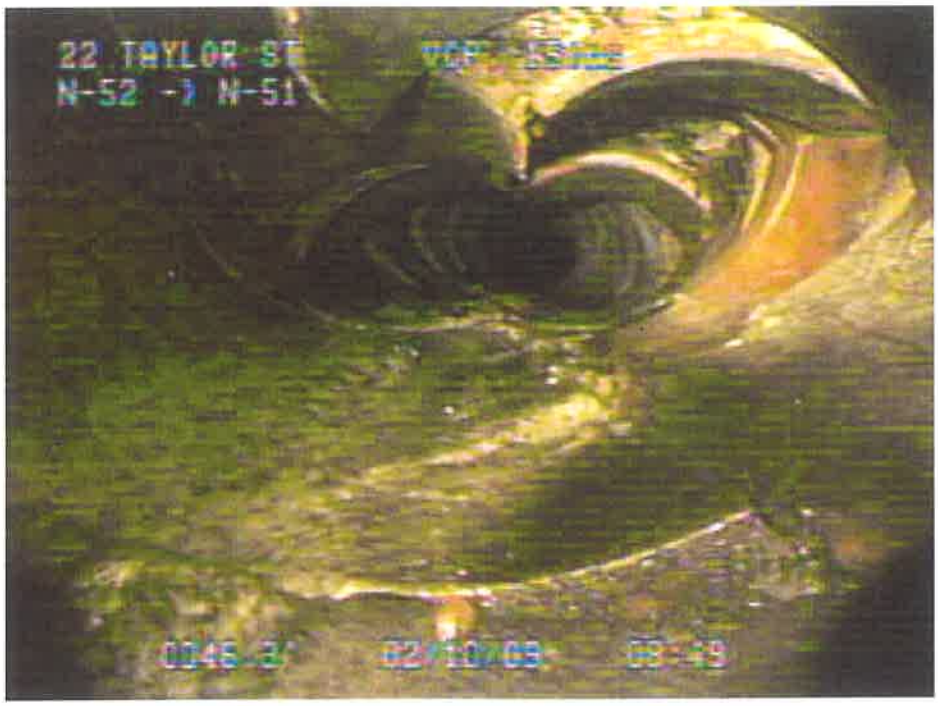
The main thrust of the SSES was to identify areas within the City that may be deficient for collecting and conveying storm and sanitary flows to the down stream collection system.

The following are the findings of the SSES for the Upper Georges Creek Collection System (UGCCS). As a general statement the sewers in the UGCCS have deficiencies which would be customary in sewers of this age. A vast majority of the collection system in this area is made up of vitrified clay pipe which has shifted and or has begun to fail in the form of offset joints, horizontal and longitudinal cracks and broken sections (missing pieces). As a result large amounts of inflow and infiltration were observed during the SSES. An effort should be made to rehabilitate the smaller structurally sound tributary sewers to reduce the amount of I/I entering the system.

The attached map identifies the VII-A, VII-B and VIII project areas. Project VII-A and VII-B includes the previously mentioned 24" combined sewer. This sewer conveys a large portion of the sewer flow generated from the western side of the City. CCTV work was performed on the portion from Taylor St to where the sewer enters neighboring Allegany County. The portion of sewer between Taylor St and Maple St is 15" at approx. 46' west of Maple St. the pipe line has collapsed. See img.-1



Img-1

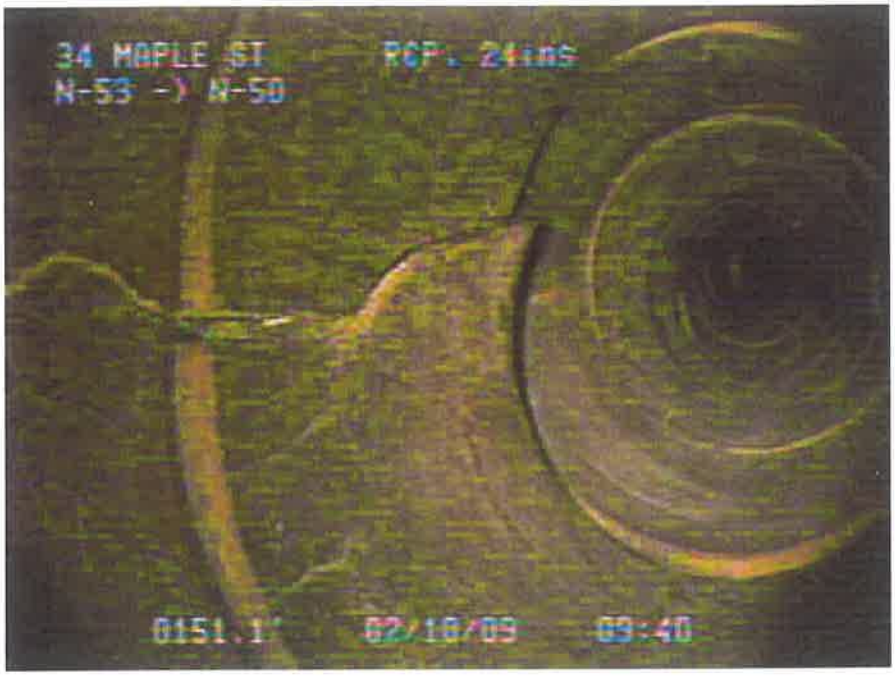
The above condition is recorded for approx. 60 liner feet. At approx. 130' east of Taylor St the pipeline has deformed and cracked. See img.-2

Img-2

The pipe line changes to 18" at Maple St and continues as 18" to Center St., at approx. 20' east of Maple St a large section of the pipeline is missing with soil visible. See img.-3

Img.-3

At approx. 150' east of Maple St. the pipeline is fractured and failing. See img.-4

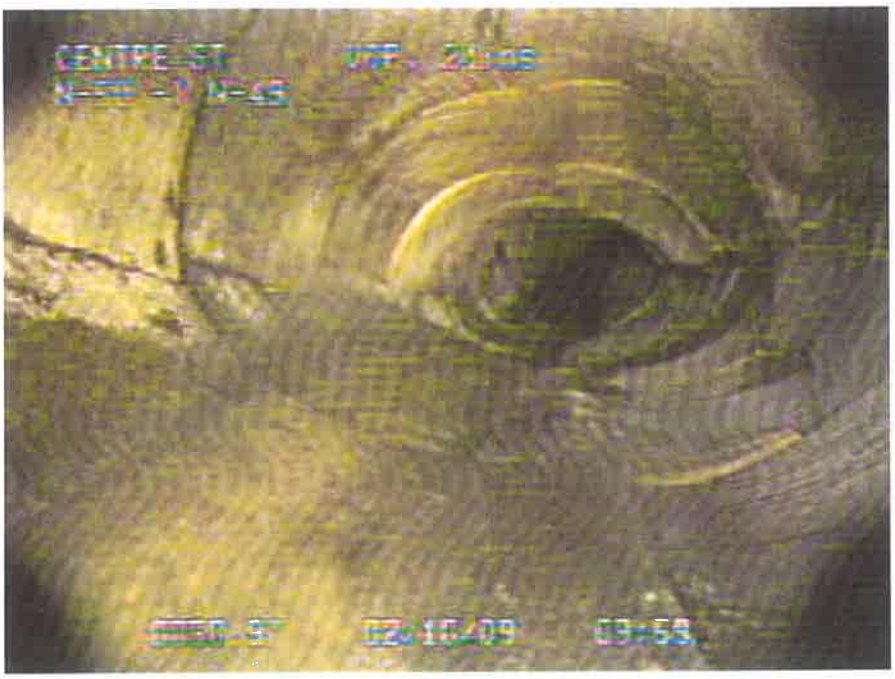


Img.-4

At approx. 175' east of Maple St. at Center St. a large section of the pipe is missing. See img.-5

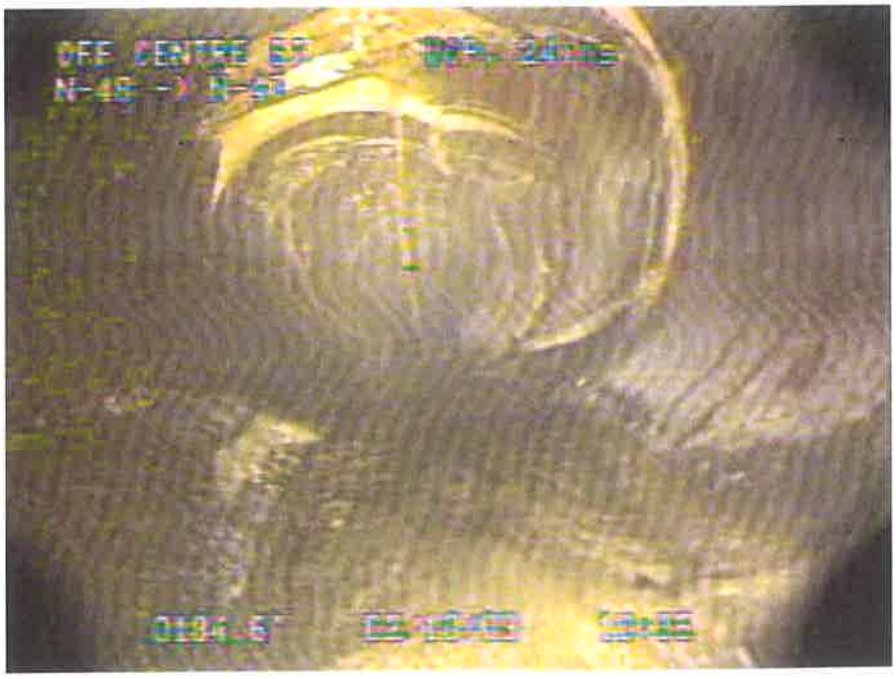
Img.-5

At Center St. the pipeline changes size to 24", at approx. 45' the pipe is fractured and failing. This condition exists for approx. 60 liner feet. See img.-6



Img.-6

From Center St to Bowery St the pipeline is 24", at approx. 185' south east of Center St the pipeline is fractured and collapsing . See img.-7

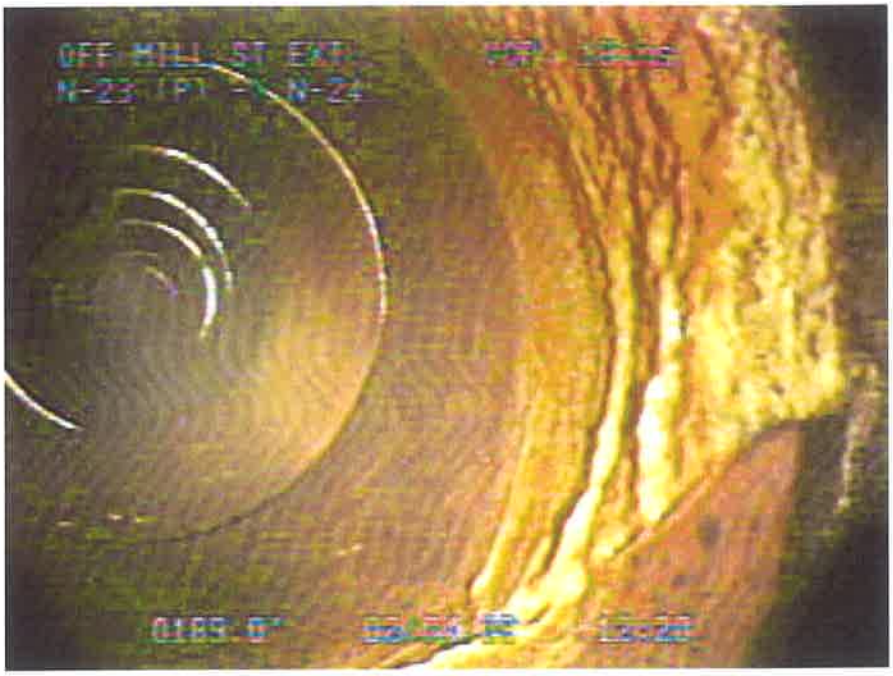


Img.-7

There are several other cases over the length of the pipeline that are in very similar condition. See img.-8 ,9 and 10 for examples.

Img.-8

Img.-9



Img.-10

Also televised was a portion of a 18" VCP located in Grant St. this 18" pipeline carries flow from as far away as Main St. CCTV was completed on the first 300' feet located in the Georges Creek study area. At approx. 15' there is root intrusion and fractured pipe. See img.-11

Img.-11

At approx. 23' there is heavy root intrusion and fractured pipe. See img.-12

Img.-12

The CCTV work was terminated in this line due to impassable conditions. A root cutter truck and flush truck should be used on this line to complete the analysis. The length of this line to the next upstream manhole is approx. 200'.

Within the project areas VII-A, VII-B and VIII there are additional sections of pipeline which require rehabilitation but the most critical sections have been selected in order to prevent a catastrophic failure which would prevent the western and central portion of the City's sanitary flow from reaching the Georges Creek Pumping Station.

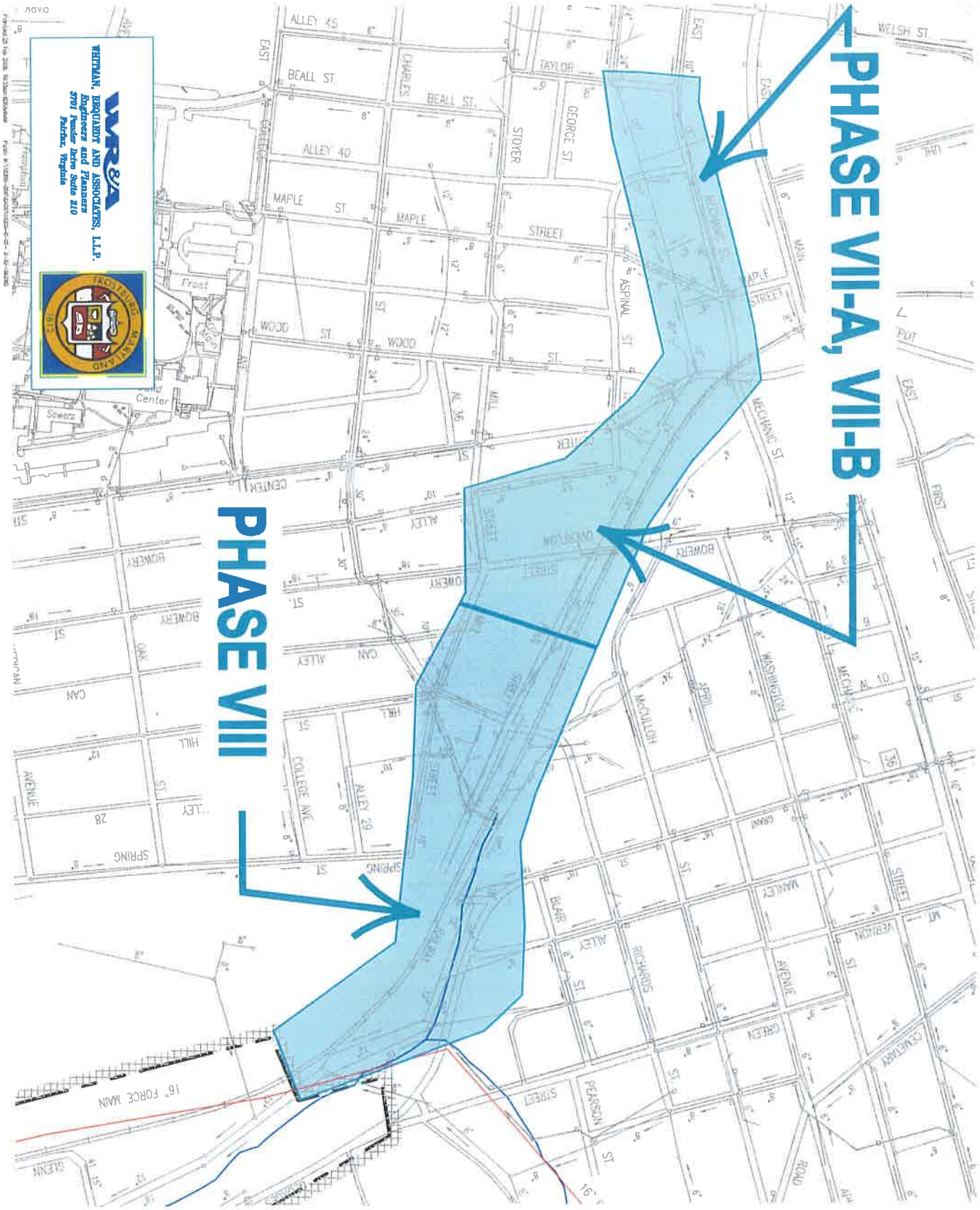
As of the writing of this SSES excerpt Whitman Requardt and Associates, LLP. has begun the preliminary engineering for a solution to these two critical project elements. A cost estimate is provided to assist you during your funds appropriation process.

During you review of this document should any questions arise please contact our office.

Very truly yours,

Whitman, Requardt & Associates, LLP

Richard Brannan
Project Manager
cc: 18356


PHASE VII-A, VII-B
PHASE VIII
WR&A
WHITMAN, REQUARDT AND ASSOCIATES, L.L.P.
Engineers and Planners
3751 Pender Drive Suite 210
Fairfax, Virginia
ALLEY 45
BEALL ST
ALLEY 40
MAPLE ST.
WOOD ST
Center
Sewers
EAST
CHARLES
STOYER
GEORGE ST
WELSH ST
TAYLOR
MAPLE
STREET
ASPINAL ST
MECHANIC ST
MAIN
FIRST
CENTER
BOWERY
ALLEY
COLLEGE AVE
ALLEY 28
SPRING
HILL
AVENUE
McCULLOH
WASHINGTON
MARKET
BLAIR
RICHARDS
VERNON
GREEN
CEMETERY
PEARSON
ROAD
16" FORCE MAIN

CCTV Surveys List for WRA

Number of surveys in this list is 38 **as of** Friday, February 13, 2009 **Unit of measure:** ft

Setup	Date	Street	Start MH	Finish MH	Dir	Size Inch	Pre Clean	Media Number	Scheduled Length	Surveyed Length
1	2/3/2009	GRANT ST 84	N-1-(Q)	N-2	D	12	N	FB-1	133.8	133.8
2	2/3/2009	GRANT ST 114	N-2	N-3	D	12	N	FB-1	242.6	242.6
3	2/3/2009	MANLEY ALLEY	N-16	N-2A(JN)	D	8	J	FB-1	319.0	315.8
4	2/3/2009	GREEN ST AT GEORGES CREEK	N-18	N-13 (U)	D	8	J	FB-1	372.8	372.8
5	2/3/2009	GREEN ST AT GEORGES CREEK	N-13 (U)	N-5	D	8	J	FB-1	15.5	15.5
6	2/3/2009	120 GRANT ST	N-12 (R)	N-17	U	8	J	FB-1	425.0	81.7
7	2/3/2009	120 GRANT ST	N-12 (R)	N-3	D	8	J	FB-1	12.2	12.2
8	2/4/2009	GRANT ST 120	N-3	N-4	D	12	N	FB-1	324.2	324.2
9	2/4/2009	GRANT ST 120	N-4	N-5	D	12	N	FB-1	16.0	16.0
10	2/4/2009	OFF GRANT ST	N-5	N-6	D	12	N	FB-1	195.6	195.6
11	2/4/2009	OFF GRANT ST	N-6	N-7	D	12	N	FB-1	170.0	74.9
12	2/4/2009	OFF MILL ST EXT.	N-23 (P)	N-24	D	18	N	FB-1	266.2	266.2
13	2/4/2009	118 GRANT ST	N-8	N-9	D	18	N	FB-1	210.5	210.5
14	2/4/2009	120 GRANT ST	N-9	N-10	D	18	N	FB-1	336.0	267.4
15	2/4/2009	120 GRANT ST	N-10	N-9	U	18	N	FB-1	336.0	68.6
16	2/4/2009	OFF GRANT ST (CLISE COAL)	N-10	N-11	D	18	N	FB-1	377.4	377.4
17	2/4/2009	84 GRANT ST	N-15	N-1	D	18	N	FB-1	22.5	22.5
18	2/4/2009	84 GRANT ST	N-1	N-24A	U	18	N	FB-1	8.0	8.0
19	2/4/2009	GRANT ST	N-15	N-14	U	18	N	FB-1	300.0	32.5
20	2/4/2009	36 PAUL ST	N-36	N-46	U	18	N	FB-1	303.2	303.2
21	2/4/2009	36 PAUL ST	N-36	N-33	D	18	N	FB-1	296.2	296.2
22	2/9/2009	101 PAUL ST	N-24	N-33	U	18	N	FB-2	149.0	149.0
23	2/9/2009	22 TAYLOR ST	N-51	N-52	D	15	N	FB-2	600.0	412.7
24	2/9/2009	22 TAYLOR ST	N-52	N-51	U	15	N	FB-2	600.0	47.6
25	2/10/2009	34 MAPLE ST	N-52	N-53	D	24	N	FB-2	32.0	32.0
26	2/10/2009	34 MAPLE ST	N-53	N-50	D	24	N	FB-2	175.1	175.1
27	2/10/2009	CENTRE ST	N-50	N-49	D	24	N	FB-2	180.1	180.1

Savin Engineers, P.C.

Savin Engineers, P.C. Phone: (914) 769-3200 Fax: (914) 747-6686

Setup	Date	Street	Start MH	Finish MH	Dir	Size inch	Pre Clean	Media Number	Scheduled Length	Surveyed Length
28	2/10/2009	OFF CENTRE ST	N-49	N-48	D	24	N	FB-2	16.1	16.1
29	2/10/2009	OFF CENTRE ST	N-48	N-46	D	24	N	FB-2	552.1	552.1
30	2/10/2009	84 GRANT ST.	N-1	N-8	D	18	N	FB-2	174.4	174.4
31	2/10/2009	81 MECHANIC ST.	N-54	N-55	U	18	N	FB-2	492.1	492.1
32	2/10/2009	85 MECHANIC ST.	N-54	N-56	D	18	N	FB-2	242.0	242.0
33	2/11/2009	PAUL ST AT BOWERY	N-58	N-57	U	18	N	FB-2	282.0	37.9
34	2/11/2009	PAUL ST AT BOWERY	N-57	N-58	D	18	N	FB-2	282.0	244.6
35	2/11/2009	PAUL ST AT BOWERY	N-58	N-59	D	18	N	FB-3	624.0	174.0
36	2/11/2009	PAUL ST AT BOWERY	N-59	N-58	U	18	J	FB-3	624.0	450.0
37	2/11/2009	OFF HILL ST EXT.	N-22	N-23	D	24	J	FB-3	153.2	153.2
38	2/11/2009	OFF HILL ST EXT.	N-22	N-21B	U	24	J	FB-3	200.0	342.0
								Total Scheduled Length	8,218.8	
								Total Length Surveyed		7,512.5

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

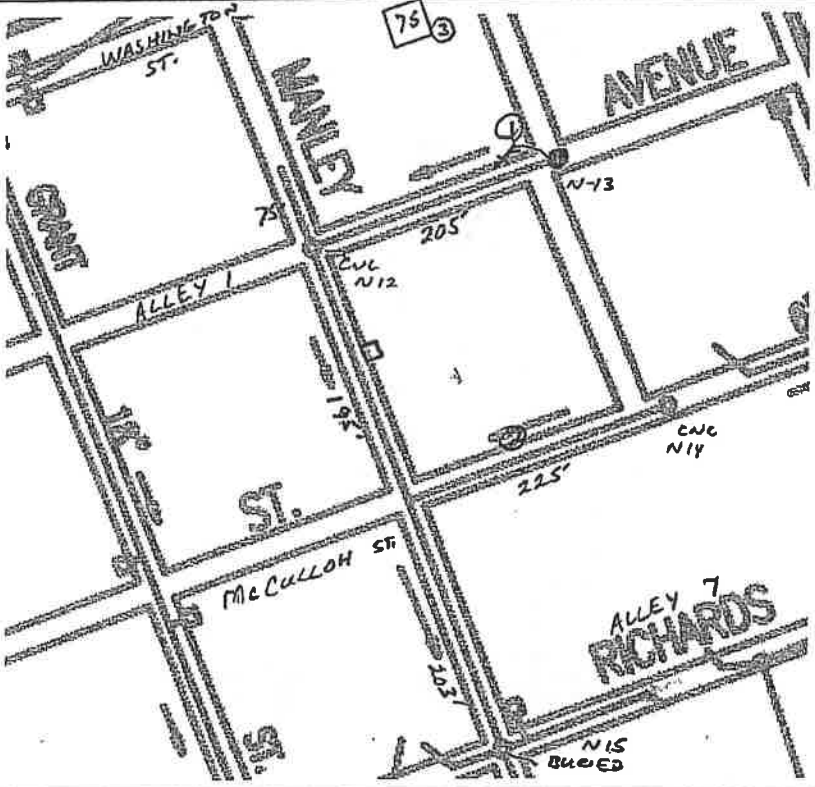
Engineer: WRA Date: 10-20-09 Subsystem: _____

Owner: FROSTBURG M.D. Time: _____ Weather: DRY

Project Name/ No.: 1126.03.02 Map No.: _____

Location: MANLEY AL + ALLEY 1

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
1	GRASS ALONG PIPE (MAIN LINE) GRASS 200 ☐			✓		1
2	Cracks IN SIDEWALK + WALL BASE 122 CONC. 200 ☐ 200 ☒	✓				2
3	75 WASHINGTON ST. ROOF LEADER 400 ☒ SHINGLES	✓				3

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

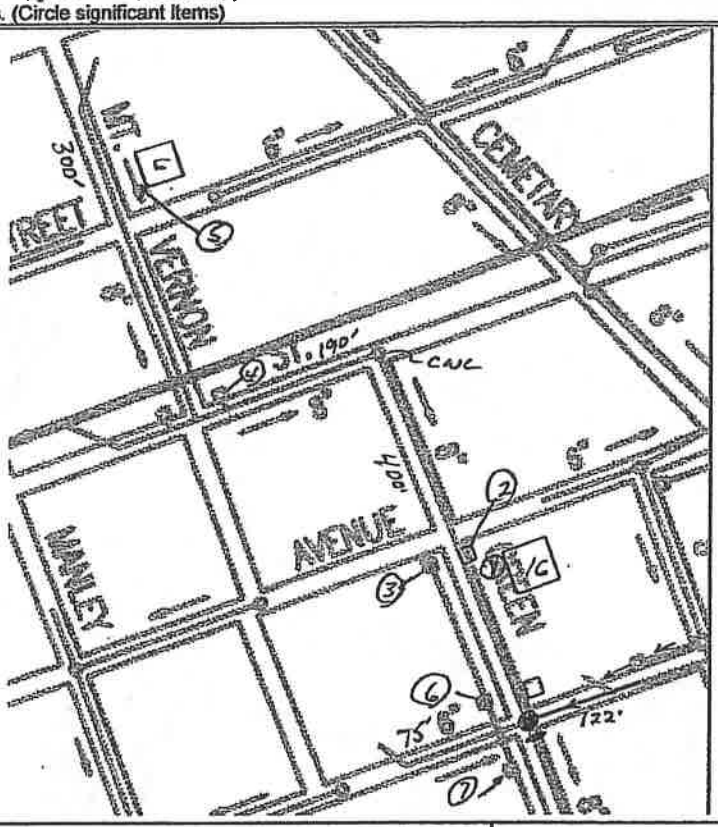
Engineer: W RA Date: 10-20-09 Subsystem: _____

Owner: FREDERICK MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: GREEN ST + McCULLOH ST

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	HOLE IN CONCRETE AT CORNER OF 1G GREEN WILL TAKE ROOF DRAINAGE 500 ☐ ROOF/200 ASPH	✓				5
(2)	CB 2000 ☐ ASPHALT		✓			6
(3)	CB 2000 ☐ ASPHALT		✓			7
(4)	CB 2000 ☐ ASPHALT		✓			8
(5)	ROOF LEADER AT 6 MTVERNON 400 ☐ SHINGLES	✓				9
(6)	CB 2000 ☐ ASPHALT		✓			10
(7)	CB 2000 ☐ ASPHALT		✓			11

Recommendations: Dye Test Storm Sewer Yes: X No: ____ TV Inspect: Yes: ____ No: ____

Additional Comments: Yes: ____ No: ____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

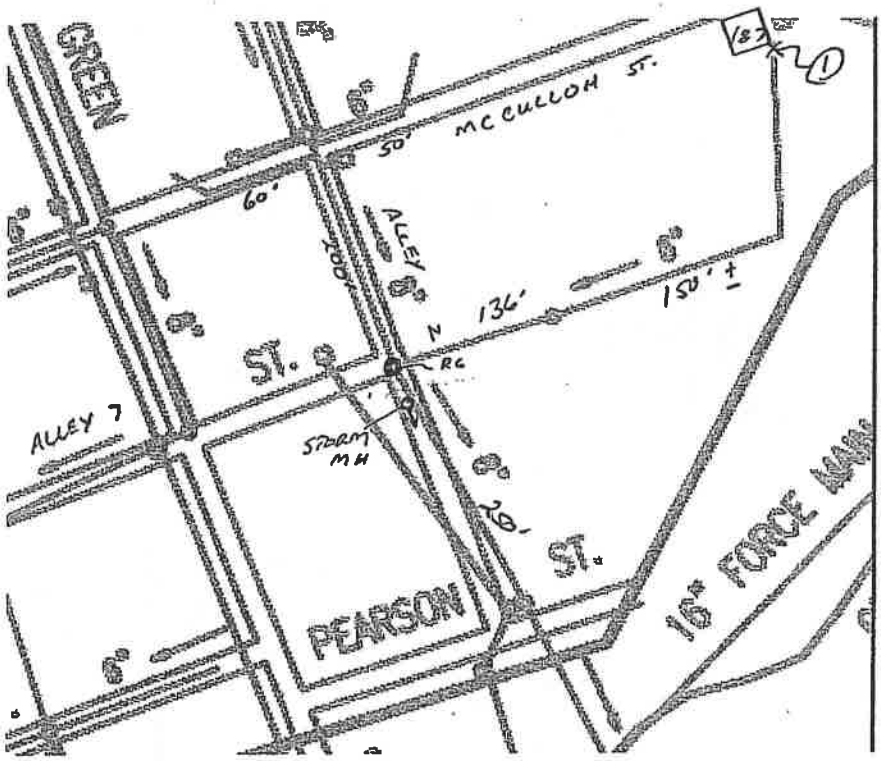
Engineer: CJRA Date: 10-20-05 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: ALLEY 2 + MC CULLOH ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADER SE CORNER OF 187 MC CULLOH 500 ☒ SHINGLES	✓				15
(2)	CB NR 161 MC CULLOH ST. 1500 ☒ ASPHALT		✓			16

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

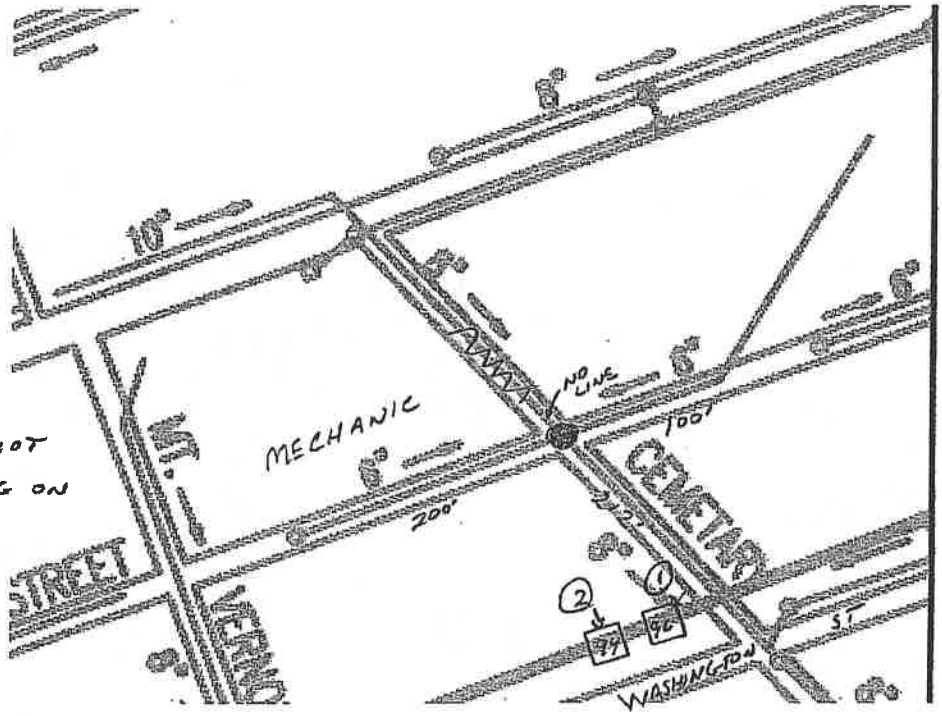
Engineer: WRA Date: 10-20-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: CEMETARY + MECHANIC.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



THESE WERE NOT SEEN SMOKING ON DOWN STREAM SET UP.

	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADER ON BACK OF 96 WASHINGTON 500 ☐ SHINGLES	✓				27
(2)	ROOF LEADER ON BACK OF 96 WASHINGTON 700 ☐ SHINGLES	✓				28

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

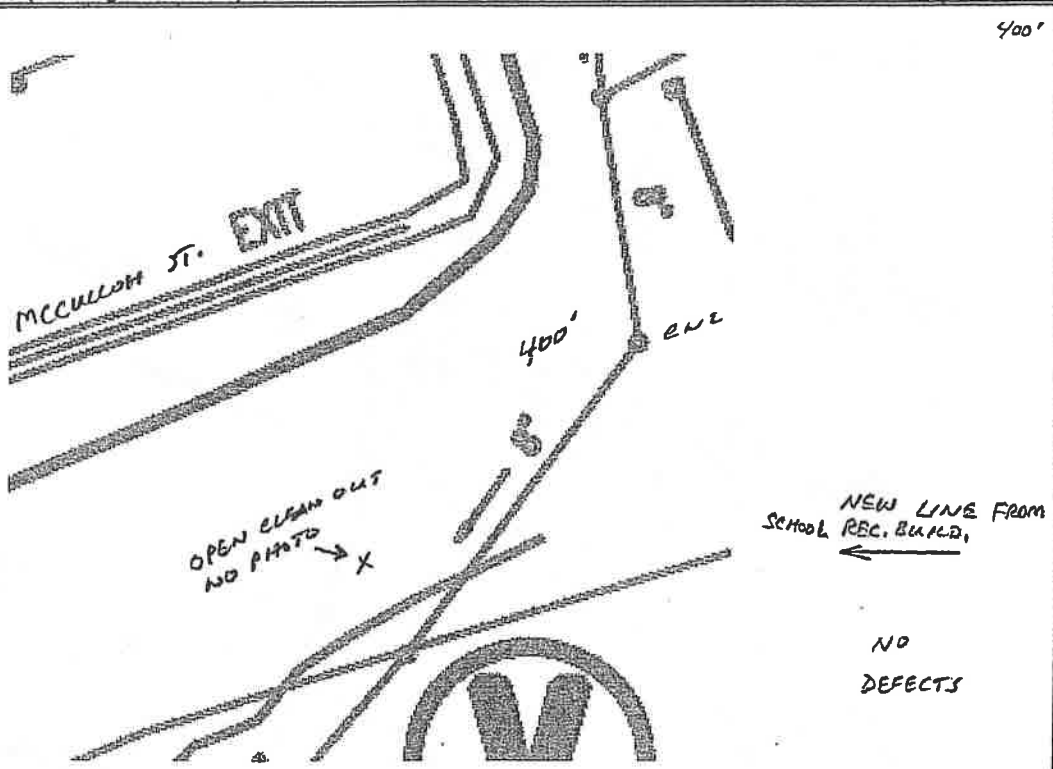
Engineer: WRA Date: 10-20-09 Subsystem: _____

Owner: FROSTBURG MD. Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: OFF EAST END OF MCCULLOH ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

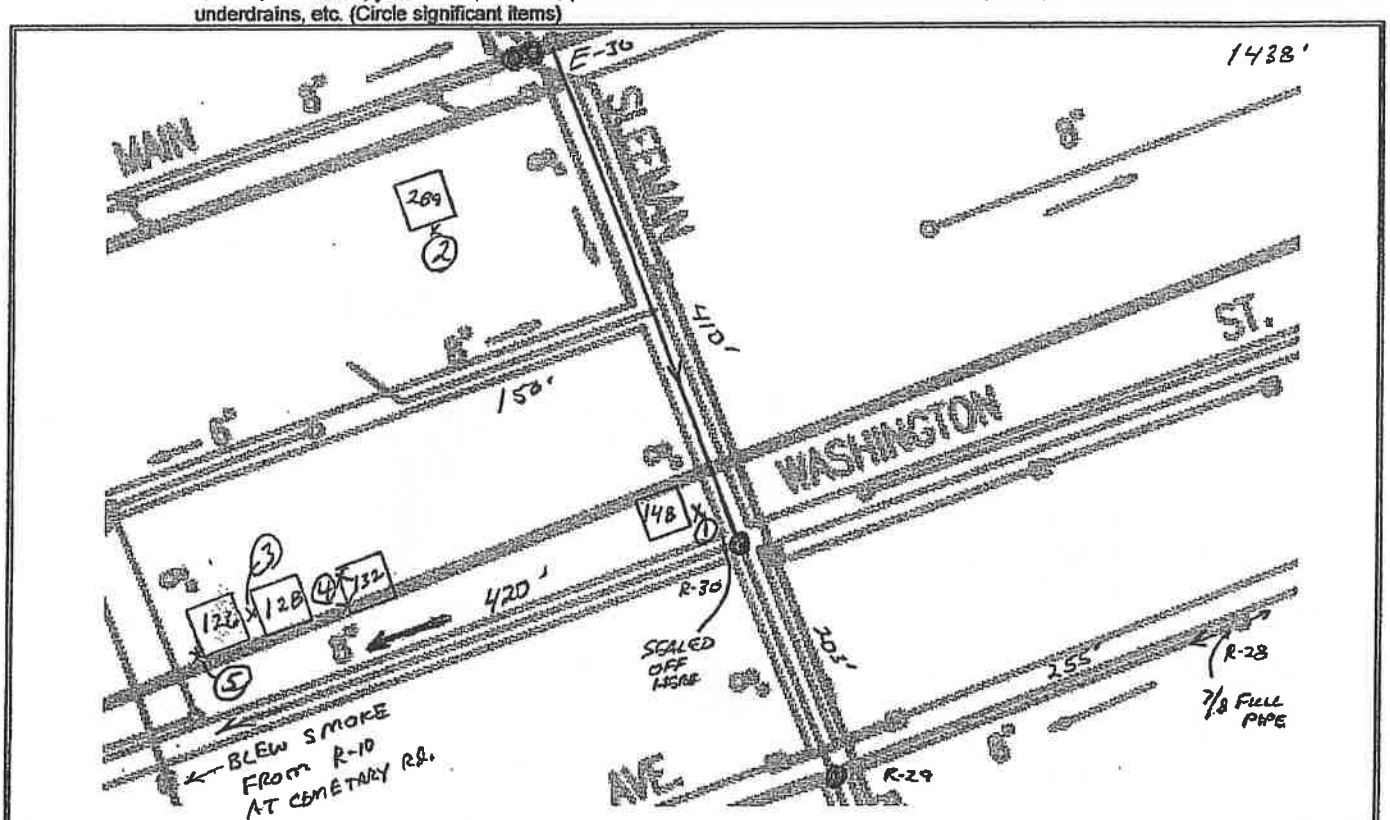
Engineer: W RA Date: 10-20-09 Subsystem: _____

Owner: FROSTBURG MD. Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: SLEEMAN ST & WASHINGTON ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	GRASS + CONCRETE AREA AT BILCO DOORS 148 WASHINGTON ST. 100 ☒ GRASS	✓				40
(2)	ROOF DRAINS ON 289 MAIN ST. APT. BUILD. 1000 ☒ SHINGLES	✓				41, 42 43
(3)	ROOF LEADER AT 128 WASHINGTON ST. (SIDE LEFT) ALSO FROM IN BACK (GATE LOCKED)	400 ☒ ✓				45
(4)	ROOF LEADERS AT 132 WASHINGTON ST 500 ☒	✓				46
(5)	ROOF LEADER LEFT FRONT ON 126 WASHINGTON ST. 200 ☒		✓			47

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Engineer: W R A Date: 10-21-09 Subsystem: _____

Owner: FROSTBURG, MD Time: _____ Weather: DRY

Project Name/ No.: 1126,3-2 Map No.: _____

Location: MAIN ST. AT SLEEMAN

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)

	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(9)	SMOKE AT EDGE OF DRIVEWAY 264 E. MAIN 50 ☒ GRASS & ASPHALT			✓		58
(10)	FRONT LAWN AT 270 E. MAIN ST. 100 ☒ GRASS		✓			59

Recommendations: Dye Test Storm Sewer Yes:_____ No:_____ TV Inspect: Yes:_____ No:_____

Additional Comments: Yes:_____ No:_____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

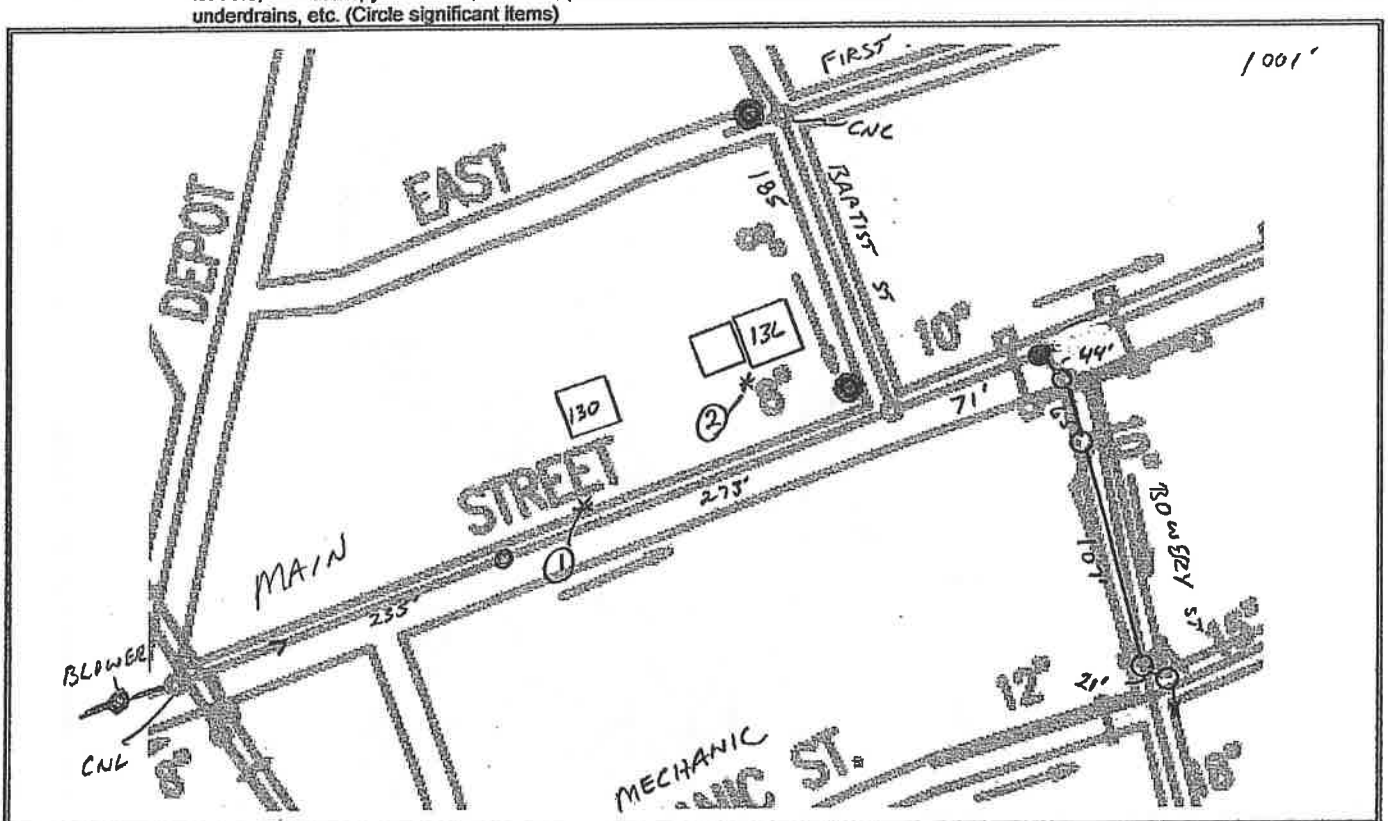
Engineer: WRA Date: 10-21-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: E. MAIN ST & DEPOT

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
①	GRATING AROUND TREE WEST OF 130 EAST MAIN ST. 40 ☒ CONCRETE SIDEWALK		✓			63
②	HOLE IN FRONT LAWN AT 136 E. MAIN 50 ☒ GRASS		✓			64

Recommendations: Dye Test Storm Sewer Yes:_____ No:_____ TV Inspect: Yes:_____ No:_____

Additional Comments: Yes:_____ No:_____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Engineer: WRA Date: 10-21-09 Subsystem: _____

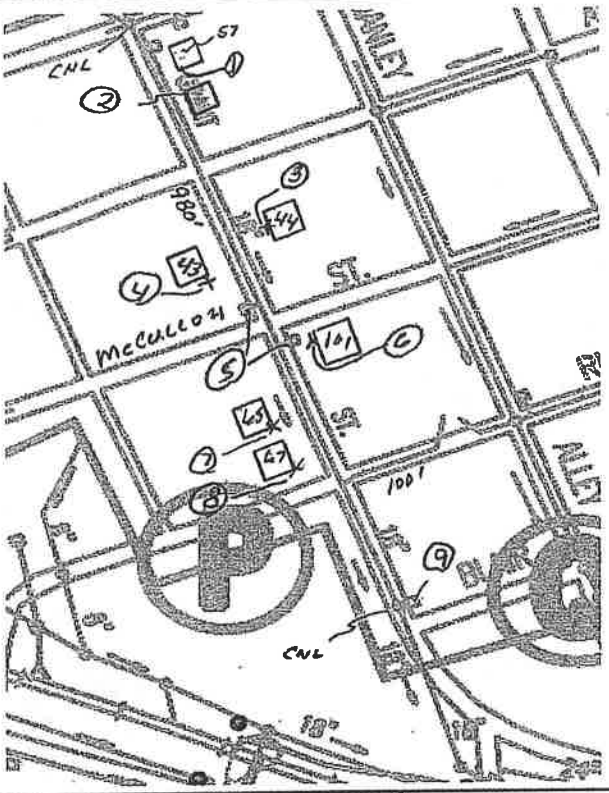
Owner: FROSTBURG MD. Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: GRANT ST + McCULLOH ST

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)

BLEW SMOKE FROM UPSTREAM MH. MAIN ST. NO OTHER UPPER ACCESS TO LINE.



980'

(9) CB AT BLAIR ST (MAJOR) 8,000 ☒ ASPHALT PHOTO 82

	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADER AT 57 WASHINGTON ST. 500 ☒ SHINGLES	✓				73
(2)	ROOF LEADER AT 30 GRANT ST W/SUMPUMP 500 ☒ + SHINGLES		✓			74
(3)	ROOF LEADER AT 44 GRANT ST. 600 ☒ SHINGLES		✓			75
(4)	ROOF LEADER AT 43 GRANT ST. 500 ☒ SHINGLES		✓			76
(5)	TWO CB AT McCULLOH & GRANT 12,000 ☒ ASPHALT	✓				77
(6)	ROOF LEADER AT 101 McCULLOH ST. W/SUMPUMP 600 ☒ SHINGLES PLUS		✓			78,79
(7)	ROOF LEADER AT 65 GRANT ST 400 ☒		✓			80
(8)	ROOF LEADER AT 47 GRANT ST 400 ☒		✓			81

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

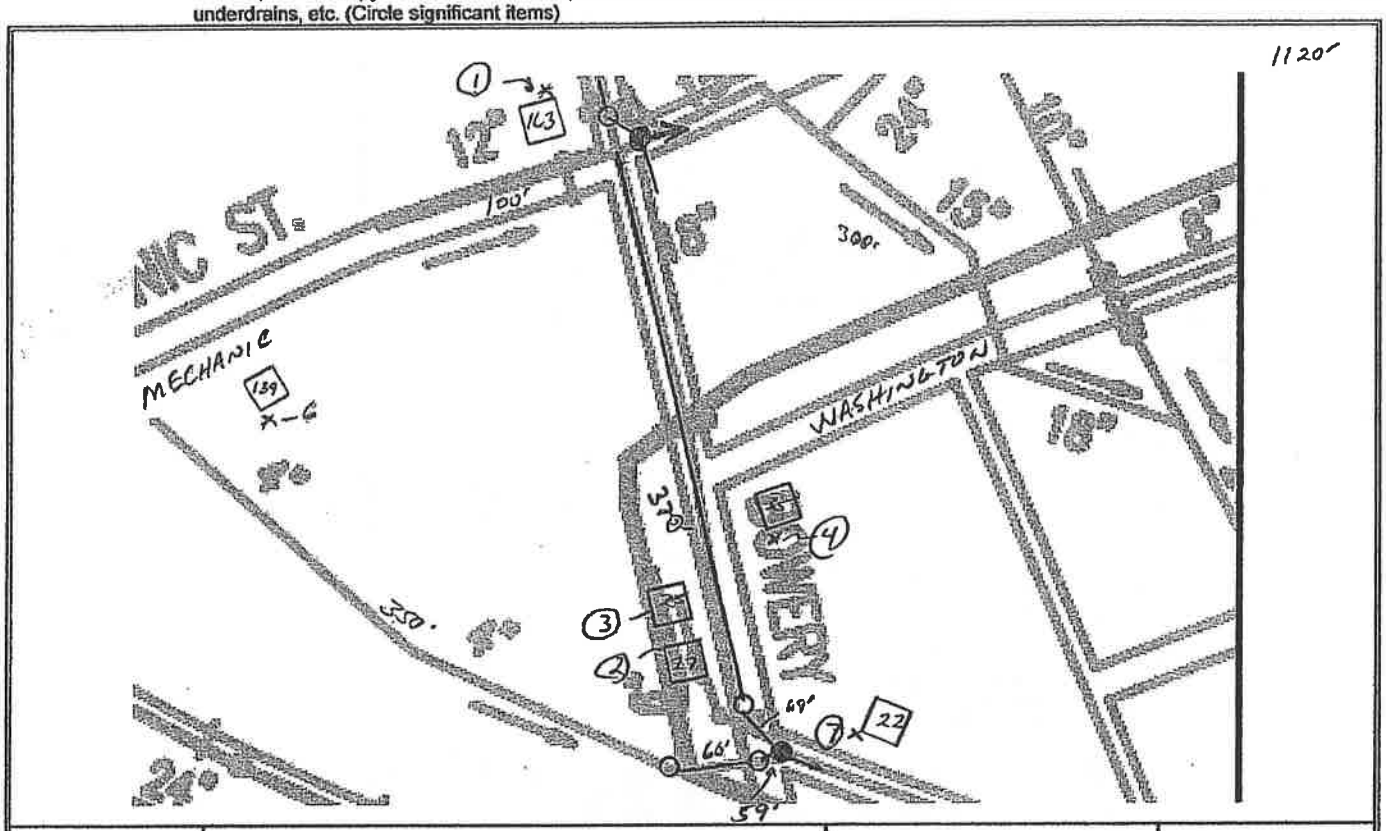
Engineer: WRA Date: 10-21-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: BOWERY ST AT MECHANIC

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
1	STAIR WELL DRAIN + DOWNSPOUT BEHIND 163 MECHANIC ST	✓			87	88,8
2	ROOF LEADER IN BACK OF 27 BOWERY ST. 600 ☐ SHINGLES	✓				89
3	ROOF LEADER IN BACK OF 25 BOWERY ST 400 ☐ SHINGLES	✓				90
4	ROOF LEADER IN BACK OF 35? WASHINGTON ST 600 ☐ SHINGLES	✓				91
5	ROOF LEADERS ON 21 BOWERY ST 500 ☐ SHINGLES	✓				92
6	ROOF LEADER (BROKEN OFF) BEHIND 139 MECHANIC 400 ☐ SHINGLES		✓			93
7	ROOF LEADER ON 22 MCCULLOH ST. 500 ☐ SHINGLES		✓			94

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

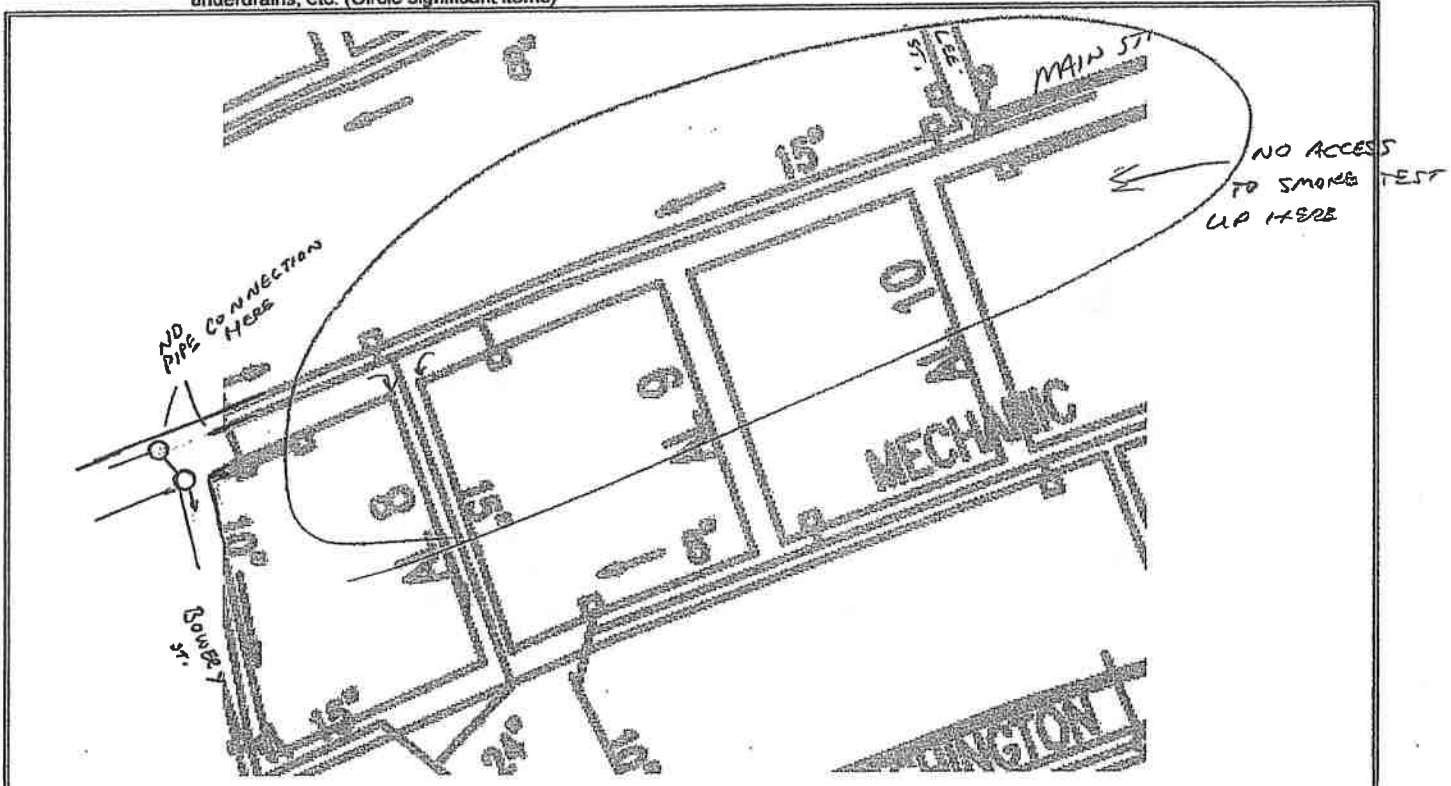
Engineer: WRA Date: 10-21-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: E. MAIN ST. EAST OF BOWERY

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

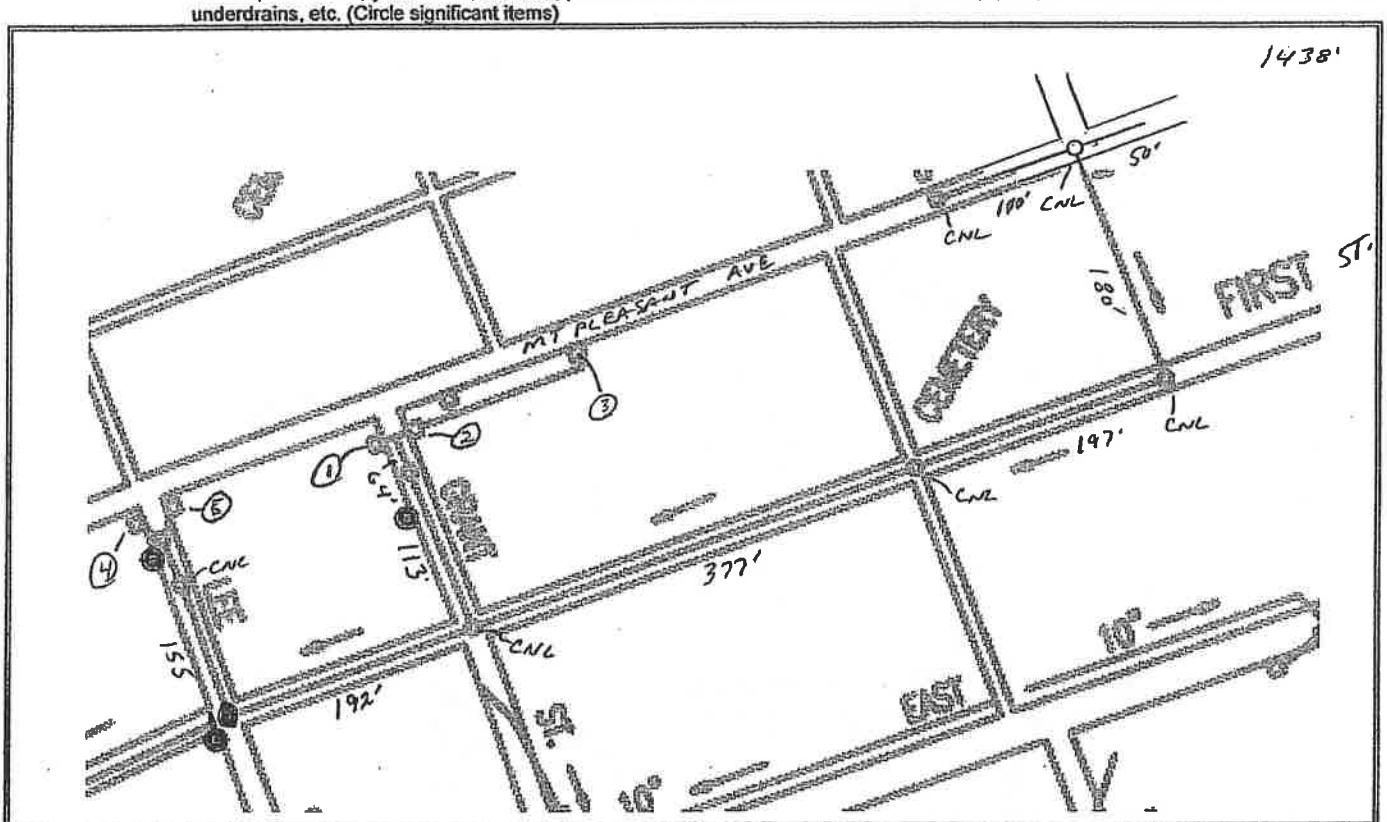
Engineer: WRA Date: 10-22-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: FIRST ST + GRANT.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	C.B AT COR. GRANT & MT. PLEASANT 500 ☒ ASPHALT	✓				102
(2)	C.B. AT COR. GRANT + MT. PLEASANT 5000 ☒ ASPHALT.	✓				103
(3)	C.B ON MT. PLEASANT AVE 70' WEST OF G1 5000 ☒ ASPHALT.	✓				104
(4)	C.B ON LEE AT MT. PLEASANT AVE 1000 ☒ ASPHALT	✓				105
(5)	C.B ON LEE (GROWN OVER) AT MT. PLEASANT. 3000 ☒ ASPHALT.		✓			106

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Page: 1 of 1

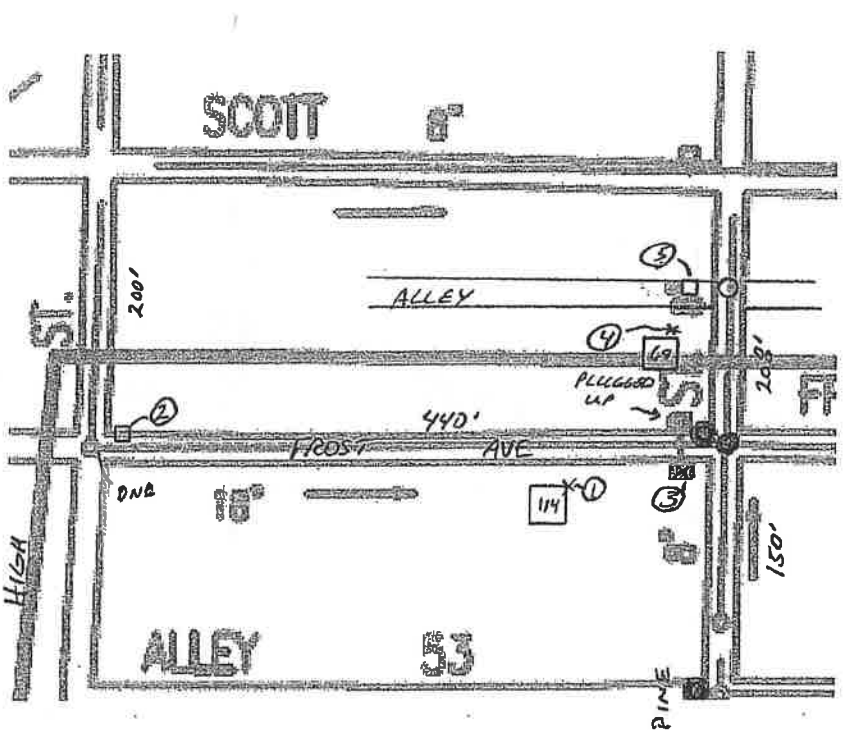
Engineer: WRA Date: 10-22-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: FROST AVE + PINE ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



Point No.	OBSERVATIONS: (Identify Point No. on sketch) Description / Drainage Area (SF) / Surface Type	Severity: Major	Mod	Trace	Picture No.	
1	ROOF LEADER AT 114 FROST AVE 600 ☐ SHINGLES		✓			111
2	C.B AT COR. OF HIGH ST + FROST AVE 1200 ☐ ASPHALT	✓				112
3	C.B AT COR. OF FROST AV + PINES. 4400 ☐ BRICK			✓		113
4	ROOF LEADER AT 69 PINE ST. 400 ☐ SHINGLES			✓		114
5	C.B AT PINE ST + ALLEY 4000 ☐ ASPHALT.	✓				115

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

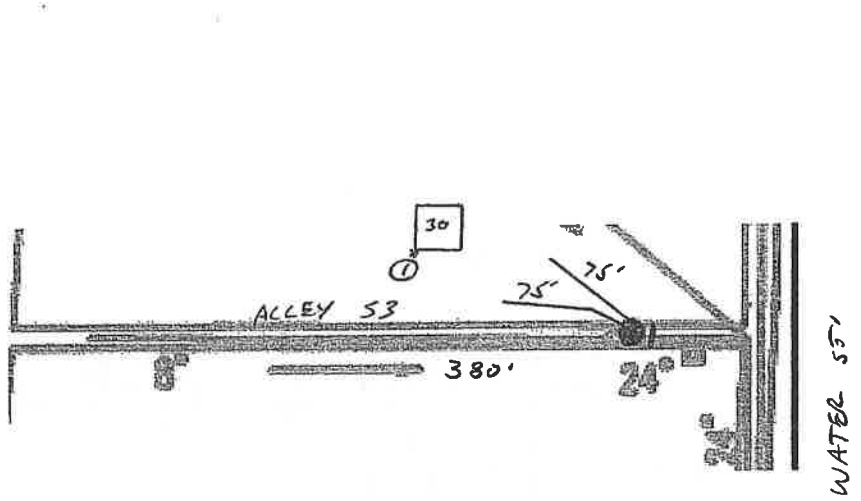
Engineer: WRA Date: 10-26-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: ALLEY 53 AT WATER ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADER FROM 30 FROST AVE SOIL	✓				123

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

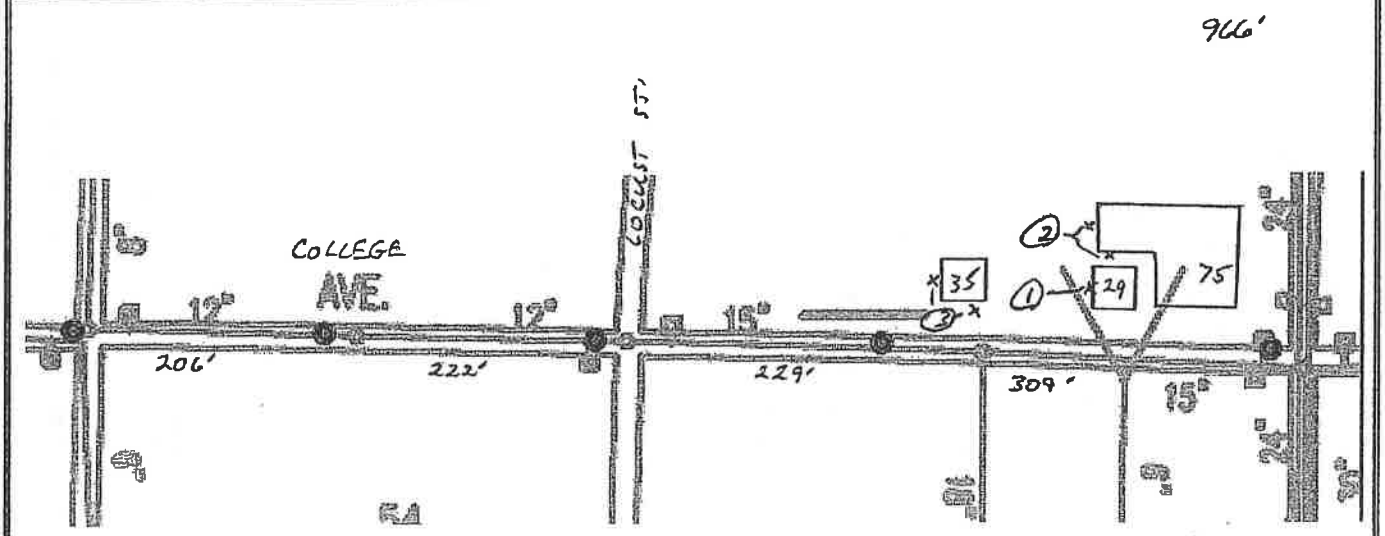
Engineer: WRA Date: 10-26-09 Subsystem: _____

Owner: FROSTBURG MD. Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: COLLEGE AVE & LOCUST ST.

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADERS ON 29 COLLEGE AVE 600 ☒ SHINGLES		✓			130
(2)	ROOF LEADERS ON BACK OF 75 S. WATER ST PRICE BEER DIST. 1500 ☒ METAL ROOF	✓			131, 132	133
(3)	ROOF LEADERS AT 35 COLLEGE AVE 700 ☒ SHINGLES	✓			134	135

Recommendations: Dye Test Storm Sewer Yes:_____ No:_____ TV Inspect: Yes:_____ No:_____

Additional Comments: Yes:_____ No:_____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

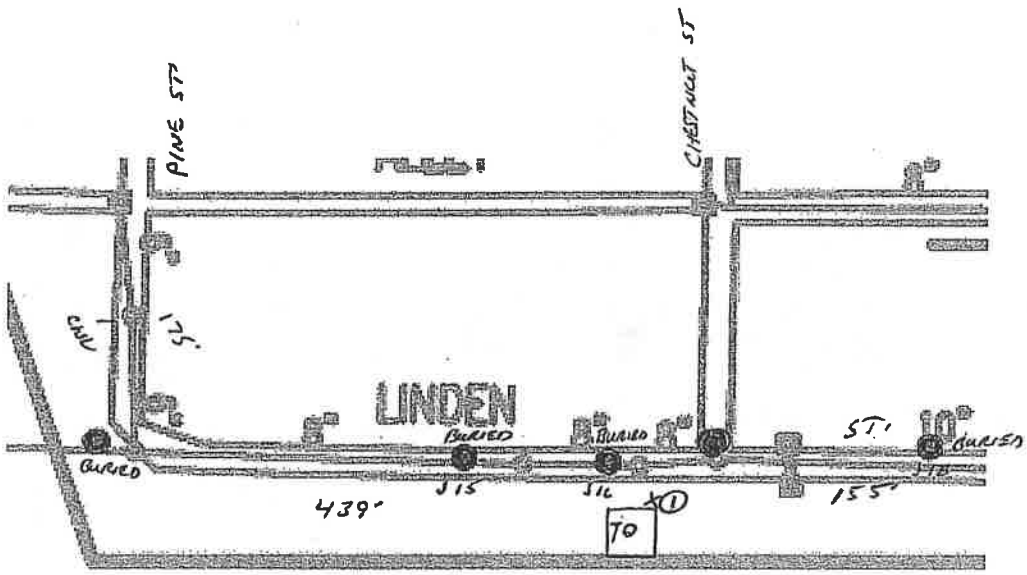
Engineer: WRA Date: 10-26-09 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: LINDEN ST & CHESTNUT ST

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	ROOF LEADER AT 70 LINDEN ST 600 ☒ SHINGLES	✓				143
(2)	LAWN BY PARKING SPOT AT 65 LINDEN ST. 50 ☒ GRASS		✓			144

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

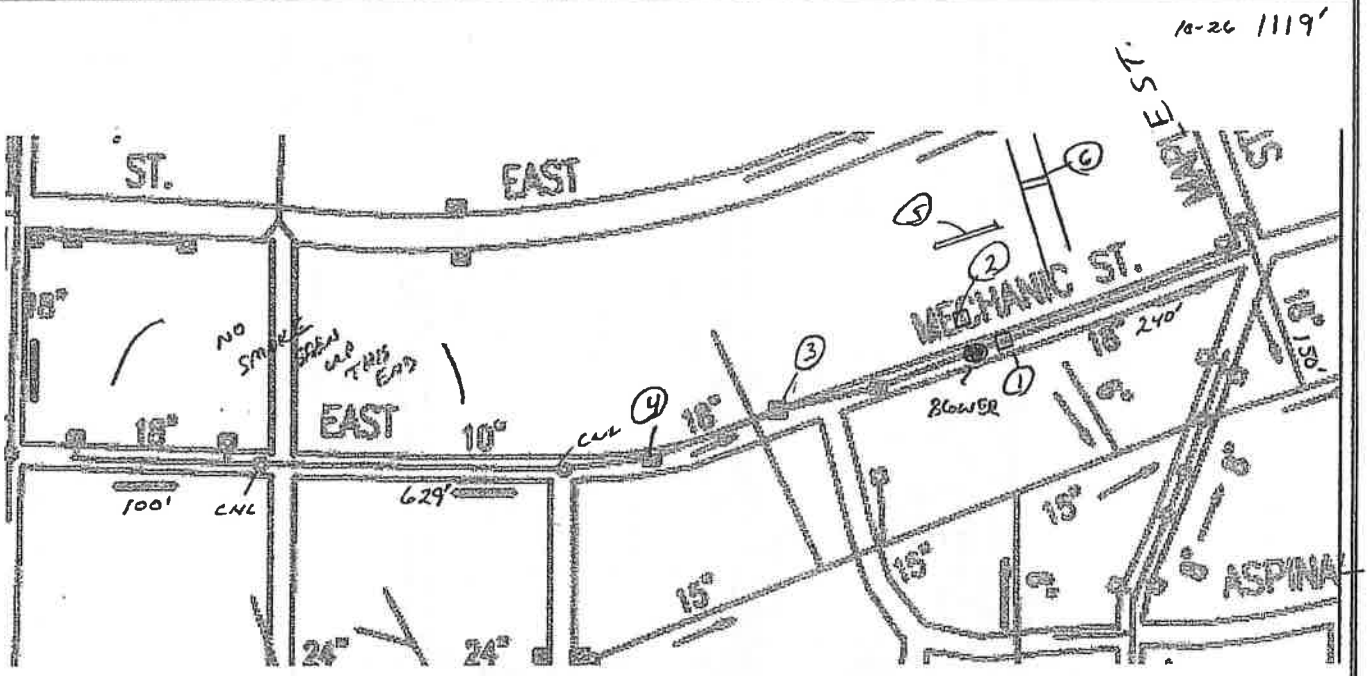
Engineer: WRA Date: 10-26-08 Subsystem: _____

Owner: FROSTBURG MD Time: _____ Weather: DRY

Project Name/ No.: _____ Map No.: _____

Location: E. MECHANIC ST. E. OF MAPLE ST

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)



	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
(1)	C.B. IN STREET BEHIND LIBRARY 20000 ☒ ASPHALT	✓				150
(2)	C.B. IN BACK OF LIBRARY (PARKING LOT) 20,000 ☒ ASPHALT	✓				151
(3)	C.B. ACCROSS FROM 81 E MECHANIC ST 10,000 ☒ ASPHALT			✓		152
(4)	C.B. ACCROSS FROM 71 E. MECHANIC ST 20000 ☒ ASPHALT	✓				153
(5)	TRENCH DRAIN FOR PARKING UNDER THE LIBRARY 4000 ☒ CONCRETE		✓			154
(6)	TRENCH DRAIN IN DRIVEWAY FOR MAIN ST. PARKING 5,000 ☒ ASPHALT		✓			155

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop ☐ Catch Basin ○ Manhole Inspector: _____

SAVIN ENGINEERS, P.C.
SMOKE TESTING DATA SHEET

Engineer: WRA Date: 10-27-05 Subsystem: _____

Owner: FROSTBURG, MD. Time: _____ Weather: DRY

Project Name/ No.: 1126.3.2 Map No.: _____

Location: TAYLOR ST. SOUTH OF MECHANIC ST

Sketch: Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and underdrains, etc. (Circle significant items)

MAP ON Pg 1

	OBSERVATIONS: (Identify Point No. on sketch)	Severity			Picture No.	
Point No.	Description / Drainage Area (SF) / Surface Type	Major	Mod	Trace		
10	DOWN SPOUT (ROOF LEADER BACK SIDE OF 8 TAYLOR ST. 600 □ SHINGLES	✓				166
11	YARD DRAIN BEHIND 28 BROADWAY TAKES ALL ROOF DRAINAGE + YARD 1000 □ GRASS + 1000 □ SHINGLES	✓			167	168

Recommendations: Dye Test Storm Sewer Yes:____ No:____ TV Inspect: Yes:____ No:____

Additional Comments: Yes:____ No:____

● Blower ___ Smoke Stop □ Catch Basin ○ Manhole Inspector: _____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APPENDIX C

RAILROAD TUNNEL SURVEY

VISUAL CONDITION SURVEY OF THE ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL IN FROSTBURG, MARYLAND

Prepared For:

Maryland Department of Transportation
State Highway Administration
Office of Materials and Research
Engineering Geology Division

Prepared By:

Rummel, Klepper & Kahl, LLP
Consulting Engineers
81 Mosher Street
Baltimore, Maryland 21218

March, 1999

VISUAL CONDITION SURVEY
OF THE
ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL
IN
FROSTBURG, MARYLAND

EXECUTIVE SUMMARY

Rummel, Klepper & Kahl, LLP (RK&K) has completed the report on the visual condition survey of the abandoned Cumberland & Pennsylvania Railroad Tunnel in Frostburg, Maryland. For your convenience, the following paragraphs briefly present the important aspects of our findings, conclusions and recommendations.

- The abandoned Cumberland and Pennsylvania Railroad Tunnel (C&P) is about 570 feet long and oriented north to south on a slight horizontal curve. The tunnel shape is an inverted "U" with dimensions averaging 14 feet wide by 19 feet high. The entire tunnel was driven through bedrock. The tunnel arch is brick lined and is supported on a six to eight-foot high natural rock bench that makes up the vertical walls.

- The tunnel is approximately 150 years old. About 50 years ago, a 160 - foot segment of the tunnel's brick lining collapsed. The exposed rock face was later shored-up with timber beams and lagging. In 1990, the City of Frostburg installed a sewer line in the tunnel invert.

- The local rock unit is part of the Dunkard Group, primarily composed of shale, siltstone and sandstone. These sediments are bedded nearly horizontally in the vicinity of the tunnel. Thin bedded shale was observed in the tunnel walls and is bedded between the thicker layers of sandstone/siltstone found in the roof and bench.

- The exposed sedimentary rock in the tunnel is generally intact and, with a few exceptions, appears to be stable. The horizontal bedding of this stratified sedimentary rock formation is favorable for tunnel openings because of the bridging action provided by the rock slabs.

- Although some of the timber beams are deteriorating or missing in the collapse area, it is estimated that 50% of this support system is intact and functioning to a limited degree.

- The existing brick lining and concrete lining appears to be in fair condition, given the age of the structure and the environmental conditions it has endured.

- It is our opinion that US Route 40 is not in danger of excessive settlement or sudden collapse as a result of a more serious collapse of the exposed rock in the timber supported area of the tunnel. However, having visually examined the tunnel in terms of safety, RK&K believes that the tunnel is unsafe for inspection purposes and for performing sewer maintenance under the existing conditions.

- Depending upon the outcome of further detailed investigations and studies, the cost to make the tunnel safe for inspection purposes and for performing sewer maintenance could range from $600,000 to $2,200,000.

subsequent repairs occurred sometime after World War II and prior to the abandonment in 1954. In 1990, the City of Frostburg completed the construction of a sewer line installed just below the tunnel invert.

Survey Information

The topographic survey data and historical information indicate that the tunnel is approximately 570 feet long and oriented north to south on a 6° horizontal curve left, looking south. Appendix A contains a plan sheet (Drawing 1) prepared by the SHA from the survey data that illustrates the tunnel's orientation relative to the roadways above. The tunnel shape can be described as an inverted "U" with dimensions averaging 14 feet wide by 19 feet high. The entire tunnel was driven through bedrock. An unsupported natural rock bench, 6 to 8 feet high, makes up the vertical walls of the U-shaped section and provides foundation support for the brick lining of the arch. In comparing the Clearance Diagram with the survey data, it appears that the invert was lowered as suggested in historical accounts. It is estimated that the invert was lowered by about two feet. Further details on the present condition of the tunnel are contained in the OBSERVATIONS section of the project.

Geology

Based on U.S. Geological Survey Maps and Publications, the project site is located in the Appalachian Plateaus Province, which is the western most province in the Appalachian Highlands. The plateau region in Maryland is commonly called the Allegheny Plateau. The plateau contains layers of sedimentary rocks that have been folded slightly and uplifted. Frostburg lies about 10 miles east of the Eastern Continental Divide which separates the rivers that drain to the Atlantic from those that drain to the Gulf of Mexico.

Geologic maps identify the local rock unit in the vicinity of the tunnel as the Dunkard Group. These sediments, composed of shale, siltstone and sandstone, were formed in a closed upland basin during the Permian time. The Dunkard Group also contains some thin impure coal seams and freshwater limestone conglomerate at the base. The thickness of the formation can be as much as 390+ feet. It is of interest to note that the underlying Monongahela Formation contains several important coal beds that have been extensively mined since about 1840. A report entitled "Mine Drainage Abatement Investigation" prepared for the State of Maryland's Board of Public Works indicates that the entire Frostburg area is underlain by deep mine workings.

Geologic mapping indicates rock attitude from outcrops in the vicinity of the tunnel are strike - about N35°E and a slight dip of 3° southeast. These measurements are consistent with our observations of rock outcrops in the tunnel and cut slopes. The exposed rock in the tunnel crown appears to be a sandstone or siltstone. A joint system is evident and consists of opposing joints at approximately 45° to the dip and oriented nearly vertical. Some limited iron staining was visible around the joints. This would indicate that the prevailing groundwater table is lower than the crown of the tunnel, because mineral formation commonly occurs in the percolation zone of groundwater transport. A thin bedded shale was present just below the level of the tunnel crown, down to the top of the rock bench. The exposed shale appeared to be highly weathered, based on the large amount of rock debris found on the bench and tunnel invert. The rock bench and tunnel invert consisted of a relatively sound fine sandstone or siltstone.

2. The west footing of the brick lining in the area adjacent to the South Portal has been underpinned and shored by placement of a concrete support wall. The wall has a few large vertical cracks. (Photograph No. 5)

3. There is evidence of ongoing ground water seepage through the brick lining from the South Portal (Station 10+20 ±) to Station 11+00±. The evidence consists of an algae growth on the lining along with spots of efflorescence. There are also numerous icicles hanging from the roof throughout this area. The icicles extend to the north through Station 12+25 ±. (Photograph Nos. 6 and 7)

4. From the Portal (Station 10+20) to Station 12+00 evidence of moderate seepage from the floor to the top of the rock bench on the west side was noted. Small to large pieces of rock have been dislodged from the rock bench on the west side, probably due to weathering. Weathering of the rock bench is resulting in undermining of the foundation of the arch lining. (Photograph No. 7)

Timber Shored Segment (Station 13+39 ± to Station 15+00±)

The brick lining is missing from Station 13+39± to Station 15+00± (length of about 160 feet), evidently the result of a collapse. No evidence of the collapse debris was observed and the cause of the collapse is not apparent. The rock in the tunnel arch is shored through this area with timber bents spaced at four feet maximum. The timber bents are founded on the rock bench (see the typical section on the following page). The timbers are in generally poor condition. The following deficiencies were noted:

1. Heavy water leakage is accelerating the deterioration of the timber bents. An estimated 15% to 20% of the timber members are in an advanced stage of deterioration. It is estimated that as much as 50% of the timbers are deteriorated to some degree. (Photograph No. 8)

2. Two bents have collapsed and fallen to the ground. They were located at Station 13+80± and Station 15+00±. (Photograph No. 9)

3. There is a 50'± stretch where the timber bents are carrying substantial load from the rock in the tunnel roof. The horizontal member of the bent at Station 14+15± has failed as evidenced by a short, longitudinal split and excessive deflection near its end. (Photograph No. 10) Also, the horizontal member of the bent at Station 14+35± has failed. This member has deflected an estimated 6" as viewed from below. (Photograph No. 11)

4. In a few areas where we could see behind the lagging and timber supports, we saw gaps of 3 to 4 feet between the lagging and the exposed rock face with piles of rock debris on the benches behind the supports. It appears that most of the rock debris on the bench is the thin bedded shale.

5. The rock bench on both sides of the tunnel in the timber shored segment appears intact with little weathering and evidence of only moderate seepage.

6. There are several pieces of rock debris on the tunnel floor which appear to have dislodged from the crown.

Brick Lined Segment (Station 15+00± to Station 15+42±)

The original brick lining is intact from Station 15+00± to Station 15+42± (length of about 42 feet). Through this area, the lining is in fair condition and appears to be structurally sound. The following deficiencies were noted:

1. There is a 75 sq. ft. area of spalled brick in the west wall at Station 15+00±. Some of the bricks are fractured and some are completely missing in this area. In addition, some large pieces of rock have dislodged from the rock bench, just below the spalled area, leaving the arch foundation partially undermined. (Photograph No. 12)

2. There is a 50 sq. ft. area of spalled brick at the arch crown near Station 15+42±. The spalling has resulted in fractured brick to 2" in depth. (Photograph No. 13)

3. There is evidence of ongoing water seepage through the lining in this segment. Numerous icicles and some efflorescence and staining were noted. Evidence of considerable seepage from the west wall of the rock bench and moderate seepage from the east wall of the rock bench were also noted. (Photograph Nos. 12 and 13)

4. The rock bench on the east side appears stable and sound while on the west side it is moderately weathered. This is consistent with the seepage noted above.

5. There are slight differences in elevation between adjacent portions of the lining where one surface protrudes out relative to the other. This occurs at Station 15+05±, Station 15+15± and Station 15+30±. The differences in elevation are estimated as 1" maximum. These differences appear to be construction related.

6. Several areas of brick near Station 15+00± appear to have been replaced as evidenced by a change from the original running bond pattern to a more random pattern in these areas. (Photograph No. 14)

7. There are steel angles along the original spring line, the purpose of which is unclear. They may have been installed to help stabilize the footing but advanced corrosion of the angles and advanced deterioration of the footing disguise their purpose and greatly reduce their structural capacity.

Concrete Lined Segment (Station 15+42 to Station 15+91)

The brick lining was replaced at some time in the past with a concrete arch lining that begins at Station 15+42± and extends to the North Portal (Station 15+91±) (length of about 50 feet). The concrete arch lining is in fair condition. The arch along this section is partially supported by a concrete bench and partially by a rock bench which appear to be intact. The following deficiencies were noted:

CONCLUSIONS

Stability of US Route 40

The principal reason for the visual inspection of the existing railroad tunnel was to determine if there were any obvious conditions that would pose an immediate threat to the stability of US Route 40. US Route 40 is perpendicular to the tunnel alignment and crosses it between Tunnel Stations 13+15 to 14+20 (refer to Drawing 1, Appendix A). As previously discussed, a 160-foot length (Tunnel Stations 13+39 to Sation 15+00) of the tunnel's brick lining collapsed about 50± years ago. The exposed rock face was later shored-up with timber beams and lagging. Some of the timber supports appear to be in poor condition. One of the primary concerns of the SHA is the potential impact to U S Route 40 if a more serious collapse of the rock formation occurs in this tunnel segment.

Based on the proceeding discussion and information in the previous sections, it is our opinion that US Route 40 is not in immediate danger of settlement or sudden collapse as a result of the failure of the existing brick lining or exposed rock in the timber supported area of the tunnel. Our opinions are based upon the following general observations:

1. The exposed sedimentary rock is generally intact and, with a few isolated exceptions, appears to be stable. In addition, the horizontal bedding of this stratified sedimentary rock formation is a favorable condition for tunnel openings, because of the bridging action provided by the slabs of rock (refer to the attached reference material in Appendix B that further explains and illustrates this point)

2. The distance of approximately 70 feet between the top of the tunnel and U S Route 40 is substantial, and we believe that if the rock in the roof of the tunnel were to fail, it is very unlikely that the raveling would reach the ground surface. It is more likely that any raveling of the rock would be slowed or stopped by the bridging action of the more competent layers of siltstone/sandstone above (refer to the attached reference material in Appendix B that further explains and illustrates this point).

3. Although some of the timber beams are deteriorated or missing, it is estimated that 50% of this support system is intact and functioning to some degree.

4. In general, the majority of the rock bench on both sides of the tunnel appears to be intact with just a few areas that are partially weathered.

5. Groundwater is seeping into the tunnel and does not appear to be trapped above the tunnel lining. It is likely that the seepage prevents the build up of excessive hydrostatic pressures on the tunnel lining.

6. The existing brick lining and concrete lining appears to be in fair condition, given the age of the structure and the environmental conditions it has endured.

Because we cannot rule out the possibility of a significant collapse of the lining at this time, we can only present what we consider a "best case" and a "worst case" scenario relative to repair requirements identified by the findings of future in-depth geotechnical and structural investigations. For the purpose of our RECOMMENDATIONS FOR SAFELY MAINTAINING THE TUNNEL section of this report, we define "best case" and "worst case" scenarios as follows:

"Best Case" Scenario - The in-depth geotechnical and structural investigation results in the conclusion that the rock formation surrounding the tunnel is *stable* and does not pose a serious threat to the existing lining. In addition, the existing brick lining is found to have a certain remaining service life which can be extended with certain repairs identified by the investigation. In this scenario, remedial work is envisioned but the existing lining would remain intact and functioning.

"Worst Case" Scenario - The in-depth investigation results in the conclusion that the rock formation surrounding the tunnel is *unstable* and does pose a threat to the existing lining. In this scenario, the existing lining would remain in place. A new structural lining would be constructed inside the existing tunnel opening and be capable of supporting the imposed vertical rock loading and/or lateral pressures.

Item	Cost
• Repair the deteriorated concrete areas in the north portal and north segment of the tunnel lining and epoxy inject the crack in the North Portal headwall and the the concrete footing wall near the South Portal.	$10,000.00
Subtotal	$390,000.00
50% Contingencies	$195,000.00
TOTAL	$585,000.00
SAY	**$600,000.00**

RK&K also considered a simpler effort to enable safe inspection of the tunnel. In this case, we believe that safe inspection of the tunnel could be accomplished by having the inspection personnel ride on a machine that provides an overhead shield. The shield would need to be designed to protect them from potential falling debris. We would recommend also that inspection be limited to the summer months, in order to avoid the danger of falling icicles. In addition, the tunnel entrances would need to be gated to prevent unauthorized access. However, we did not provide costs for these ideas, because maintenance to the sewer line would be limited to inspection and limited use of maintenance equipment under this scheme.

"Worst Case" Scenario

If it is concluded from further detailed studies that the rock formation surrounding the tunnel is unstable and does pose a threat to the existing lining, then it is likely that a new structural lining would need to be constructed. Construction of a new lining would likely make the tunnel useful for inspection, maintenance and other purposes for at least another 100 years. It is our opinion that any attempt to repair the existing lining or portal walls to provide safe access for another 100 years would be impractical given their current conditions. Consequently, we would recommend that the new structural lining be constructed inside of the existing tunnel opening (over the existing lining) and be designed to support all imposed loadings. The new lining would consist of pre-cast or cast-in-place reinforced concrete with plain finished surfaces having no aesthetic value. It is preliminarily estimated that the new lining will range from one to two feet in thickness. Consequently, the smallest dimensions of the final tunnel opening could be about 10 feet wide by 15 feet high. The following items of work have been identified based on our visual survey as the necessary repairs to make the tunnel safe for inspection and maintenance purposes considering the possible worst case conditions .

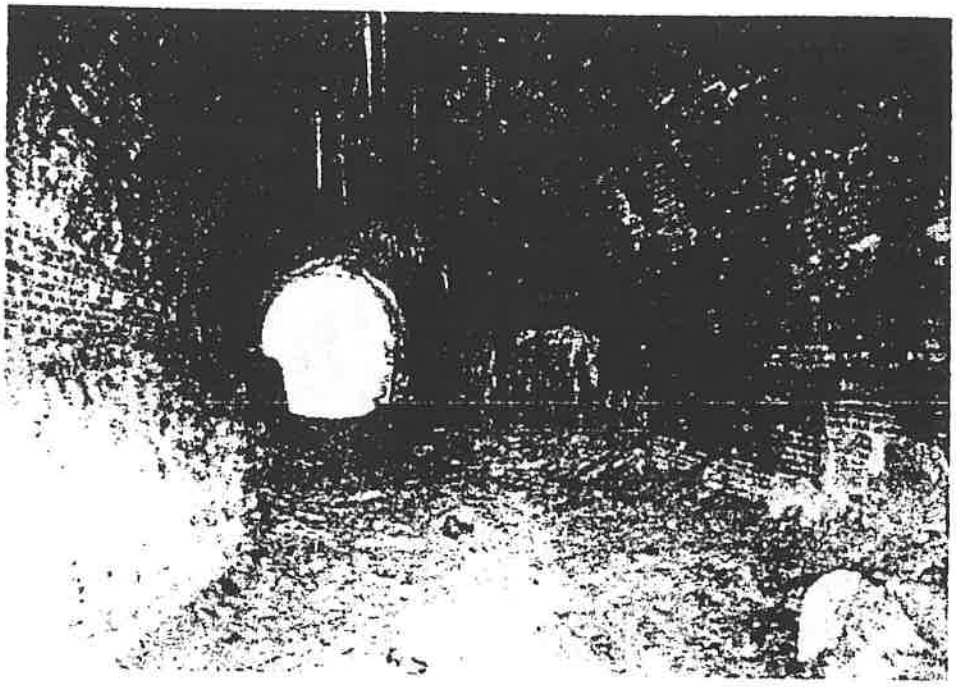
Project Location Map

Photographs

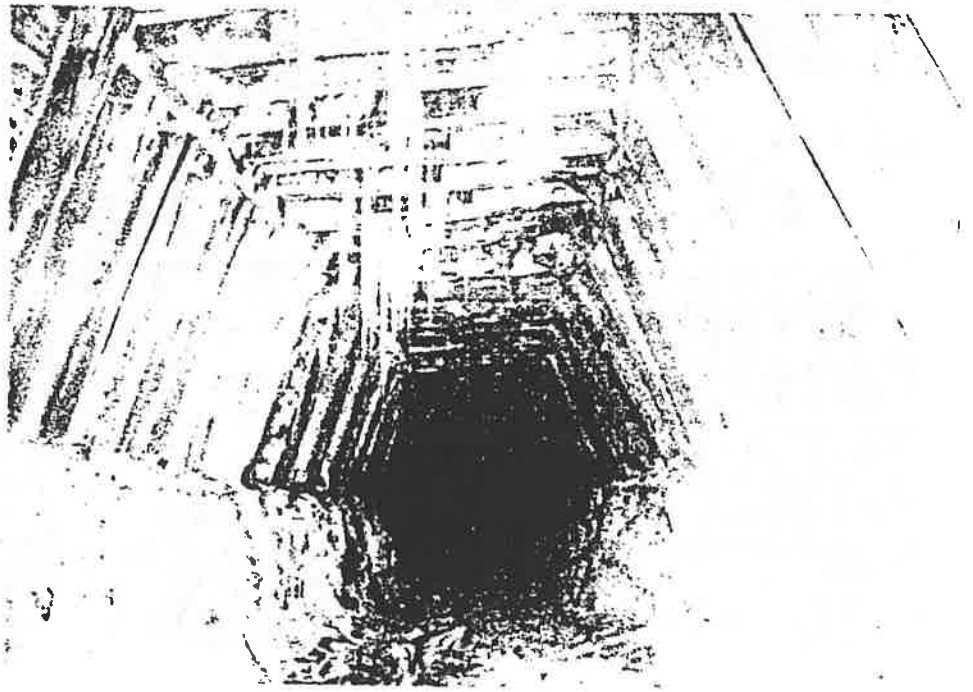
ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL
FROSTBURG, MARYLAND
March. 1999

Photograph No. 3. Deteriorated Masonry at South Portal.

Photograph No. 4: Large Crack in Brick Lining near South Portal.

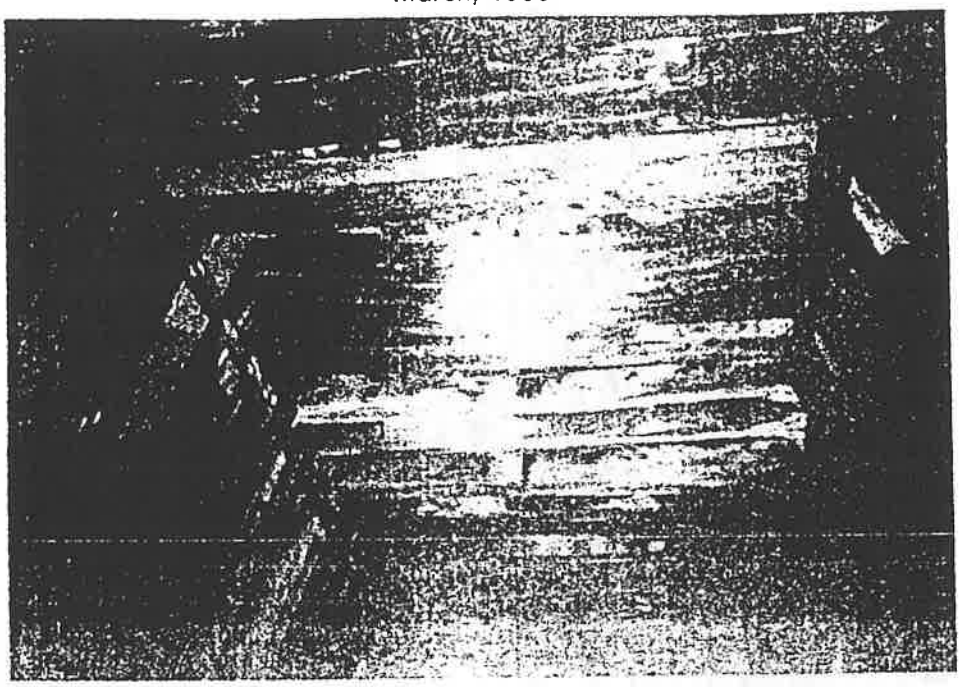


Photograph No. 7: Signs of Leakage Through Brick Lining from South Portal To Station 12+25±. Note Also, Dislodged Portions of Rock Bench on West Side (Right Side in Photograph) of Tunnel.



Photograph No. 8: Heavy Leakage Accelerating Deterioration of Timber Bents.

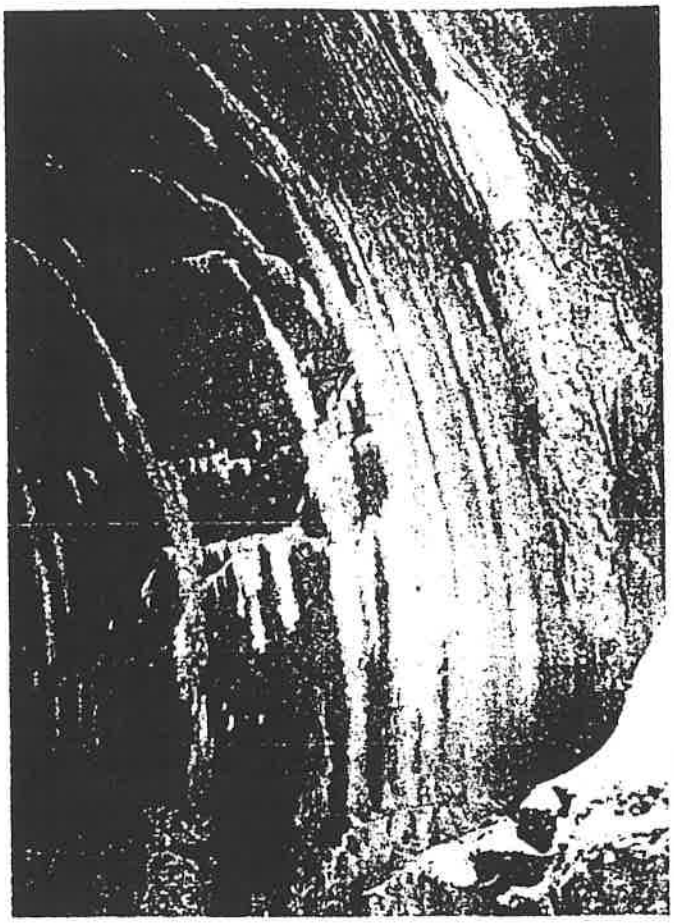
ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL
FROSTBURG, MARYLAND
March, 1999



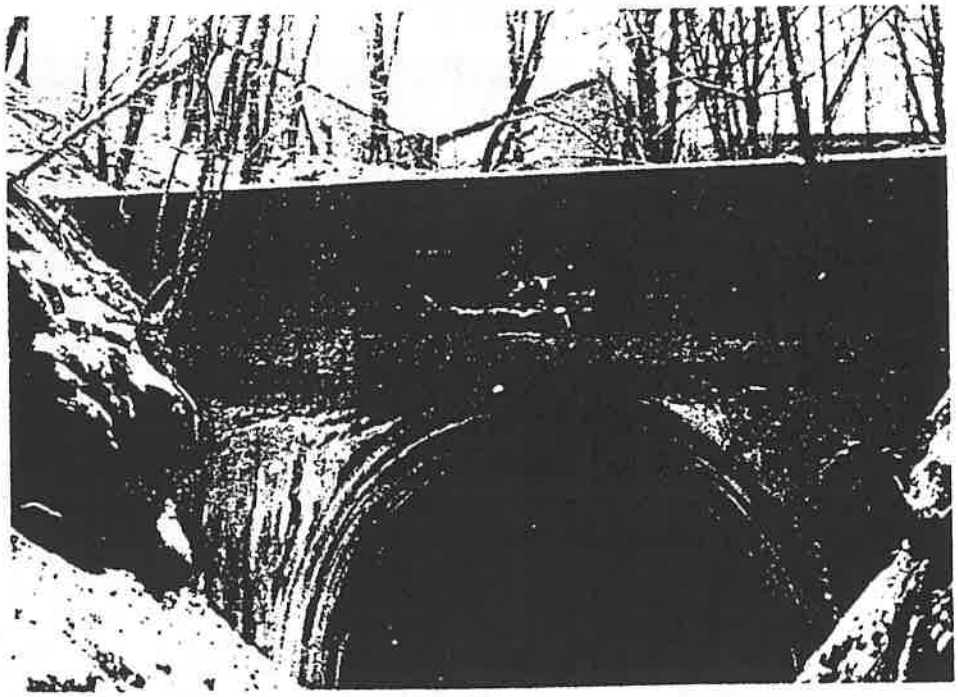
Photograph No. 11: Failure of Horizontal (Ceiling) Member of Timber Bent at Station 14+35±. Note Excessive Deflection on Fourth Bent from Top of Photograph

Photograph No. 12: Spalled Brick Lining at Station 15+00±. Note Also Dislodged Portion of Rock Bench Beneath Spalled Area and Heavy Leakage (Ice) Just North of this Area.

ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL
FROSTBURG, MARYLAND
March, 1999

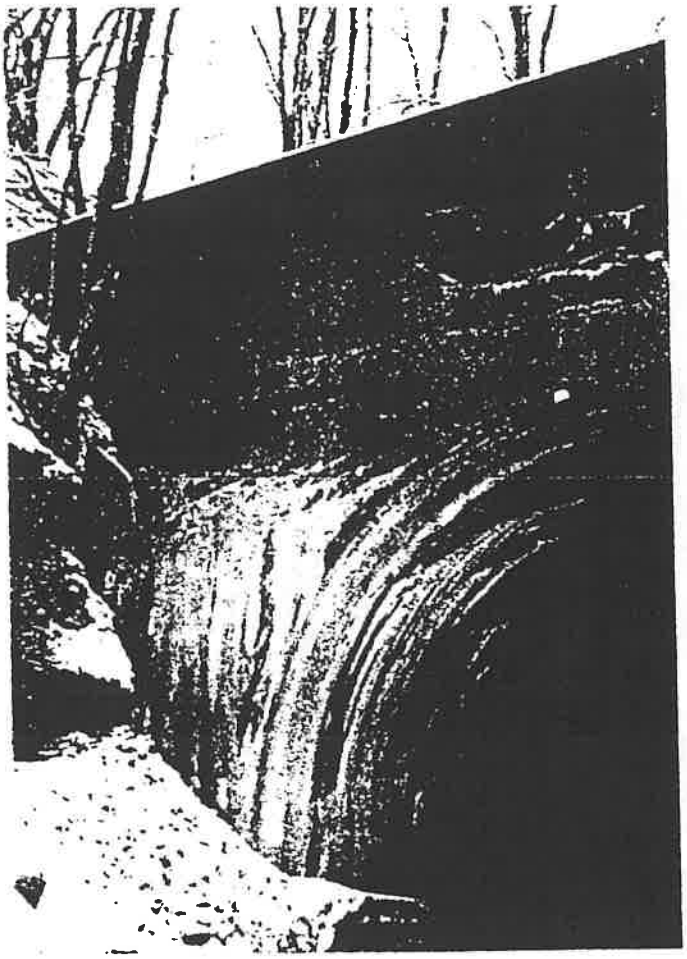


Photograph No. 17: Severely Deteriorated Concrete Lining at North Portal.



Photograph No. 18: North Portal Headwall. Note Deterioration and Cracking.

ABANDONED CUMBERLAND AND PENNSYLVANIA RAILROAD TUNNEL
FROSTBURG, MARYLAND
March, 1999



Photograph No. 19: Deterioration at East Side of North Portal Wall. Note Also, Crack above Arch Crown.

Photograph 20: Deterioration at West Side of North Portal Wall.

Appendix A
SHA Survey and Historical Information
Drawing 1
Drawing 2

Also have survey check elevations again.

- Our forces are scheduled to perform an inspection in two years. This should be an inspection of the exposed rock portion under our roadway only. Afterwards, we will determine the need to continue with our inspections. We expect the County to have established and hopefully begun conducting periodic inspections. This structure could then remain "inventoried but inactive" not requiring our inspections.

Description	Station	Offset	Rdwy Elev	Ceiling Elev	Bolt Elev	Floor Elev
north end / tunnel	15+90.94	---	---	1944.07	---	---
north end / exposed rock portion	14+99.50	---	---	1943.39	---	---
SSMH cover / benchmark	14+43±	---	---	----	---	1924.38
brass disk / north curb Depot St	14+15.68	6.37 rt	2009.17	---	---	---
bolt / tunnel wall	14+15.68	7.0± rt	---	---	1927.99	---
tunnel	14+00.00	---	---	1942.79	---	---
brass disk / north curb Depot St	13+99.11	7.63 lt	2011.39	---	---	---
bolt / tunnel wall	13+99.11	8.0± lt	---	---	1927.70	---
railroad spike / WBL Main St	13+65.60	6.48 lt	2012.95	---	---	---
bolt / tunnel wall	13+65.60	7.0± lt	---	---	1927.07	---
railroad spike / WBL Main St	13+63.66	6.27 rt	2012.23	---	---	---
bolt / tunnel wall	13+63.66	6.5± rt	---	---	1926.71	---
tunnel	13+50.00	---	---	1943.34	---	---
south end / exposed rock portion	13+39.00	---	---	1943.10	---	---
brass disk / south curb EBL Main St	13+27.77	6.36 lt	2012.77	---	---	---
bolt / tunnel wall	13+27.77	6.5± lt	---	---	1928.31	---
brass disk / south curb EBL Main St	13+25.11	6.16 rt	2011.98	---	---	---
bolt / tunnel wall	13+25.11	6.5± rt	---	---	1926.34	---
SSMH cover / benchmark	13+04±	---	---	---	---	1923.44
south end / tunnel	10+20.00	---	---	1939.75	---	---

Frostburg Tunnel under US Alt. 40

Martin Debus (SHA) circa 600 ft long. Brick lining, partial collapse repaired with wood. sewer line in place. RR station cornerstone 1891.

Kemmet (WMRR. 800-872-4640 x16): referred to Eberly. Kirsch.

Kirsch (NRRA, WMD chapter, 301-722-7519): walk-through in 1990 or 91. Had timber lining sewer line put through 1987-88. Referred to Patrick Stakem

Eberly (Frostburg, 301-689-6000): Frostburg owns R-O-W for sewer line, County recently purchased tunnel from Allegany Coal and Land which has an interest in the Depot St. Development Corp. Referred to Phil Jenkins (ACL)

Jenkins (ACL. 301-689-2178): referred to Jim Oberhaus (DSDC). Said Allegany Coal and Land never owned tunnel.

Oberhaus (DSDC, 301-689-2178):secretary referred to Betty Van Newkirk. Later left message through his secretary that he didn't really know anything except that tunnel was built in 1857.

Newkirk (Frostburg museum. 301-689-6853): tunnel built in 1857. Workman paid $1.12/day. Thought tunnel was abandoned before WM bought C&P, and before passenger service stopped Knew nothing about partial collapse.

Feldstein (MD Planning Office. 301-777-2158): tunnel 515 ft. long. Plans exist to possibly incorporate tunnel into the Allegany Highlands Trail. Referred to Oberhaus.

Dorsey (AG Co. Planning. 301-777-5921 x292): county purchase of tunnel is still in the works. Former owner is Depot St. Devel. Corp. There is an MHT inventory form from 1976 (John Nelson) (AL-VII-7A-035). Referred to Chris Hovatter (Frostburg City engineer).

Hovatter (Frostburg, engineer. 301-689-6000): Sewer designed and put in 1989-90. Has 5 sheets of schematic plans that he would be happy to share as baseline information. Would go along when SHA survey is done if desired. The partial collapse occurred before the sewer line (he has no information about it); the tracks were already gone. City is anxious to help SHA to keep the tunnel intact. Also mentioned potential use as part of Allegany Highlands Trail.

Stakem (NRRA, WMD chapter historian, 410-290-7600): clearly the most knowledgeable about history. Tunnel built about 1855 (to Borden 1854; from other side 1856). 537' long, brick and stone lined. 6560 cu yds. of earth removed during construction. Tunnel was abandoned in 1954 but track on both sides still

1864. Consolidation Coal Co., owner of C&P, gained control of entire RR from Piedmont, WVA to Cumberland via Mt. Savage
major C&P upgrades 1864 by Consolidation Coal Co.
primary function was coal transport
1882 four passenger runs daily
Tunnel Hotel built at N end of tunnel circa 1888, "vacant" by early 1920's but used for moonshining, later restored and used as gift shop
Passenger train service abandoned 1942
C&P bought by WMRR in 1944
Frostburg depot abandoned 1973, reopened as restaurant 1989

Appendix B
Reference Information

Fig. 16 a *Bridge action of thick stratum of sandstone over the initial excavation for a railroad tunnel.*

GHTS ....NEL
near Grafton, West Virginia
Contractor: Guthrie-Marsch-Walker Company.

TUNNELS IN UNWEATHERED STRATIFIED ROCKS AND IN SCHISTS

Sources of weakness

Almost every stratified rock breaks readily along bedding planes. Therefore the bedding planes constitute a source of mechanical weakness. In schists the cleavage planes have a similar effect. In addition to these innate mechanical defects, every stratified rock and every schist contains at least two sets of joints oriented at approximately right angles to the planes mentioned before. These will be referred to as *transverse joints.*

Bridge action in rocks with horizontal layers

If the spacing of the transverse joints is greater than the width of the tunnel, the rock layers bridge the tunnel like solid slabs as shown in *Fig. 16 a* and they are subject to bending under their own weight. If the bending stresses are smaller than the tensile strength of the rock, the roof is stable without any support, as shown in *Figs. 16 b* and c. *Fig. 16 c* also illustrates the benefits derived from an arch-shaped roof. The sides of the arch constitute corbels which reduce very considerable the free span of the roof slabs.

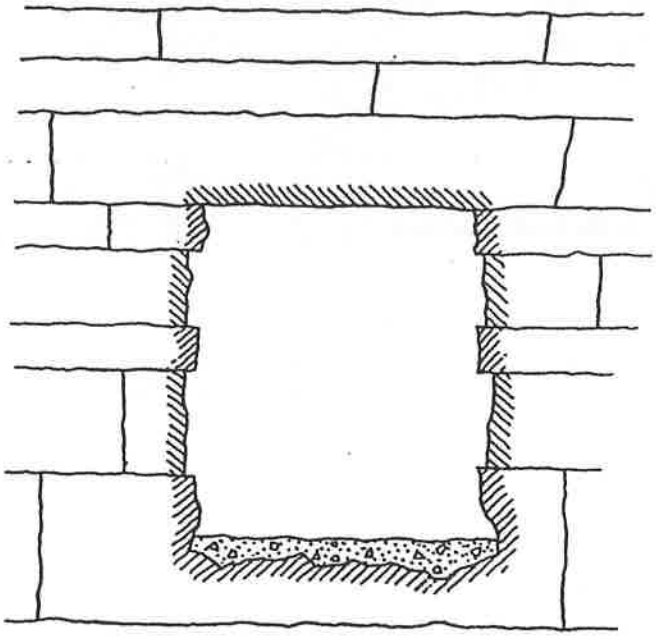


Fig. 16 b **Bridge action in rocks with widely spaced transverse joints.**

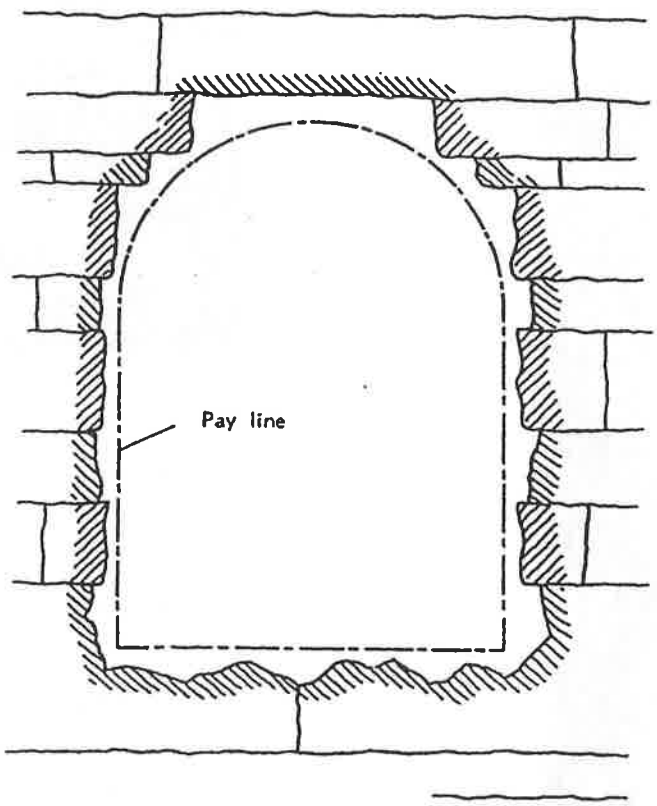
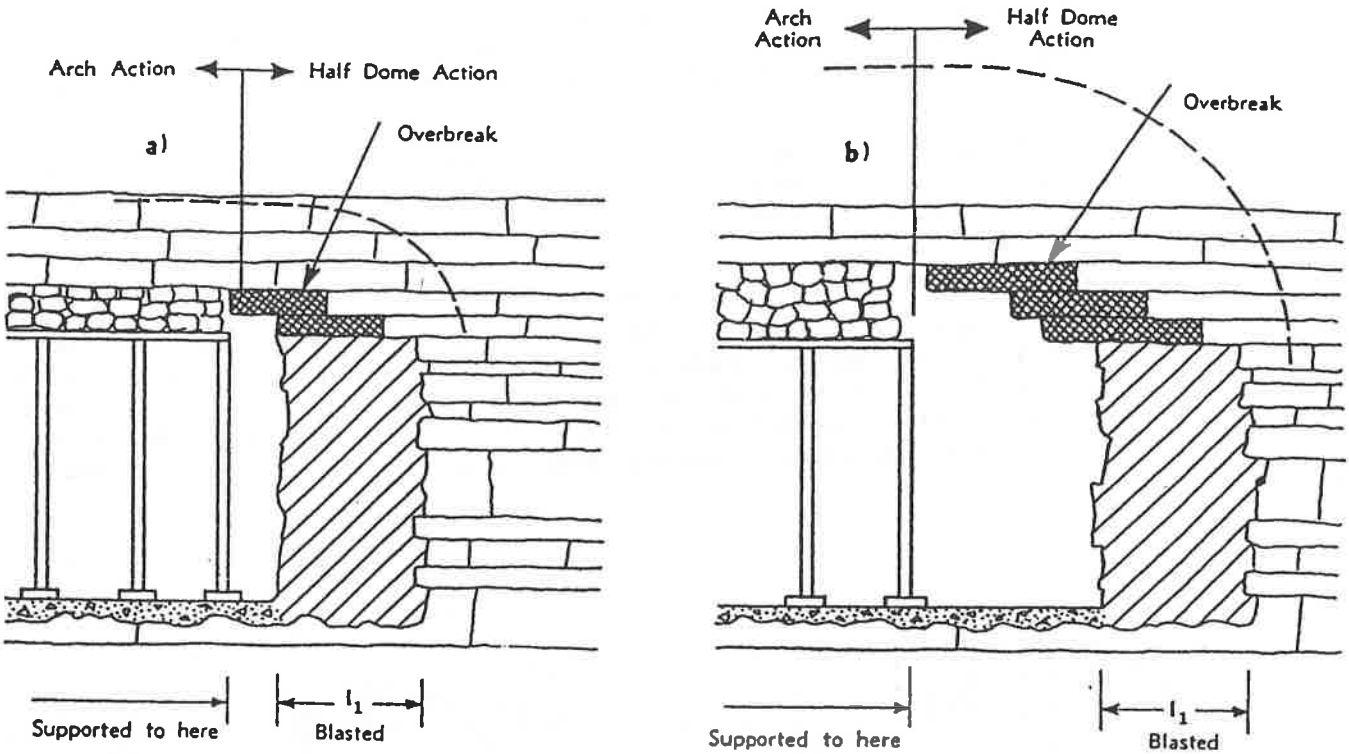


Fig. 16 c **Bridge action in rocks with closely spaced transverse joints.**

If the bending stresses in the rock layers above the tunnel exceed the strength of the rock, or if layers are weakened by transverse joints, they require support as shown in *Fig. 17.*

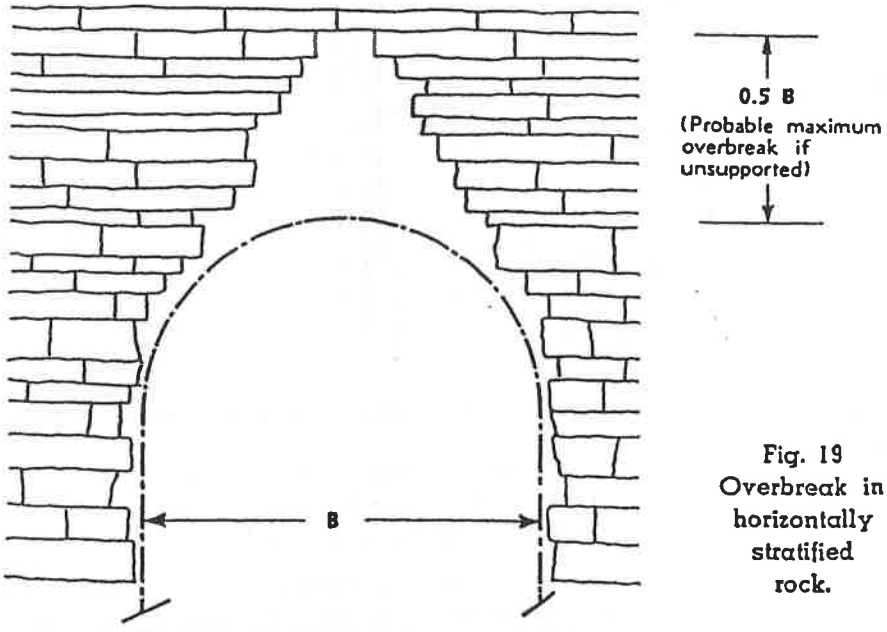
The corbel arch principle has been used in early days for reducing the free span of bridges as shown in *Fig. 18.* Heavy wooden beams, each one longer than the one below it, cantilever out from the abutments thereby reducing the free span of the bridge to a nominal figure.



a) Overbreak if unsupported section is very short.

b) Overbreak if unsupported section is long.

composed of fairly thick strata with few joints, the roof will be flat as shown in *Fig. 14*. On the other hand if the strata are thin and weakened by many joints a peaked roof will be formed as indicated in *Fig. 19 c*. Yet the breakage will rarely if ever continue after the vertical distance between the top of a semi-circular payline and the top of the overbreak becomes equal to 0.5 B as indicated in *Fig. 19 c*. This condition determines the maximum value which the load on the roof support can assume.



c) Ultimate overbreak if no support is installed.

Fig. 19
Overbreak in horizontally stratified rock.

If the tunnel support is constructed and wedged soon after blasting, the friction forces on the sides of the rock fragments occupying the space between roof support and vault transfer part of the weight of this rock onto the rock located beyond the sides of the vault. Hence even the ultimate load, measured in feet of rock, on an

APPENDIX D

REVIEW AND FORECAST OF LTCP FINANCING

WR&A

City of Frostburg, MD
Review and Forecast of LTCP Financing

May 5, 2009

WR&A
Whitman Requardt and Associates LLP

The review of costs and projects has shown approximately $8.56 million has been spent or budgeted for expenditure through 2009, and $6.76 million was estimated in the LTCP schedule. The actual expenditure is approximately 27% more than anticipated. Inflation accounts for a portion of the increase, as annual inflation rate assumed in the LTCP of 4% is less than the actual inflation rate between 2002 and 2009 of 5.4% (per MEANS Heavy Construction Index). Cumulative costs increase to $7.05 million when calculated with the revised inflation rate, which is still less than actual expenditures.

Inflation rates between 1980 and 2000 averaged 3.5% annually. The 4% inflation rate assumed in the LTCP was a reasonable, conservative estimate based on historical information. Although the inflation rate increased significantly between 2003 and 2007, the future inflation rate is unknown and long term data will be used to provide the broadest historical basis for this assumption. Between 1980 and 2009 the average rate of inflation was 3.8%, therefore a 4% inflation rate will continue to be used in future cost estimates as listed in **Table 2**.

Table 2
Annual Inflation Rates

Historical 1980 – 2000	3.5%
LTCP Estimate	4.0%
Actual 2002 – 2009	5.4%
Future Estimate	4.0%

There are a few possible reasons for the project expenditures exceeding inflation. However, due to variations between project scope identified in the LTCP and the actual extent of construction, direct cost comparison is not feasible. Possibilities for cost differences include;

- Some of the larger, more difficult projects have been completed earlier in the schedule increasing the costs.
- The project scope items included in the actual construction projects have exceeded the estimated scope, increasing the costs.
- The 2003 LTCP cost estimates under-estimated unit costs due to local market conditions.
- Other costs relative to the work including interconnections, utility relocations, pavement restoration, etc. are adding to the overall project cost to a greater extent than budgeted.

The capital expenditures exceed the LTCP budget by 21%. It is reasonable to assume the work is requiring more funding than estimated in 2003 as the amount of work completed corresponds to the plan. To account for this shortfall, it is recommended to budget a 21% increase into the remaining LTCP projects.

per EDU surcharge generates $180,000 per year dedicated to the CSO plan. Rates have contributed a variable amount averaging approximately $150,000 per year.

A review of project funding indicates City funds, derived from rates and the surcharge, have contributed 26% of the required funds. Grant funding has provided 74% of the CSO budget requirements. The City has made use of numerous grants from MDE, EPA, CDBG and ARC.

Future project financing may not be able to secure grant funding at the level the City has obtained in previous years. Therefore, it is prudent to review funding options periodically in order to limit future rate impacts and avoid potential inability to meet the requirements of the LTCP.

Future Capital Project Financing - General

The City has successfully secured financial assistance to fund the completed projects with a large percentage in the form of grant funding and it is assumed some level of grant funding from outside agencies will continue. Completion of the LTCP will continue to require the financial assistance and resources of outside agencies to minimize the financial burden on the ratepayers. Availability of funding in future years is highly uncertain and no attempt has been made to predict State or Federal funding levels.

The City is expected to supplement or provide a local share for the grant funding with rate and surcharge revenues as in the past. Future funding options will also include debt-based financing.

Future Capital Project Financing - Alternatives

A number of alternatives have been reviewed related to future project funding. The budget portion funded by grants is reviewed at the 75%, 50%, 25% and no grant levels. Alternative 1 presents the data as the average cost per year in current 2009 pricing, with no increase for inflation, a present value analysis. This is intended to provide a simple review of future financing. Alternative 2 includes a 4% inflation escalation in the project costs and has been projected as costs per EDU. Alternative 2 provides information the City can use when reviewing funding and affordability. Each analysis gives an overview of the costs and the corresponding funding challenges and options.

Debt-based financing is also considered as this is a common means of funding public infrastructure. For purposes of analysis, debt is calculated assuming a 30 year term and a 6% rate of interest. Under funding Alternative 1, the initial costs would be as shown in **Table 6**. However, each year these amounts would increase as additional loans are required to provide funding for future years. By 2022, the final year of the program, the debt service would require a yearly payment of $1 million or approximately $23 per EDU per month, assuming no grants are secured as shown in **Graph 1**.

Table 6
Funding Alternative 1

	Total Required Funds (thousands)	Yearly Loan Payment	Payment Per EDU per month (year 1)	Payment Per EDU per month (2022)
Project Cost, 0% Grant	1,453	$105,542	$1.76	$22.87
Project Cost, 25% Grant	1,090	$79,157	$1.32	$17.15
Project Cost, 50% Grant	726	$52,771	$0.88	$11.43
Project Cost, 75% Grant	363	$26,386	$0.44	$5.72

Graph 1
Debt-based Financing
Charge per EDU per Month

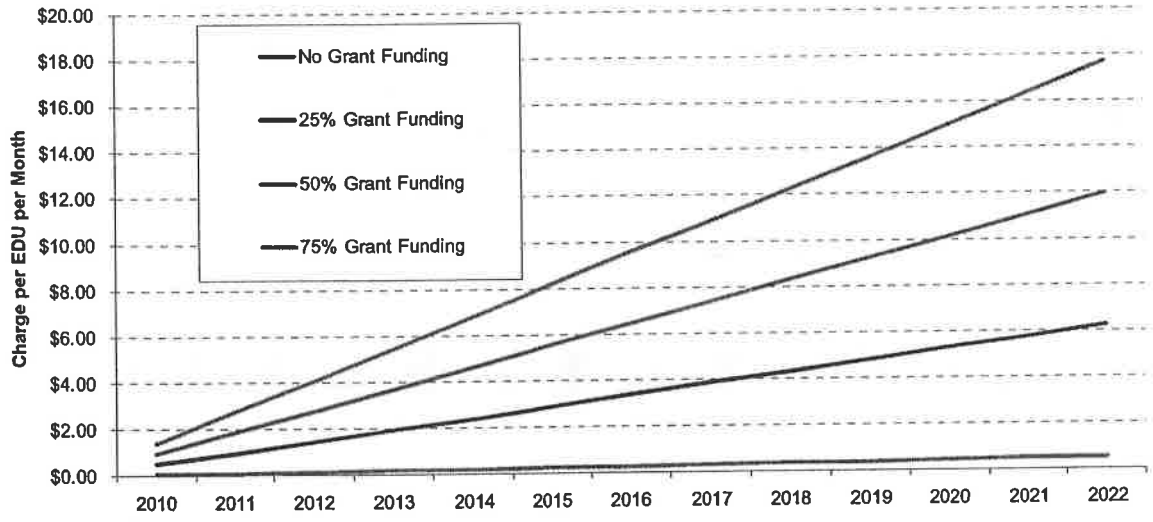
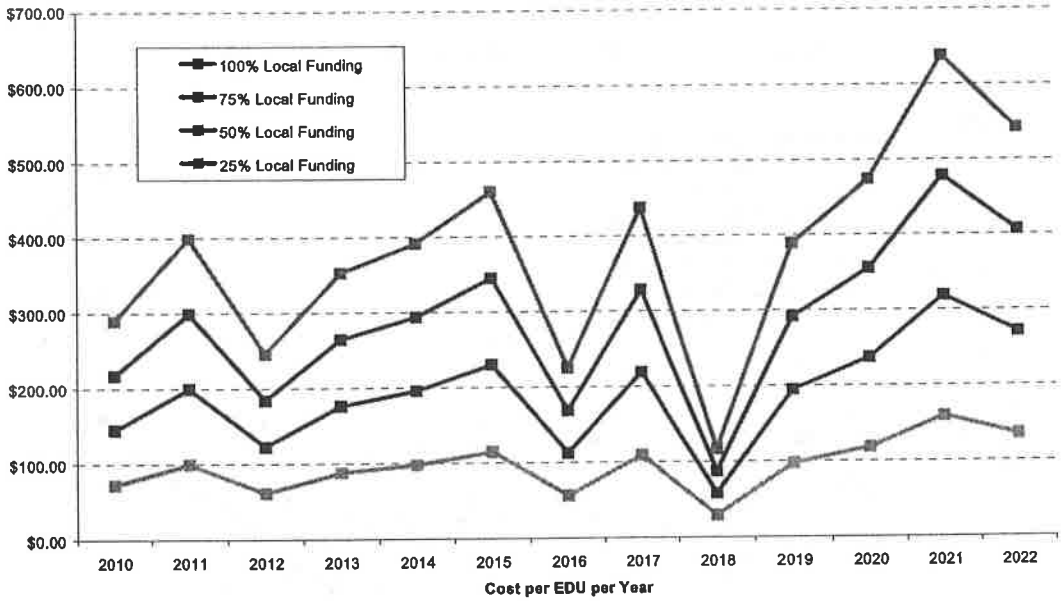


Table 7
Project Costs – per EDU per Year

Project Year	EDU	Project Cost with inflation (4%)	Cost per EDU per year			
			100% Local Funds	75% Local, 25% Grant	50% Local, 50% Grant	25% Local, 75% Grant
2010	5000	1,449	$289.80	$217.35	$144.90	$72.45
2011	5013	2,000	$399.00	$299.25	$199.50	$99.75
2012	5025	1,234	$245.57	$184.18	$122.79	$61.39
2013	5038	1,778	$352.95	$264.71	$176.47	$88.24
2014	5050	1,979	$391.87	$293.90	$195.93	$97.97
2015	5063	2,331	$460.42	$345.31	$230.21	$115.10
2016	5075	1,143	$225.20	$168.90	$112.60	$56.30
2017	5088	2,228	$437.88	$328.41	$218.94	$109.47
2018	5101	595	$116.65	$87.48	$58.32	$29.16
2019	5114	1,990	$389.16	$291.87	$194.58	$97.29
2020	5126	2,431	$474.21	$355.66	$237.11	$118.55
2021	5139	3,278	$637.84	$478.38	$318.92	$159.46
2022	5152	2,793	$542.11	$406.58	$271.06	$135.53

Graph 3
Project Costs per EDU per Year



Recovery of project costs through the use of local financing and grants, at the 75% grant funding level will require $6.25 per month per EDU in 2010 and this will increase with inflation to $10.00 per EDU in 2022.

Debt-based financing of the project costs is estimated for a 30-year term at 6% interest. Debt service will start low and increase over time as additional loans are initiated. The cost per EDU for annual debt-service payment is listed in **Table 9**. The existing annual CSO surcharge of $36.00 per EDU, would be sufficient to cover the debt service cost initially and then would require an increase. The existing rates and CSO surcharge could also be used to lower the amount to be financed, lowering payments. The debt service amount listed in 2022, the last year of the LTCP, would be required to continue until the loans come to term.

Table 9
Project Costs – Debt-service per EDU per year

Project Year	EDU	Project Cost with inflation (4%)	Debt-service per EDU			
			100% Local Funds	75% Local, 25% Grant	50% Local, 50% Grant	25% Local, 75% Grant
2010	5000	1,449	$21.05	$15.79	$10.53	$5.26
2011	5013	2,000	$49.99	$37.49	$24.99	$12.50
2012	5025	1,234	$67.70	$50.78	$33.85	$16.93
2013	5038	1,778	$93.18	$69.88	$46.59	$23.29
2014	5050	1,979	$121.41	$91.06	$60.71	$30.35
2015	5063	2,331	$154.56	$115.92	$77.28	$38.64
2016	5075	1,143	$170.53	$127.90	$85.27	$42.63
2017	5088	2,228	$201.92	$151.44	$100.96	$50.48
2018	5101	595	$209.89	$157.42	$104.95	$52.47
2019	5114	1,990	$237.64	$178.23	$118.82	$59.41
2020	5126	2,431	$271.50	$203.62	$135.75	$67.87
2021	5139	3,278	$317.16	$237.87	$158.58	$79.29
2022	5152	2,793	$355.75	$266.81	$177.88	$88.94

The cost over time is shown in **Graph 5** for each of the grant funding levels. Future years' payments would be level through 2040, and would then decline as the loans are paid-off.

APPENDIX E

FLOW METERING SUMMARY AND DATA TABLES

City of Frostburg

Flow Metering Update Cont.

Summary

Poor House Frostburg			
	DRY		WET
	121,920.00		271,200.00

Sand Spring Interceptor			
	DRY		WET
	797,109.68		2,540,438.71

Below Consol on Sand Spring Interceptor			
	DRY		WET
	40,800.00		157,935.48

Calhoun Ball field			
	DRY		WET
	337,440.00		1,161,600.00

Note:

1. Sanitary flows provided are Average Day flows for Dry and Wet Weather. Using the Minimum and Maximum flow rates collected for a given day during the collection cycle.

2. Flow totals are not displayed as cumulative.

Rt-936 -N- Powells Lane

Minimum Event			
Date	Flow (GPM)	Gallons per Day	
11/1/2008 0:00	20	28800	
11/2/2008 0:00	20	28800	
11/3/2008 0:00	20	28800	
11/4/2008 0:00	-100	-144000	N/A
11/5/2008 0:00	10	14400	
11/6/2008 0:00	10	14400	
11/7/2008 0:00	20	28800	
11/8/2008 0:00	20	28800	
11/9/2008 0:00	20	28800	
11/10/2008 0:00	10	14400	
11/11/2008 0:00	20	28800	
11/12/2008 0:00	20	28800	
11/13/2008 0:00	20	28800	
11/14/2008 0:00	10	14400	
11/15/2008 0:00	20	28800	
11/16/2008 0:00	20	28800	
11/17/2008 0:00	40	57600	
11/18/2008 0:00	20	28800	
11/19/2008 0:00	20	28800	
11/20/2008 0:00	30	43200	
11/21/2008 0:00	30	43200	
11/22/2008 0:00	20	28800	
11/23/2008 0:00	20	28800	
11/24/2008 0:00	20	28800	
11/25/2008 0:00	20	28800	
11/26/2008 0:00	70	100800	
11/27/2008 0:00	60	86400	
11/28/2008 0:00	60	86400	
11/29/2008 0:00	40	57600	
11/30/2008 0:00	50	72000	

Maximum Event		
Date	Flow (GPM)	Gallons per Day
11/1/2008 0:00	110	158400
11/2/2008 0:00	170	244800
11/3/2008 0:00	150	216000
11/4/2008 0:00	120	172800
11/5/2008 0:00	160	230400
11/6/2008 0:00	140	201600
11/7/2008 0:00	110	158400
11/8/2008 0:00	100	144000
11/9/2008 0:00	140	201600
11/10/2008 0:00	130	187200
11/11/2008 0:00	120	172800
11/12/2008 0:00	120	172800
11/13/2008 0:00	110	158400
11/14/2008 0:00	450	648000
11/15/2008 0:00	110	158400
11/16/2008 0:00	260	374400
11/17/2008 0:00	150	216000
11/18/2008 0:00	170	244800
11/19/2008 0:00	110	158400
11/20/2008 0:00	120	172800
11/21/2008 0:00	130	187200
11/22/2008 0:00	120	172800
11/23/2008 0:00	170	244800
11/24/2008 0:00	130	187200
11/25/2008 0:00	260	374400
11/26/2008 0:00	350	504000
11/27/2008 0:00	190	273600
11/28/2008 0:00	190	273600
11/29/2008 0:00	160	230400
11/30/2008 0:00	130	187200

Average Day (Min) **37,737.93**

Average Day (Max) **234,240.00**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Cluster in interceptor

Minimum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	960	1382400
5/2/2008 0:00	900	1296000
5/3/2008 0:00	860	1238400
5/4/2008 0:00	890	1281600
5/5/2008 0:00	1120	1612800
5/6/2008 0:00	990	1425600
5/7/2008 0:00	800	1152000
5/8/2008 0:00	670	964800
5/9/2008 0:00	750	1080000
5/10/2008 0:00	790	1137600
5/11/2008 0:00	940	1353600
5/12/2008 0:00	1250	1800000
5/13/2008 0:00	2080	2995200
5/14/2008 0:00	1970	2836800
5/15/2008 0:00	1220	1756800
5/16/2008 0:00	1090	1569600
5/17/2008 0:00	1060	1526400
5/18/2008 0:00	1180	1699200
5/19/2008 0:00	1330	1915200
5/20/2008 0:00	1100	1584000
5/21/2008 0:00	1150	1656000
5/22/2008 0:00	1190	1713600
5/23/2008 0:00	940	1353600
5/24/2008 0:00	900	1296000
5/25/2008 0:00	810	1166400
5/26/2008 0:00	750	1080000
5/27/2008 0:00	720	1036800
5/28/2008 0:00	640	921600
5/29/2008 0:00	710	1022400
5/30/2008 0:00	640	921600
5/31/2008 0:00	560	806400
Average Day (Min)		**1,438,141.94**

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	2300	3312000
5/2/2008 0:00	2420	3484800
5/3/2008 0:00	2240	3225600
5/4/2008 0:00	3450	4968000
5/5/2008 0:00	2900	4176000
5/6/2008 0:00	2740	3945600
5/7/2008 0:00	2630	3787200
5/8/2008 0:00	2080	2995200
5/9/2008 0:00	2170	3124800
5/10/2008 0:00	2240	3225600
5/11/2008 0:00	3240	4665600
5/12/2008 0:00	3150	4536000
5/13/2008 0:00	3970	5716800
5/14/2008 0:00	3170	4564800
5/15/2008 0:00	2820	4060800
5/16/2008 0:00	2540	3657600
5/17/2008 0:00	3050	4392000
5/18/2008 0:00	2650	3816000
5/19/2008 0:00	2930	4219200
5/20/2008 0:00	2860	4118400
5/21/2008 0:00	2910	4190400
5/22/2008 0:00	2800	4032000
5/23/2008 0:00	2710	3902400
5/24/2008 0:00	2440	3513600
5/25/2008 0:00	2350	3384000
5/26/2008 0:00	2310	3326400
5/27/2008 0:00	2270	3268800
5/28/2008 0:00	2580	3715200
5/29/2008 0:00	2380	3427200
5/30/2008 0:00	2290	3297600
5/31/2008 0:00	2420	3484800
Average Day (Max)		**3,855,948.39**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Beals Ln - Fairview St

Minimum Event			
Date	Flow (GPM)	Gallons per Day	
5/1/2008 0:00	20	28800	
5/2/2008 0:00	20	28800	
5/3/2008 0:00	10	14400	
5/4/2008 0:00	10	14400	
5/5/2008 0:00	30	43200	
5/6/2008 0:00	30	43200	
5/7/2008 0:00	20	28800	
5/8/2008 0:00	20	28800	
5/9/2008 0:00	10	14400	
5/10/2008 0:00	20	28800	
5/11/2008 0:00	30	43200	
5/12/2008 0:00	50	72000	
5/13/2008 0:00	80	115200	
5/14/2008 0:00	60	86400	
5/15/2008 0:00	40	57600	
5/16/2008 0:00	30	43200	
5/17/2008 0:00	10	14400	
5/18/2008 0:00	10	14400	
5/19/2008 0:00	10	14400	
5/20/2008 0:00	10	14400	
5/21/2008 0:00	10	14400	
5/22/2008 0:00	10	14400	
5/23/2008 0:00	10	14400	
5/24/2008 0:00	0	0	N/A
5/25/2008 0:00	10	14400	
5/26/2008 0:00	10	14400	
5/27/2008 0:00	10	14400	
5/28/2008 0:00	10	14400	
5/29/2008 0:00	10	14400	
5/30/2008 0:00	10	14400	
5/31/2008 0:00	0	0	N/A
Average Day (Min)		**30,289.66**	

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	70	100800
5/2/2008 0:00	100	144000
5/3/2008 0:00	70	100800
5/4/2008 0:00	490	705600
5/5/2008 0:00	180	259200
5/6/2008 0:00	90	129600
5/7/2008 0:00	70	100800
5/8/2008 0:00	70	100800
5/9/2008 0:00	100	144000
5/10/2008 0:00	160	230400
5/11/2008 0:00	430	619200
5/12/2008 0:00	440	633600
5/13/2008 0:00	240	345600
5/14/2008 0:00	160	230400
5/15/2008 0:00	80	115200
5/16/2008 0:00	70	100800
5/17/2008 0:00	320	460800
5/18/2008 0:00	150	216000
5/19/2008 0:00	140	201600
5/20/2008 0:00	30	43200
5/21/2008 0:00	120	172800
5/22/2008 0:00	30	43200
5/23/2008 0:00	20	28800
5/24/2008 0:00	50	72000
5/25/2008 0:00	50	72000
5/26/2008 0:00	50	72000
5/27/2008 0:00	140	201600
5/28/2008 0:00	290	417600
5/29/2008 0:00	30	43200
5/30/2008 0:00	10	14400
5/31/2008 0:00	10	14400
Average Day (Max)		**197,883.87**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Route 40 -n- Jenkins

Minimum Event			
Date	Flow (GPM)	Gallons per Day	
5/1/2008 0:00	0	0	N/A
5/2/2008 0:00	0	0	N/A
5/3/2008 0:00	0	0	N/A
5/4/2008 0:00	0	0	N/A
5/5/2008 0:00	10	14400	
5/6/2008 0:00	10	14400	
5/7/2008 0:00	0	0	N/A
5/8/2008 0:00	0	0	N/A
5/9/2008 0:00	0	0	N/A
5/10/2008 0:00	0	0	N/A
5/11/2008 0:00	0	0	N/A
5/12/2008 0:00	10	14400	
5/13/2008 0:00	20	28800	
5/14/2008 0:00	10	14400	
5/15/2008 0:00	0	0	N/A
5/16/2008 0:00	0	0	N/A
5/17/2008 0:00	0	0	N/A
5/18/2008 0:00	10	14400	
5/19/2008 0:00	10	14400	
5/20/2008 0:00	10	14400	
5/21/2008 0:00	10	14400	
5/22/2008 0:00	0	0	N/A
5/23/2008 0:00	0	0	N/A
5/24/2008 0:00	0	0	N/A
5/25/2008 0:00	0	0	N/A
5/26/2008 0:00	0	0	N/A
5/27/2008 0:00	0	0	N/A
5/28/2008 0:00	0	0	N/A
5/29/2008 0:00	0	0	N/A
5/30/2008 0:00	0	0	N/A
5/31/2008 0:00	0	0	N/A

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	10	14400
5/2/2008 0:00	20	28800
5/3/2008 0:00	20	28800
5/4/2008 0:00	440	633600
5/5/2008 0:00	40	57600
5/6/2008 0:00	30	43200
5/7/2008 0:00	20	28800
5/8/2008 0:00	10	14400
5/9/2008 0:00	30	43200
5/10/2008 0:00	20	28800
5/11/2008 0:00	80	115200
5/12/2008 0:00	80	115200
5/13/2008 0:00	60	86400
5/14/2008 0:00	50	72000
5/15/2008 0:00	20	28800
5/16/2008 0:00	10	14400
5/17/2008 0:00	130	187200
5/18/2008 0:00	70	100800
5/19/2008 0:00	60	86400
5/20/2008 0:00	20	28800
5/21/2008 0:00	80	115200
5/22/2008 0:00	20	28800
5/23/2008 0:00	20	28800
5/24/2008 0:00	20	28800
5/25/2008 0:00	20	28800
5/26/2008 0:00	20	28800
5/27/2008 0:00	50	72000
5/28/2008 0:00	140	201600
5/29/2008 0:00	10	14400
5/30/2008 0:00	10	14400
5/31/2008 0:00	10	14400

Average Day (Min) **16,000.00**

Average Day (Max) **75,251.61**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Between-Cumberland and Annapolis Hall

Minimum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	30	43200
5/2/2008 0:00	70	100800
5/3/2008 0:00	40	57600
5/4/2008 0:00	50	72000
5/5/2008 0:00	80	115200
5/6/2008 0:00	70	100800
5/7/2008 0:00	70	100800
5/8/2008 0:00	60	86400
5/9/2008 0:00	60	86400
5/10/2008 0:00	70	100800
5/11/2008 0:00	80	115200
5/12/2008 0:00	130	187200
5/13/2008 0:00	210	302400
5/14/2008 0:00	160	230400
5/15/2008 0:00	130	187200
5/16/2008 0:00	100	144000
5/17/2008 0:00	120	172800
5/18/2008 0:00	130	187200
5/19/2008 0:00	130	187200
5/20/2008 0:00	120	172800
5/21/2008 0:00	110	158400
5/22/2008 0:00	110	158400
5/23/2008 0:00	90	129600
5/24/2008 0:00	80	115200
5/25/2008 0:00	70	100800
5/26/2008 0:00	50	72000
5/27/2008 0:00	60	86400
5/28/2008 0:00	40	57600
5/29/2008 0:00	40	57600
5/30/2008 0:00	40	57600
5/31/2008 0:00	40	57600
Average Day (Min)		**122,632.26**

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	140	201600
5/2/2008 0:00	130	187200
5/3/2008 0:00	130	187200
5/4/2008 0:00	890	1281600
5/5/2008 0:00	170	244800
5/6/2008 0:00	110	158400
5/7/2008 0:00	100	144000
5/8/2008 0:00	110	158400
5/9/2008 0:00	120	172800
5/10/2008 0:00	140	201600
5/11/2008 0:00	770	1108800
5/12/2008 0:00	670	964800
5/13/2008 0:00	490	705600
5/14/2008 0:00	240	345600
5/15/2008 0:00	180	259200
5/16/2008 0:00	160	230400
5/17/2008 0:00	520	748800
5/18/2008 0:00	410	590400
5/19/2008 0:00	480	691200
5/20/2008 0:00	160	230400
5/21/2008 0:00	300	432000
5/22/2008 0:00	160	230400
5/23/2008 0:00	140	201600
5/24/2008 0:00	120	172800
5/25/2008 0:00	140	201600
5/26/2008 0:00	120	172800
5/27/2008 0:00	220	316800
5/28/2008 0:00	470	676800
5/29/2008 0:00	110	158400
5/30/2008 0:00	100	144000
5/31/2008 0:00	100	144000
Average Day (Max)		**376,258.06**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Poor House Frostburg

Minimum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	60	86400
5/2/2008 0:00	60	86400
5/3/2008 0:00	50	72000
5/4/2008 0:00	60	86400
5/5/2008 0:00	90	129600
5/6/2008 0:00	80	115200
5/7/2008 0:00	70	100800
5/8/2008 0:00	70	100800
5/9/2008 0:00	60	86400
5/10/2008 0:00	70	100800
5/11/2008 0:00	80	115200
5/12/2008 0:00	110	158400
5/13/2008 0:00	230	331200
5/14/2008 0:00	140	201600
5/15/2008 0:00	110	158400
5/16/2008 0:00	80	115200
5/17/2008 0:00	100	144000
5/18/2008 0:00	110	158400
5/19/2008 0:00	110	158400
5/20/2008 0:00	100	144000
5/21/2008 0:00	100	144000
5/22/2008 0:00	100	144000
5/23/2008 0:00	80	115200
5/24/2008 0:00	80	115200
5/25/2008 0:00	70	100800
5/26/2008 0:00	70	100800
5/27/2008 0:00	60	86400
5/28/2008 0:00	50	72000
5/29/2008 0:00	50	72000
5/30/2008 0:00	50	72000
5/31/2008 0:00	50	72000

Average Day (Min) **121,920.00**

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	90	129600
5/2/2008 0:00	90	129600
5/3/2008 0:00	80	115200
5/4/2008 0:00	480	691200
5/5/2008 0:00	200	288000
5/6/2008 0:00	100	144000
5/7/2008 0:00	90	129600
5/8/2008 0:00	90	129600
5/9/2008 0:00	120	172800
5/10/2008 0:00	160	230400
5/11/2008 0:00	490	705600
5/12/2008 0:00	400	576000
5/13/2008 0:00	400	576000
5/14/2008 0:00	230	331200
5/15/2008 0:00	150	216000
5/16/2008 0:00	120	172800
5/17/2008 0:00	320	460800
5/18/2008 0:00	260	374400
5/19/2008 0:00	320	460800
5/20/2008 0:00	130	187200
5/21/2008 0:00	250	360000
5/22/2008 0:00	130	187200
5/23/2008 0:00	110	158400
5/24/2008 0:00	100	144000
5/25/2008 0:00	100	144000
5/26/2008 0:00	100	144000
5/27/2008 0:00	170	244800
5/28/2008 0:00	240	345600
5/29/2008 0:00	80	115200
5/30/2008 0:00	70	100800
5/31/2008 0:00	70	100800

Average Day (Max) **271,200.00**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

Below Concol collec-on S.S

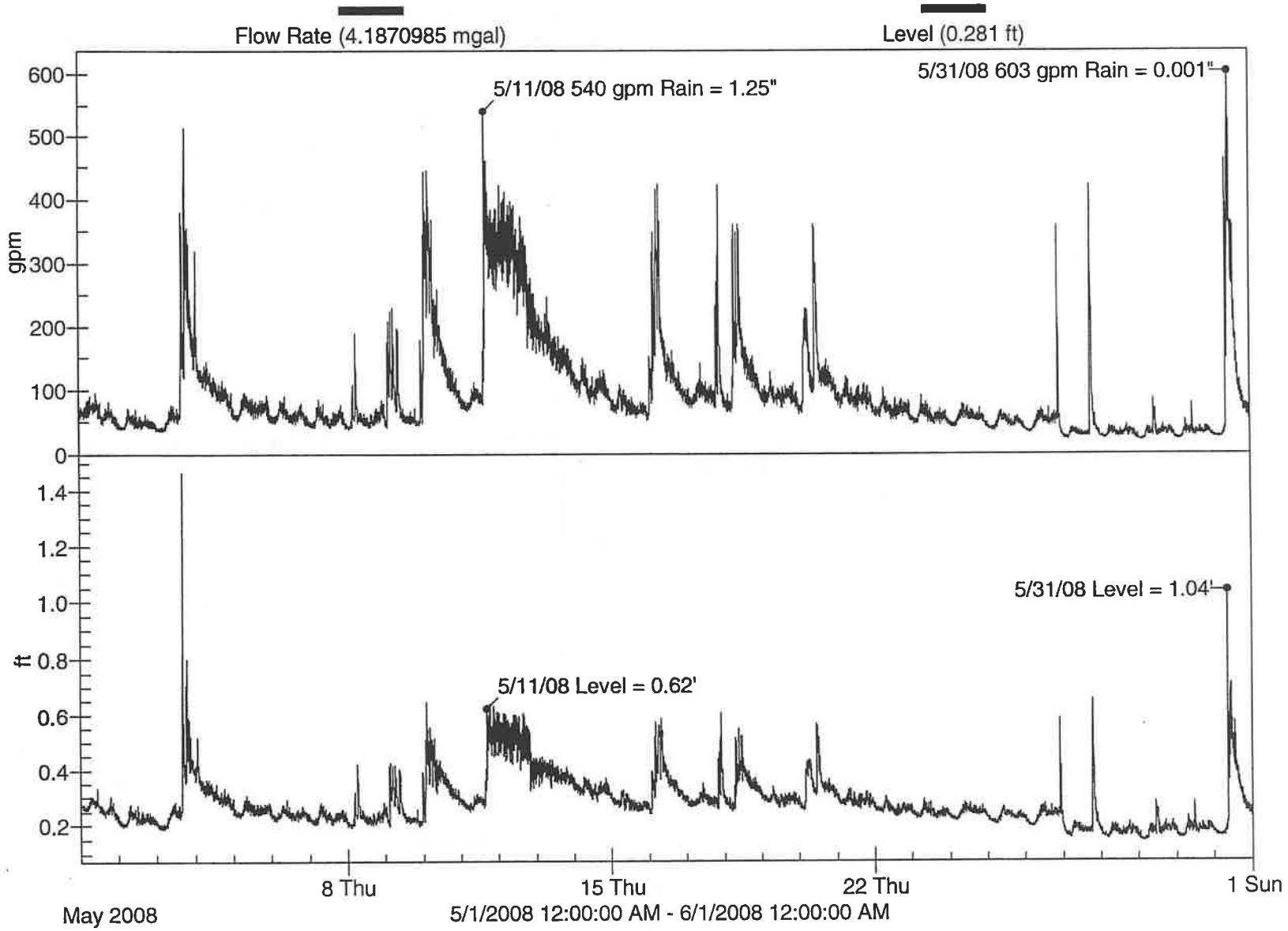
Minimum Event			
Date	Flow (GPM)	Gallons per Day	
5/1/2008 0:00	20	28800	
5/2/2008 0:00	10	14400	
5/3/2008 0:00	10	14400	
5/4/2008 0:00	10	14400	
5/5/2008 0:00	0	0	N/A
5/6/2008 0:00	10	14400	
5/7/2008 0:00	40	57600	
5/8/2008 0:00	30	43200	
5/9/2008 0:00	10	14400	
5/10/2008 0:00	10	14400	
5/11/2008 0:00	10	14400	
5/12/2008 0:00	40	57600	
5/13/2008 0:00	30	43200	
5/14/2008 0:00	30	43200	
5/15/2008 0:00	30	43200	
5/16/2008 0:00	30	43200	
5/17/2008 0:00	30	43200	
5/18/2008 0:00	30	43200	
5/19/2008 0:00	60	86400	
5/20/2008 0:00	70	100800	
5/21/2008 0:00	60	86400	
5/22/2008 0:00	30	43200	
5/23/2008 0:00	20	28800	
5/24/2008 0:00	20	28800	
5/25/2008 0:00	20	28800	
5/26/2008 0:00	50	72000	
5/27/2008 0:00	40	57600	
5/28/2008 0:00	40	57600	
5/29/2008 0:00	20	28800	
5/30/2008 0:00	20	28800	
5/31/2008 0:00	20	28800	
Average Day (Min)		**40,800.00**	

Maximum Event		
Date	Flow (GPM)	Gallons per Day
5/1/2008 0:00	50	72000
5/2/2008 0:00	40	57600
5/3/2008 0:00	30	43200
5/4/2008 0:00	30	43200
5/5/2008 0:00	20	28800
5/6/2008 0:00	190	273600
5/7/2008 0:00	100	144000
5/8/2008 0:00	80	115200
5/9/2008 0:00	40	57600
5/10/2008 0:00	20	28800
5/11/2008 0:00	240	345600
5/12/2008 0:00	160	230400
5/13/2008 0:00	130	187200
5/14/2008 0:00	90	129600
5/15/2008 0:00	70	100800
5/16/2008 0:00	70	100800
5/17/2008 0:00	80	115200
5/18/2008 0:00	290	417600
5/19/2008 0:00	370	532800
5/20/2008 0:00	360	518400
5/21/2008 0:00	100	144000
5/22/2008 0:00	80	115200
5/23/2008 0:00	50	72000
5/24/2008 0:00	110	158400
5/25/2008 0:00	110	158400
5/26/2008 0:00	150	216000
5/27/2008 0:00	100	144000
5/28/2008 0:00	90	129600
5/29/2008 0:00	60	86400
5/30/2008 0:00	50	72000
5/31/2008 0:00	40	57600
Average Day (Max)		**157,935.48**

Note:
Data Shown is the Highest and Lowest recorded flow rate for each date within the monitoring period.

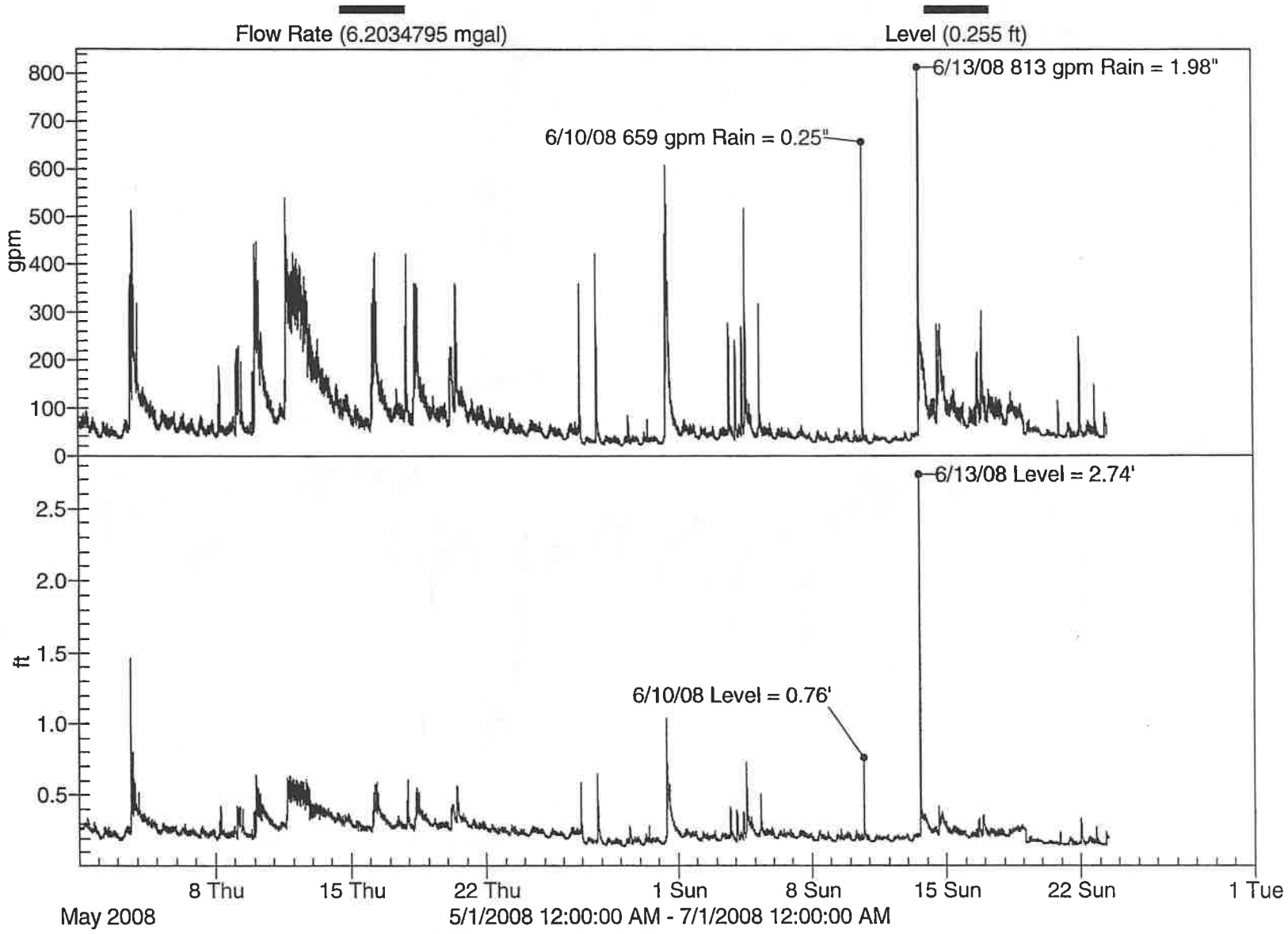
State Street (C) overflow

Flowlink 5



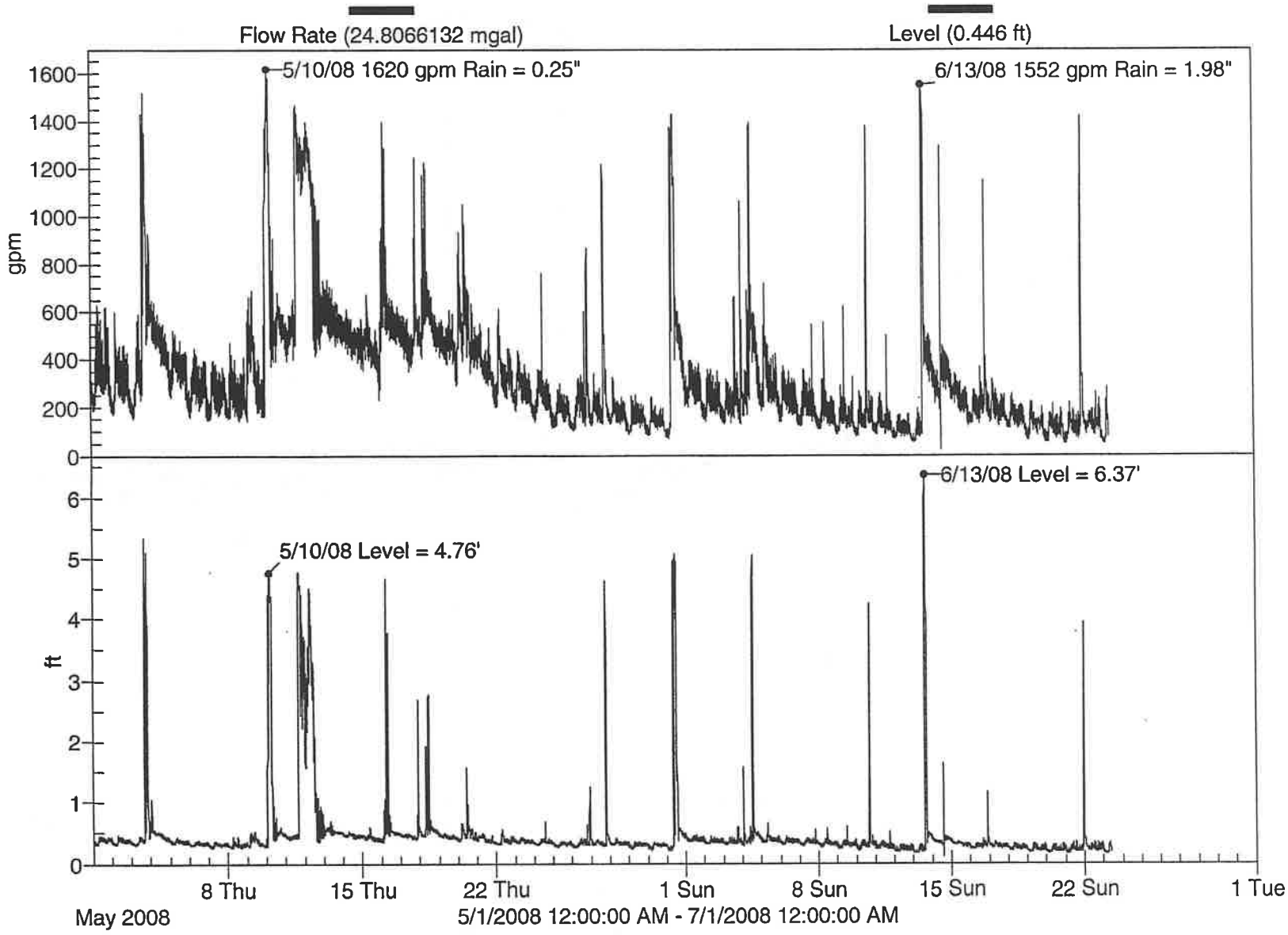
State Street (C) overflow

Flowlink 5



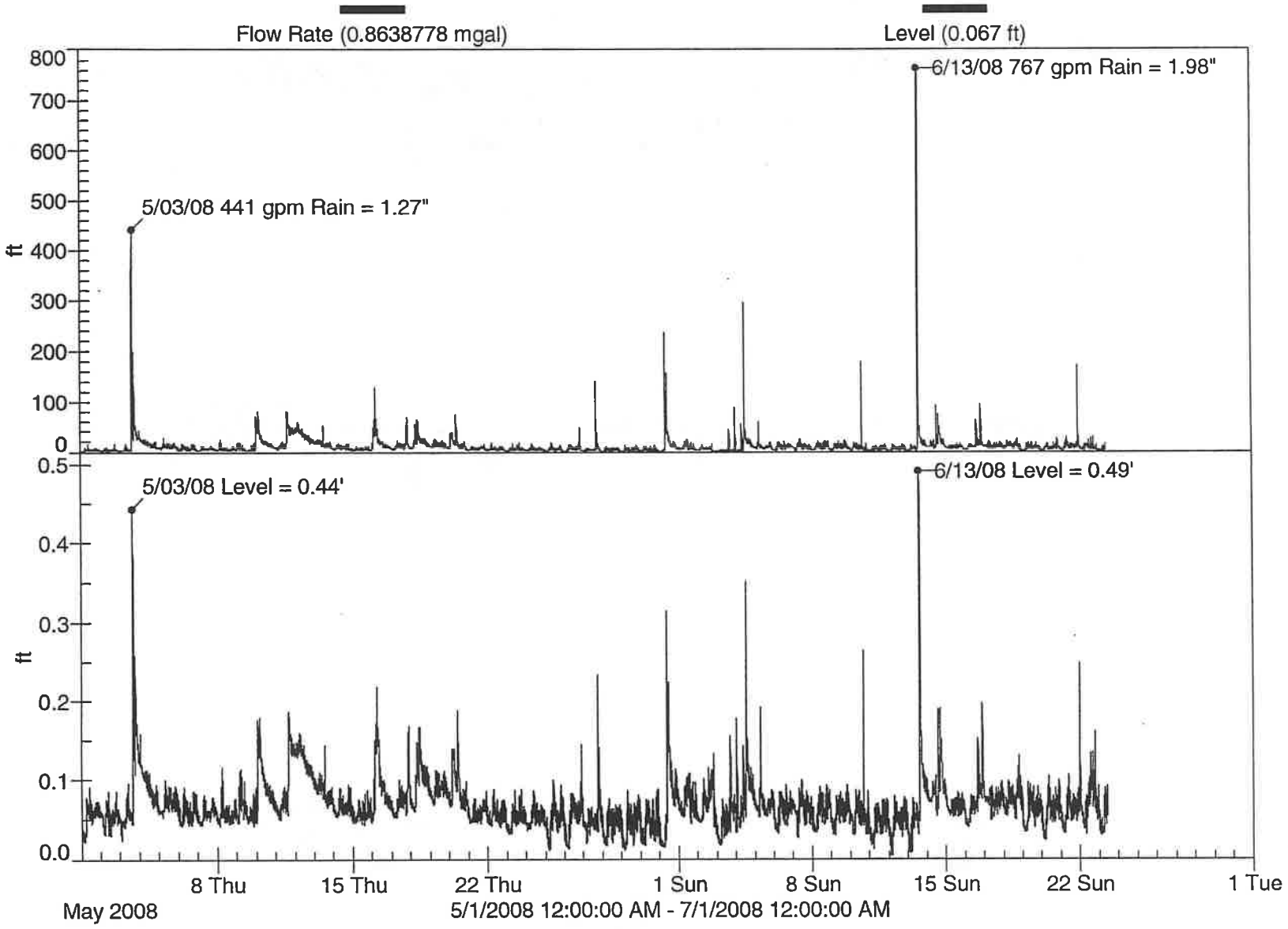
Frostburg State north end of track(E)

Flowlink 5



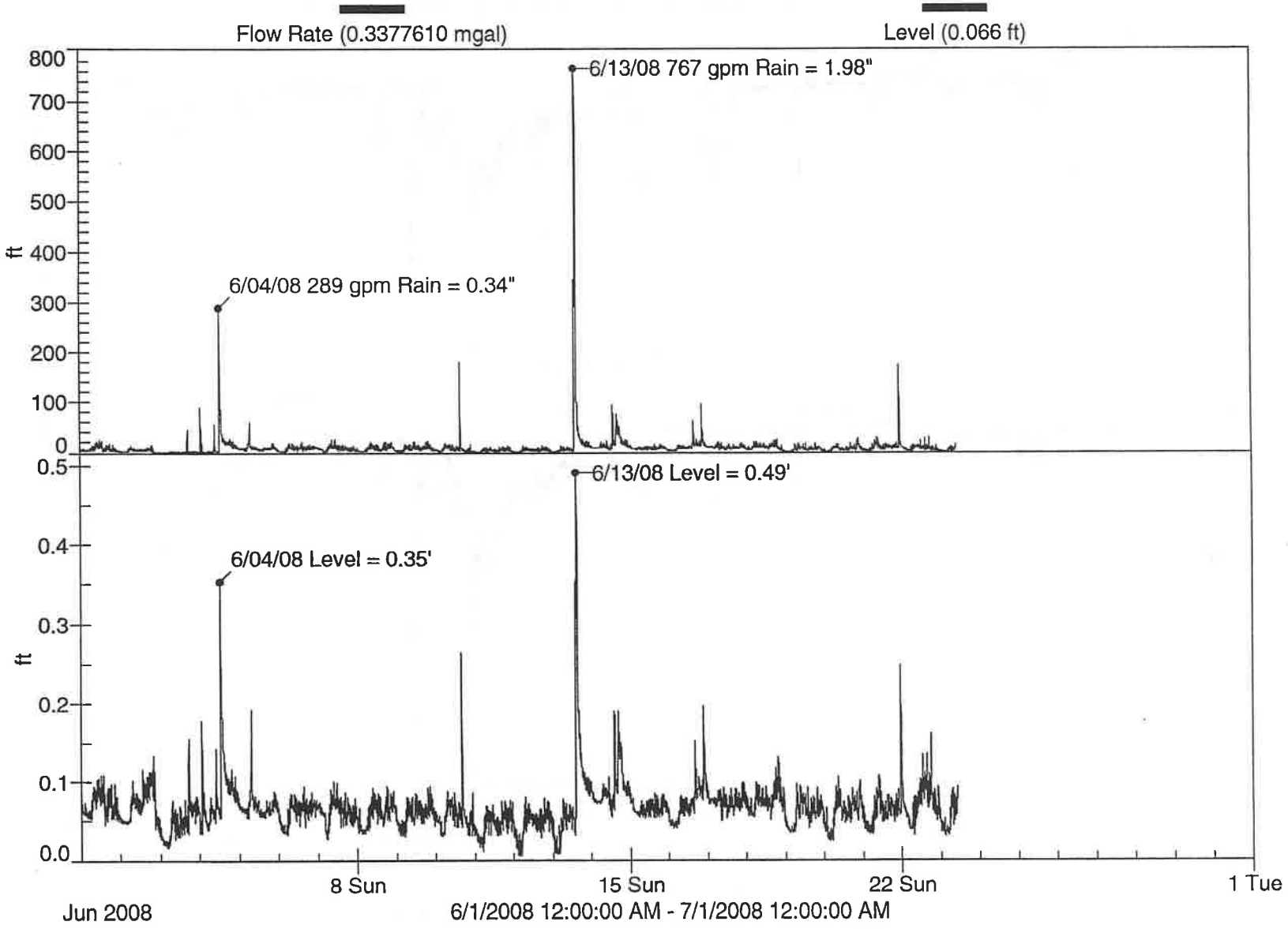
Beals lane (F)

Flowlink 5



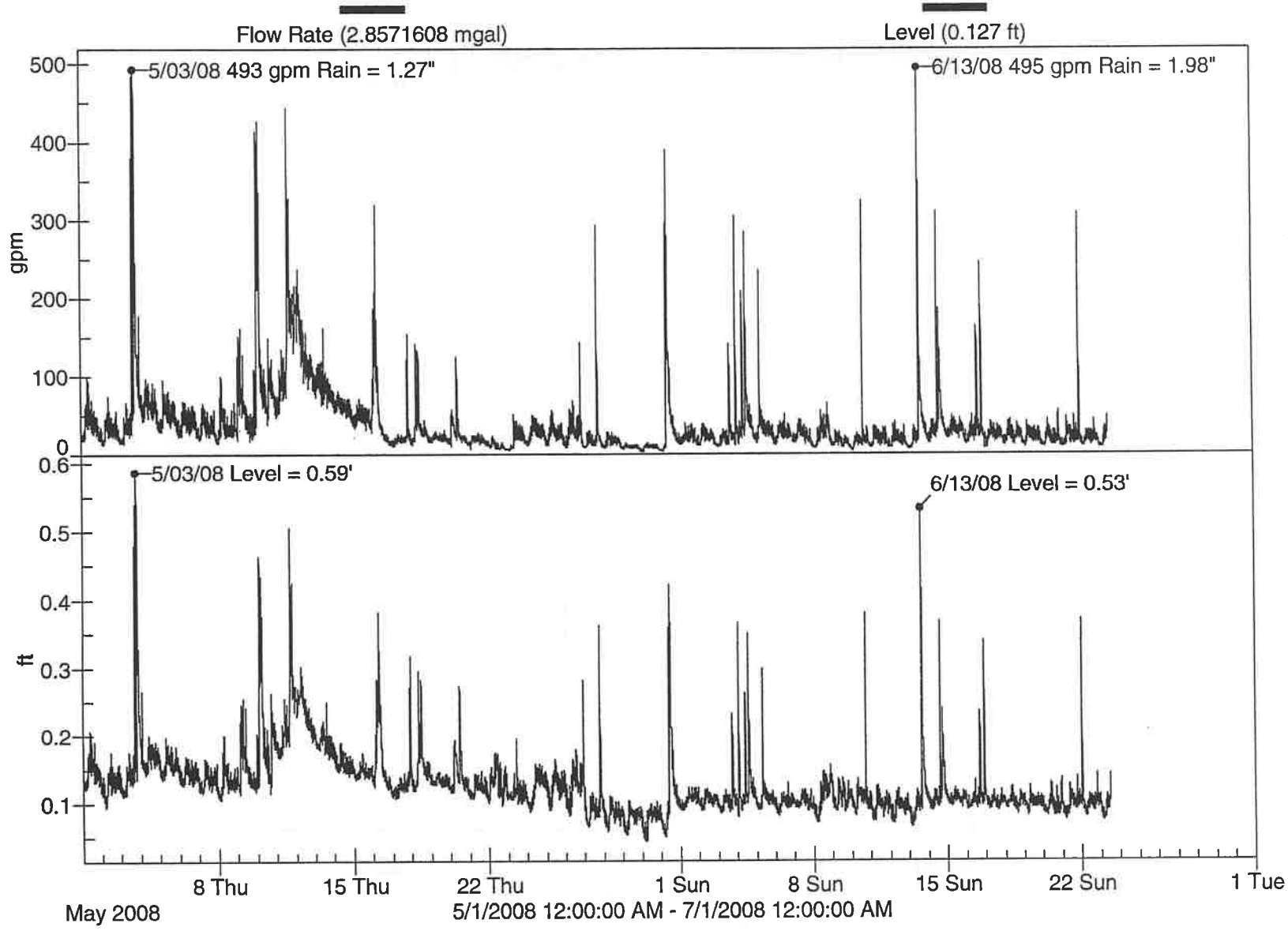
Beals lane (F)

Flowlink 5



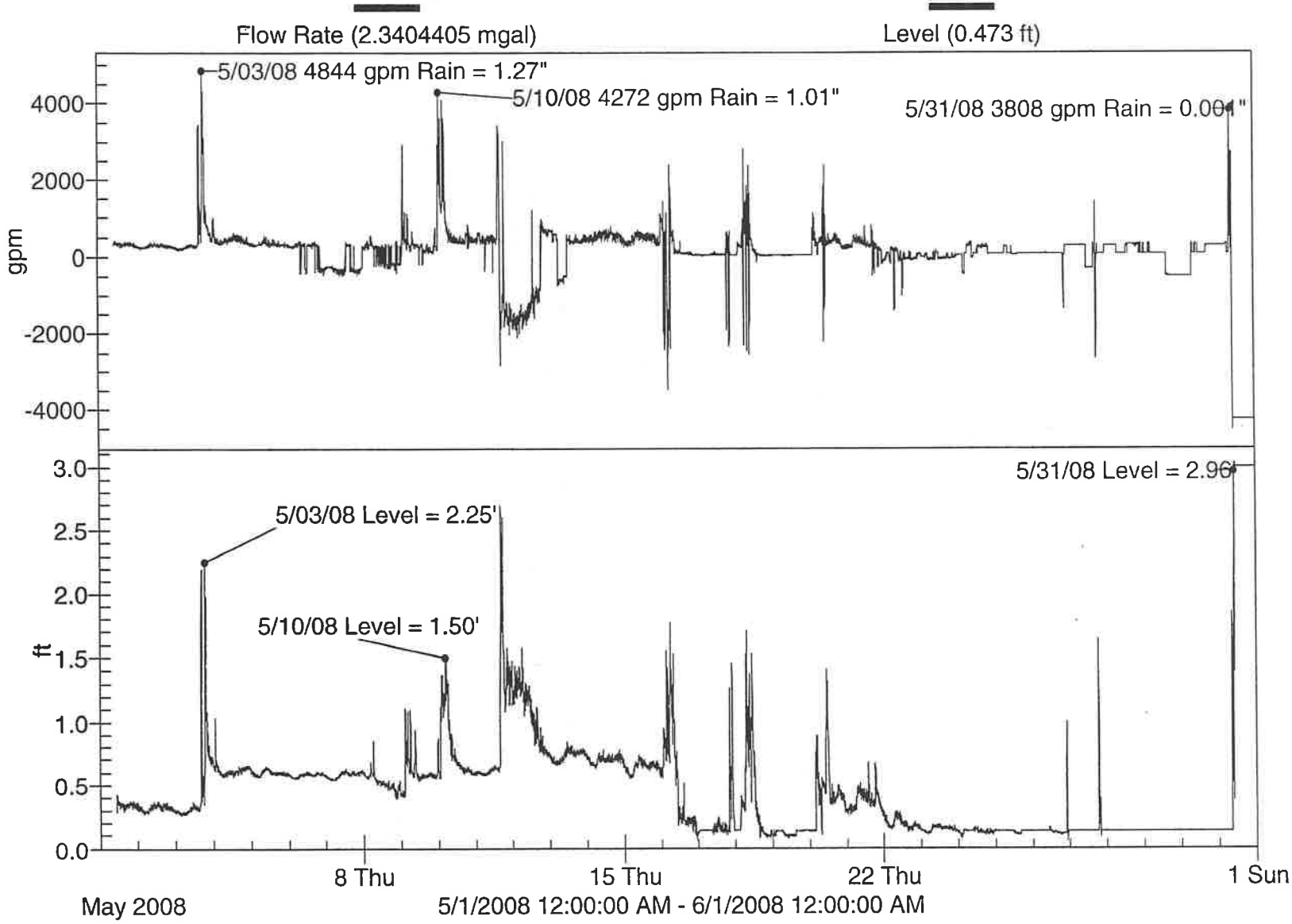
Water street - Depot rd. down from--H

Flowlink 5



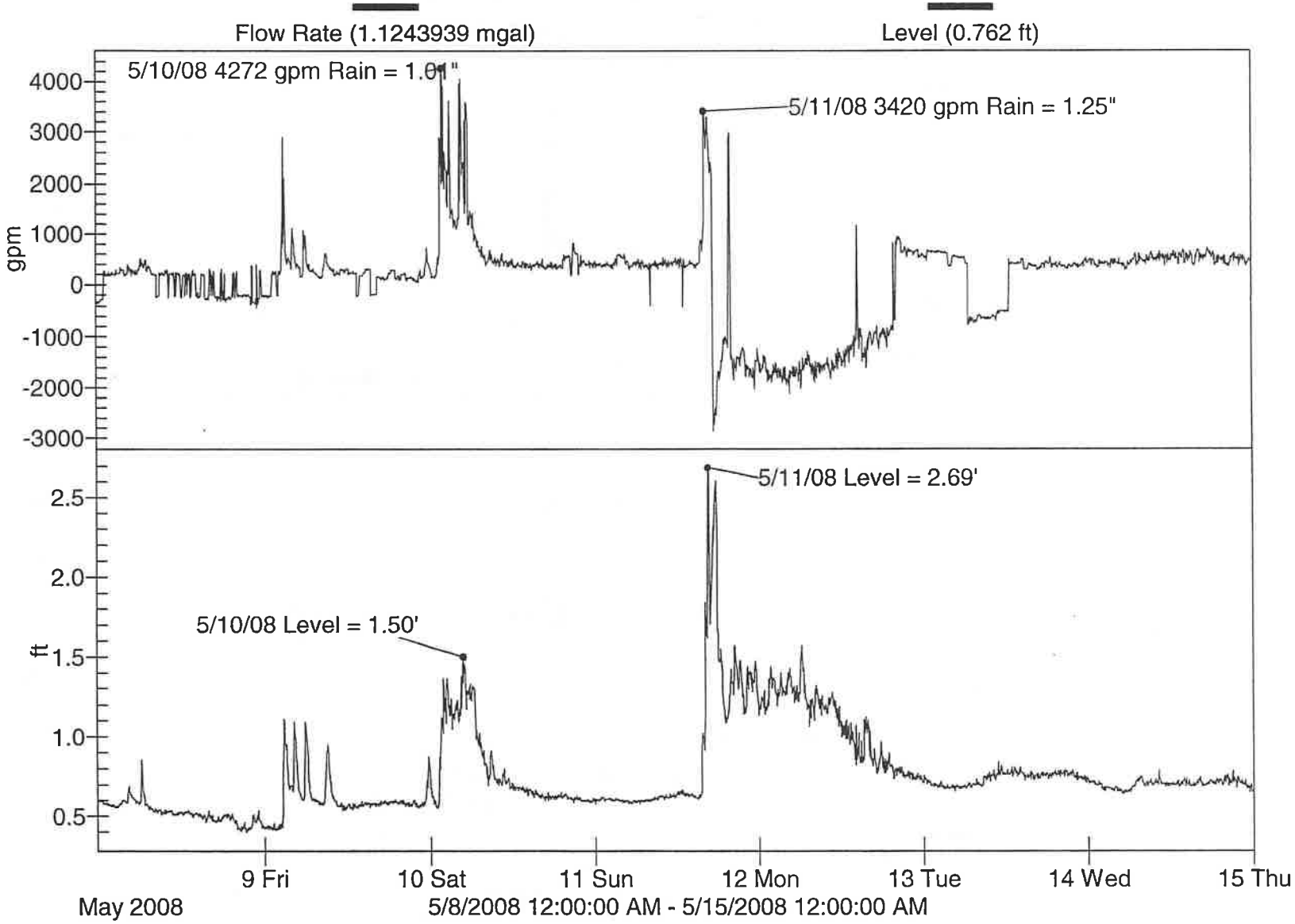
Tide Gate----- Paul St. S.E (P)

Flowlink 5



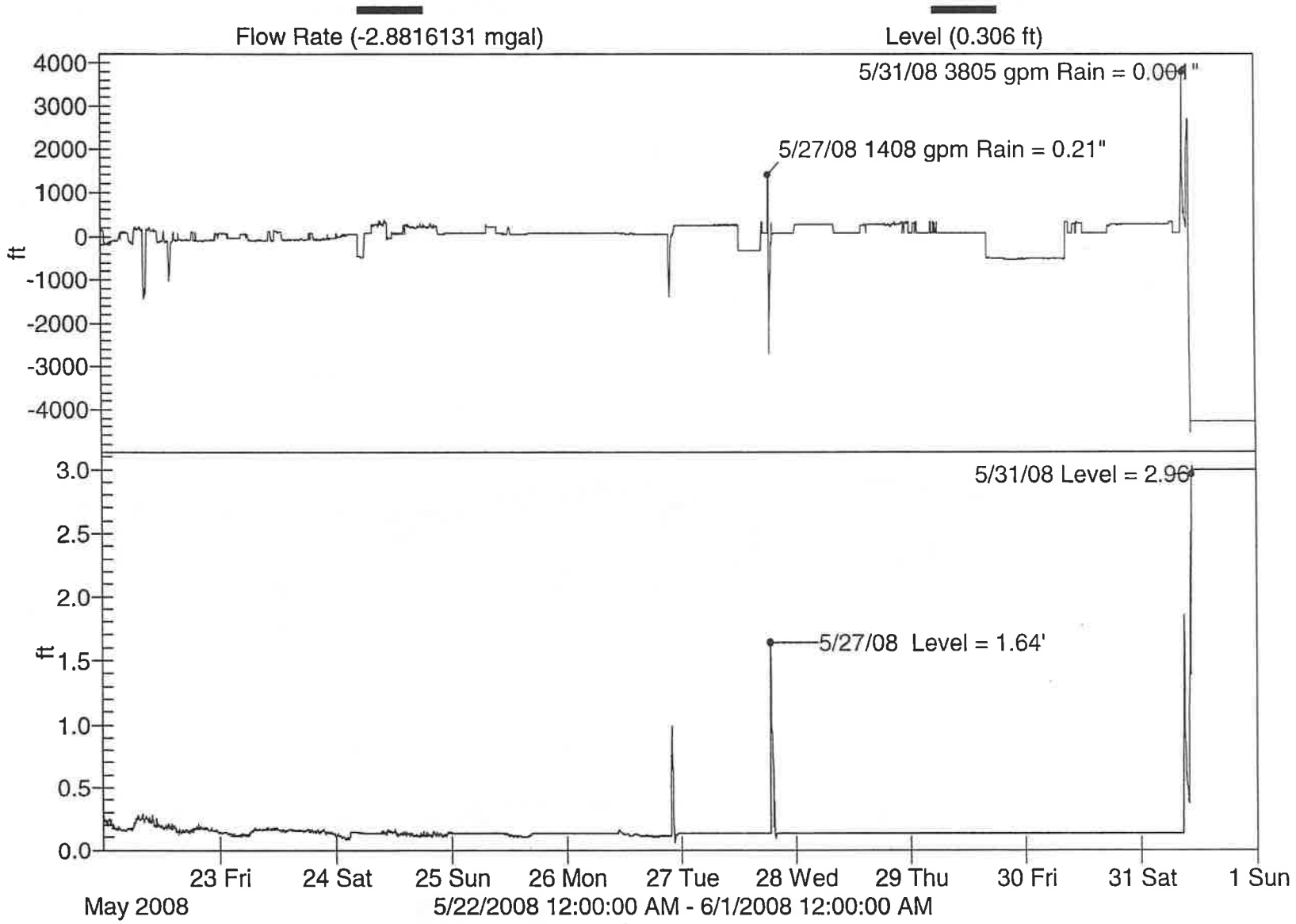
Tide Gate----- Paul St. S.E (P)

Flowlink 5



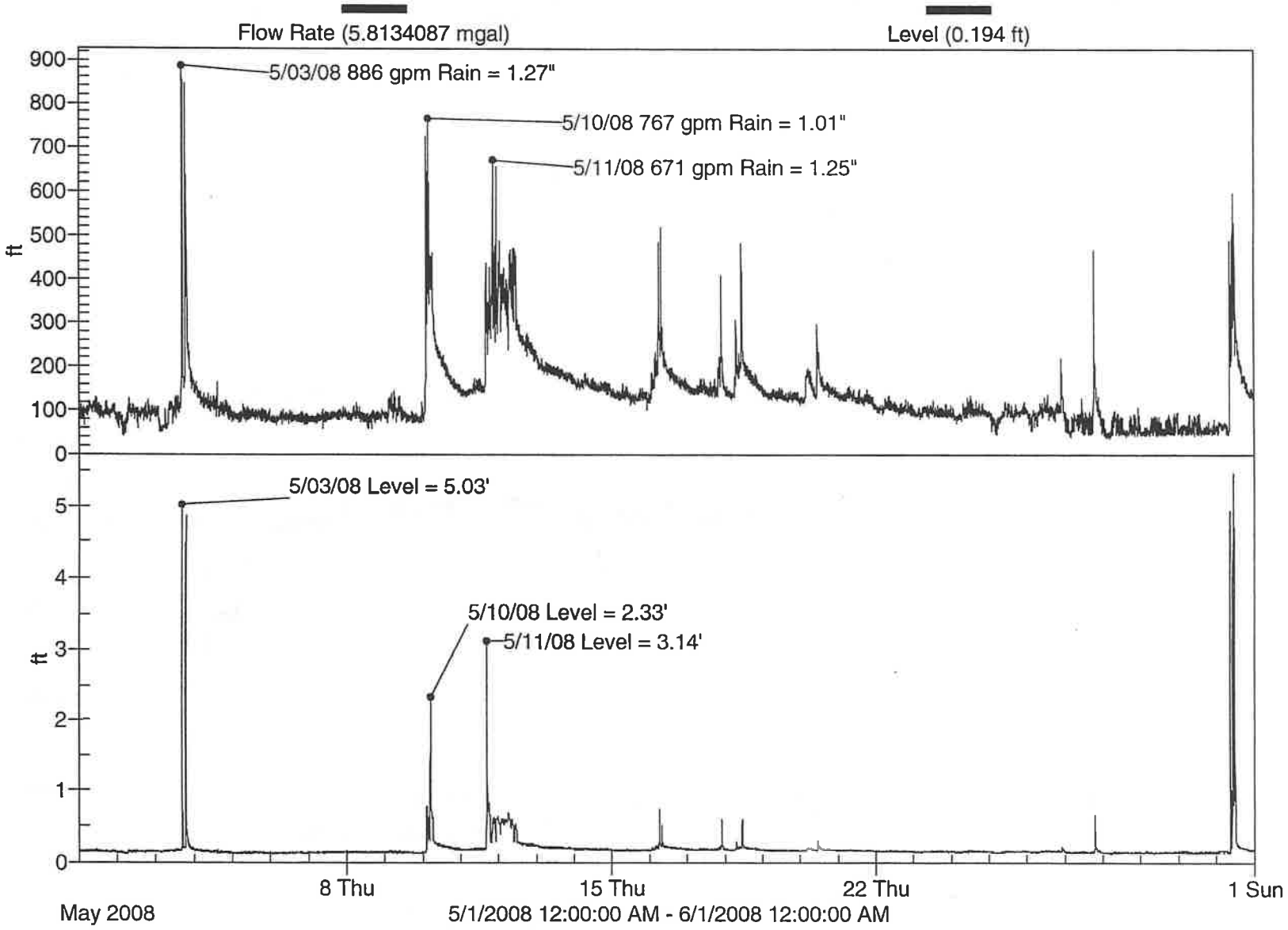
Tide Gate----- Paul St. S.E (P)

Flowlink 5



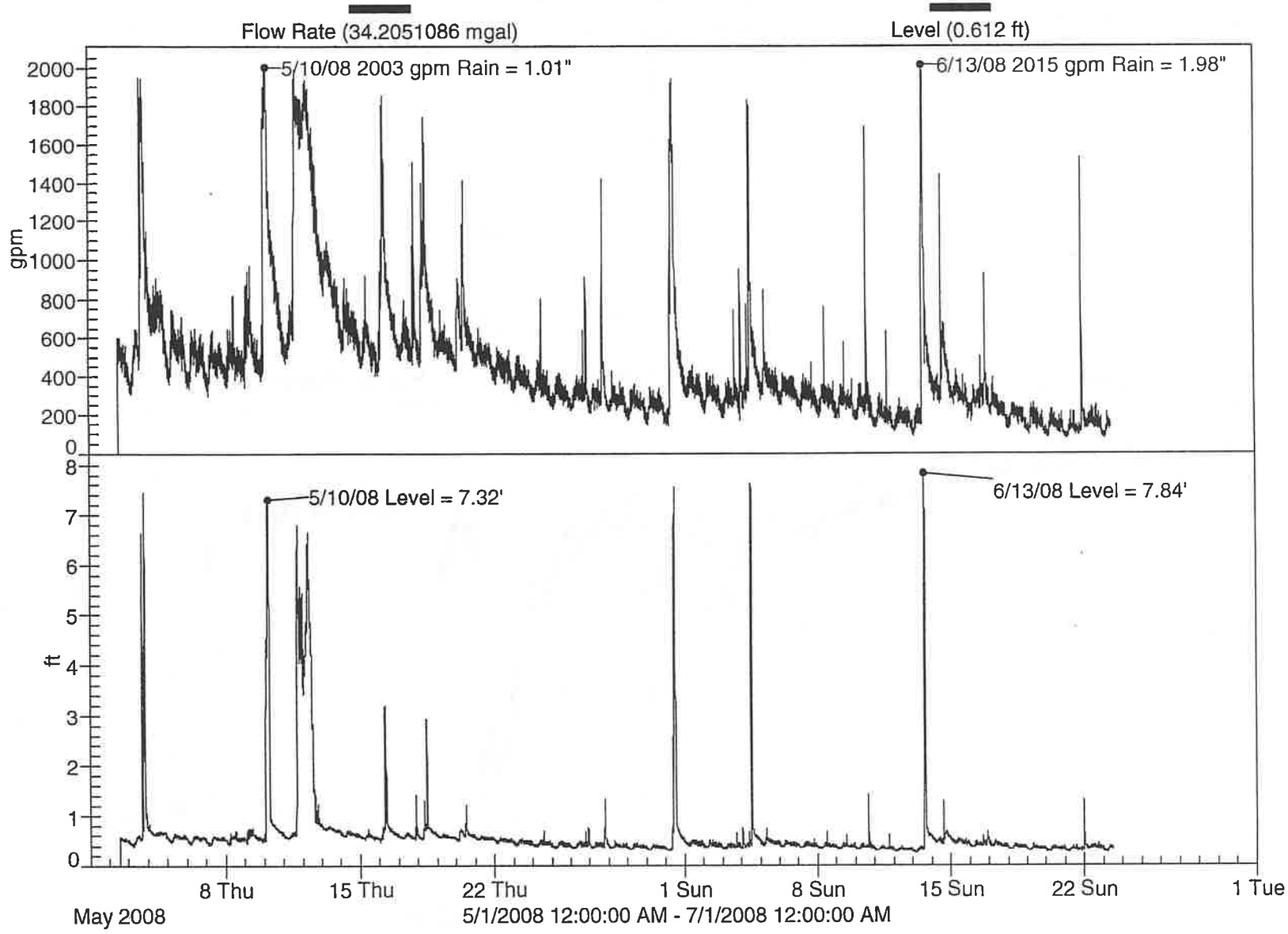
MH (U) West on Grant near poor hse

Flowlink 5



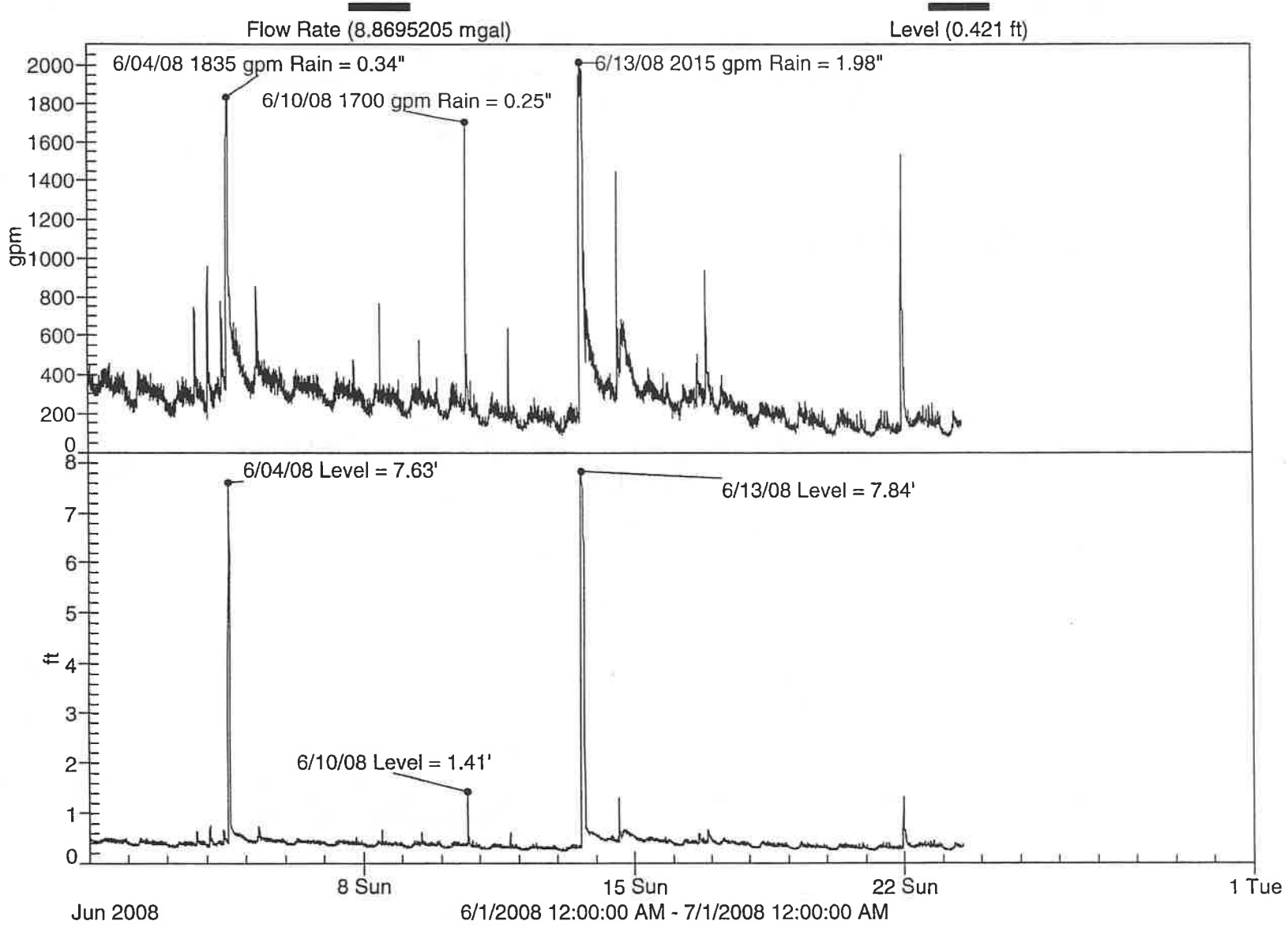
12 INCH SAND SPRING INTERSEPTOR

Flowlink 5



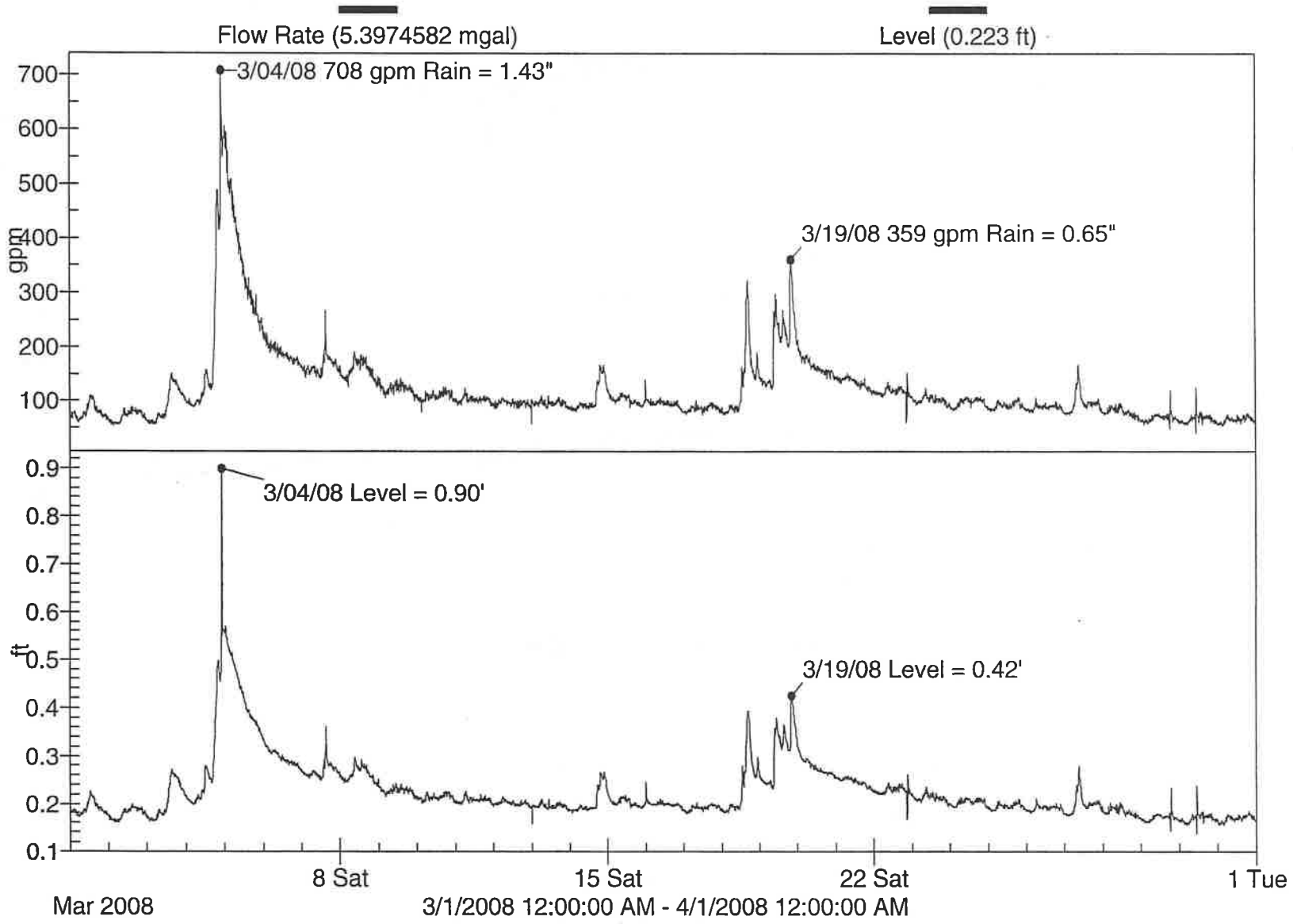
12 INCH SAND SPRING INTERSEPTOR

Flowlink 5



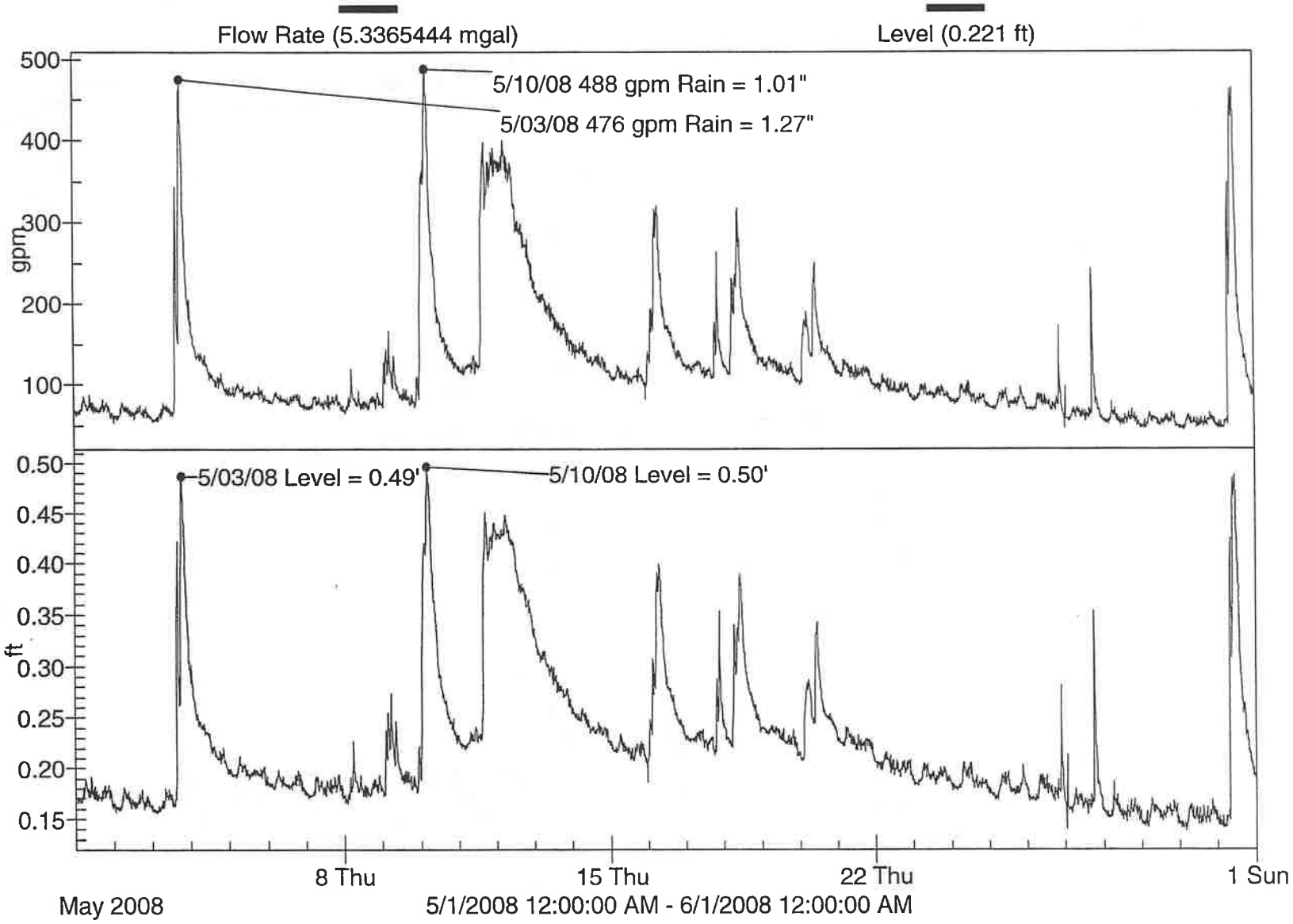
mh at poor house frostburg

Flowlink 5



mh at poor house frostburg

Flowlink 5



mh at poor house frostburg

Flowlink 5