Mayor and Council
Executive Session, Special Session (4th Voting Session) and Executive Session
February 11, 2025
Agenda

"The City of Hagerstown will inspire an inclusive, business-friendly, and sustainable community with clean, safe, and vibrant neighborhoods."
"The City of Hagerstown shall be a community focused municipality"

The agenda and meeting packet is available at www.hagerstownmd.org/government/agenda

"Leave nothing for tomorrow which can be done today" – *President Abraham Lincoln*

EXECUTIVE SESSION

3:00 PM 1. **EXECUTIVE SESSION – *Council Chamber, 2nd floor, City Hall***

3:00 PM 2. **The Mayor and Council will meet in Open Session only for the purpose of voting to close its meeting to discuss matters that the Open Meetings Act permits it to discuss in Executive/Closed Session.**

4:00 PM SPECIAL SESSION

4:00 PM 1. Approval of the Purchase of Tuition for Nineteen (19) Cadets to Attend the Washington County Police Academy

4:00 PM 2. Approval of the Purchase of Flock Safety Platform LPR's

3. Approval of a Memorandum of Understanding with the Washington County Forensic Response Team (FRT)

4:00 PM WORK SESSION

4:10 PM 1. Request for Lights at Wheaton Park – *Scott Myers, Fellowship of Christian Athletes*

4:20 PM 2. Hagerstown Sister City – *Mike Keifer, Liaison with Hagerstown, Indiana*

4:30 PM 3. Pangborn Park Fishing Discussion - *Eric Deike, Director of Public Works*

4:50 PM 4. AFSCME Local 3373 Labor Contract Tentative Agreement – *Donald Francis, HR Director*

5:00 PM 5. Edgemont Reservoir - *Nancy Hausrath, Director of Utilities*

5:20 PM 6. Water/Wastewater Rate Model Update - *Nancy Hausrath, Director of Utilities*

5:40 PM 7. State Revolving Fund (SRF) for Maryland Department of the Environment (MDE) Water/Wastewater – Nancy Hausrath, Director of Utilities

CITY ADMINISTRATOR'S COMMENTS

MAYOR AND COUNCIL COMMENTS

ADJOURN

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
EXECUTIVE SESSION – *Council Chamber, 2nd floor, City Hall*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
February_4__2025_Executive_Session.pdf	Executive Session Agenda

MAYOR AND CITY COUNCIL
EXECUTIVE SESSION
FEBRUARY 4, 2025
AGENDA

Vision Statement:
The City of Hagerstown will inspire an inclusive, business-friendly, and sustainable community with clean, safe and vibrant neighborhoods."

Mission Statement:
"The City of Hagerstown shall be a community focused municipality."

The agenda and meeting packet is available at www.hagerstownmd.org/government/agenda

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3:30 p.m. EXECUTIVE SESSION

1. To consider the investment of public funds; (#5)

   * *Loan Repayment Offer*

2. To consider a matter that concerns the proposal for a business or industrial organization to locate, expand, or remain in the State; (#4)

   * *Business Proposal*

3. To conduct collective bargaining negotiations or consider matters that relate to the negotiations; (#9)

   * *Local AFSCME 3373 Contract Negotiations*

***AUTHORITY: Annotated Code of Maryland, General Provisions Article: Section 3-305(b)**
(Subsection is noted in parentheses)

CITY OF HAGERSTOWN, MARYLAND

PUBLIC BODY: ***Mayor & City Council*** **DATE:** ***February 4, 2025***

PLACE: ***Council Chamber, 2nd floor, City Hall*** **TIME:** ***3:30 p.m.***

AUTHORITY: ANNOTATED CODE OF MARYLAND, GENERAL PROVISIONS ARTICLE: Section 3-305(b):

1. To discuss:

[ ] (i) the appointment, employment, assignment, promotion, discipline, demotion, compensation, removal, resignation or performance evaluation of appointees, employees, or officials over whom it has jurisdiction; or

[ ] (ii) any other personnel matter that affects one or more specific individuals;

[ ] 2. To protect the privacy or reputation of individuals with respect to a matter that is not related to public business;

[ ] 3. To consider the acquisition of real property for a public purpose and matters directly related thereto;

[X] 4. To consider a matter that concerns the proposal for a business or industrial organization to locate, expand, or remain in the State;

[X] 5. To consider the investment of public funds;

[ ] 6. To consider the marketing of public securities;

[ ] 7. To consult with counsel to obtain legal advice;

[ ] 8. To consult with staff, consultants, or other individuals about pending or potential litigation;

[X] 9. To conduct collective bargaining negotiations or consider matters that relate to the negotiations;

[ ] 10. To discuss public security, if the public body determines that public discussions would constitute a risk to the public or public security, including:
(i) the deployment of fire and police services and staff; and
(ii) the development and implementation of emergency plans;

[ ] 11. To prepare, administer or grade a scholastic, licensing, or qualifying examination;

[ ] 12. To conduct or discuss an investigative proceeding on actual or possible criminal conduct; or

[ ] 13. To comply with a specific constitutional, statutory, or judicially imposed requirement that prevents public disclosures about a particular proceeding or matter; or

[ ] 14. Before a contract is awarded or bids are opened, discuss a matter directly related to a negotiation strategy or the contents of a bid or proposal, if public discussion or disclosure would adversely impact the ability of the public body to participate in the competitive bidding or proposal process.

[ ] 15. Administrative Function

EXECUTIVE SESSION AGENDA

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
The Mayor and Council will meet in Open Session only for the purpose of voting to close its meeting to discuss matters that the Open Meetings Act permits it to discuss in Executive/Closed Session.

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Approval of the Purchase of Tuition for Nineteen (19) Cadets to Attend the Washington County Police Academy

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
Motion_WC_Police_Academy_Tuition_for_19_Cadets.pdf	MOTION: WC Police Academy Tuition 19 Cadets
CONSENT_FORM_-_WCPA.pdf	CONSENT FORM
INVOICE_-_WCPA.pdf	INVOICE

REQUIRED MOTION

MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Date: February 11, 2025

TOPIC: **Approval of Purchase of Tuition for (19) Cadets to attend the Washington County Police Academy #10**

Charter Amendment	_____
Code Amendment	_____
Ordinance	_____
Resolution	_____
Other	__X__

MOTION: I hereby move for Mayor and Council approval of the purchase of tuition to the Washington County Police Academy for (19) cadets.

This will be paid for out of HPD's operating budget.

DATE OF PASSAGE: February 11, 2025

PURCHASE / CONTRACT / CONSENT FORM

City of Hagerstown Mayor and Council

Regular Session Date: _____ Special Session Date: February 11, 2025

Originating Department: Police Division (if applicable): _____

Department Director or Manager: Chief Paul J. Kifer

Account/Project Name: Tuition for 19 Entry Level Recruits

Account No: 0110203 530703 CIP Control No. _____

Budget Amount: $ 20,789 Account Balance: $ 9,896 Unbudgeted Amount: $ (37,804)*

Fiscal Year: 25 / 26 Source of Funds: General Fund operating & Add'l State Aid grant

Quantity	Description	Value
19	Entry Level Recruit Fees for WCPA 10 ($2,500 / each)	$ 47,500.00
	TOTAL VALUE OF PROJECT $	$ 47,500.00

* Budget transfer from additional State grant funding receiving in FY25 to offset these costs.

ABOVE TO BE USED FOR: WCPA Tuition

RECOMMENDED VENDOR: Business Name: Washington County Sheriff's Office

Business Address: 500 Western Maryland Parkway

City/State/Zip: Hagerstown, Maryland 21740

Bid/Proposal/Quote No.: _____ Sole Source? X Yes ____ No

OTHER VENDORS		
Firm	City/State	Total Amount

PLEASE INDICATE WHICH FOCUS AREA OF THE MAYOR & COUNCIL'S STATEGIC PLAN THIS PURCHASE/CONTRACT APPLIES TO		
Indicate with an X	FOCUS AREA	GOAL STATEMENT
	NEIGHBORHOODS REVITALIZATION & SUSTAINABILITY	The citizens of Hagerstown will experience a high quality of life.
X	PUBLIC SAFETY	The City of Hagerstown ensures that all who live, work, and play in the City of Hagerstown will be healthy and safe.
	PUBLIC FACILITIES & INFRASTRUCTURE	The City of Hagerstown will maintain quality services and infrastructure that support residents and businesses in a cost-effective manner.
	ECONOMIC DEVELOPMENT	The City of Hagerstown will continue to grow a diverse, business-friendly economy that supports the community's needs.
	CITIZEN-BASED GOVERNMENT	The City of Hagerstown is an ethical and financial responsible government.
	FISCAL ACCOUNTABILITY	The City of Hagerstown will strive for continuous improvement of fiscal responsible decision making.
	PARKS & RECREATION FOR ACTIVE/HEALTHY LIVING	The City of Hagerstown supports a culturally vibrant community.
	INNOVATIVE/PROGRESSIVE GOVERNMENT	The City of Hagerstown is committed to employee development, excellence in services, and adapting to meet the needs of the community and organization.
	COMMUNITY PROMOTION/PRIDE	The City of Hagerstown will improve our community image.
	ECONOMIC DEVELOPMENT THROUGH SPORTS AND TOURISM	The City of Hagerstown will be creative and diversify opportunities for economic development through non-traditional means.
	MISC. PROJECTS, GOALS AND LEGISLATIVE PRIORITIES	The City of Hagerstown takes a creative approach at finding solutions.

REVIEWED AND APPROVED AS FOLLOWS:

(1) Department Director and Division Manager

COMMENTS This purchase covers the tuition of 18 new recruits to attend the next academy. Finding comes from our general fund budget.

Chief Rawl 2/5/25
Signature / Date

Signature / Date

(2) Purchasing Agent

COMMENTS

Approve

Tyler Fleer 2/7/25
Signature / Date

(3) Chief Financial Officer

COMMENTS

Michelle Hepburn 2/5/25
Signature / Date

(4) City Administrator

COMMENTS

Recommend Approval

Scott Nicewarner 2/6/25
Signature / Date

WASHINGTON COUNTY POLICE ACADEMY

INVOICE

FROM	TITLE	Date	Due Date
Sgt. Patrick Kemmerer	WCPA Director	1/28/25	Upon Receipt

Quantity	Description	Unit Price	Line Total
19	Entry Level recruit fees for WCPA Academy 10 HPD Police Department Invoice for (19) cadets. Academy start date is 2/10/25. Please submit ASAP.	$2,500	$47,500
		Subtotal	$47,500
		Sales Tax	N/A
		Total	$47,500

REMIT TO: Washington County Sheriff's Office
500 Western Maryland Parkway
Hagerstown, MD. 21740
Attn: Pam Delosier

MAKE CHECKS PAYABLE TO: Washington County Treasurer

PURCHASE / CONTRACT / CONSENT FORM

City of Hagerstown Mayor and Council

Regular Session Date: _____ Special Session Date: February 11, 2025

Originating Department: Police Division (if applicable): _____

Department Director or Manager: Chief Paul J. Kifer

Account/Project Name: Tuition for 19 Entry Level Recruits

Account No: 0110203 530703 CIP Control No. _____

Budget Amount: $_____ Account Balance: $_____ Unbudgeted Amount: $_____

Fiscal Year: 25 / 26 Source of Funds: General Fund

Quantity	Description	Value
19	Entry Level Recruit Fees for WCPA 10 ($2,500 / each)	$ 47,500.00
	TOTAL VALUE OF PROJECT	$ $ 47,500.00

ABOVE TO BE USED FOR: WCPA Tuition

RECOMMENDED VENDOR: Business Name: Washington County Sheriff's Office
Business Address: 500 Western Maryland Parkway
City/State/Zip: Hagerstown, Maryland 21740

Bid/Proposal/Quote No.: _____ Sole Source? X Yes _____ No

OTHER VENDORS		
Firm	**City/State**	**Total Amount**

PLEASE INDICATE WHICH FOCUS AREA OF THE MAYOR & COUNCIL'S STATEGIC PLAN THIS PURCHASE/CONTRACT APPLIES TO		
Indicate with an X	**FOCUS AREA**	**GOAL STATEMENT**
	NEIGHBORHOODS REVITALIZATION & SUSTAINABILITY	The citizens of Hagerstown will experience a high quality of life.
X	PUBLIC SAFETY	The City of Hagerstown ensures that all who live, work, and play in the City of Hagerstown will be healthy and safe.
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REVIEWED AND APPROVED AS FOLLOWS:

(1) Department Director and Division Manager

COMMENTS This purchase covers the tuition of 18 new recruits to attend the next academy. Finding comes from our general fund budget.

2/5/25

Signature / Date

Signature / Date

(2) Purchasing Agent

COMMENTS

Signature / Date

(3) Chief Financial Officer

COMMENTS

Signature / Date

(4) City Administrator

COMMENTS

Signature / Date

WASHINGTON COUNTY POLICE ACADEMY

INVOICE

FROM	TITLE	Date	Due Date
Sgt. Patrick Kemmerer	WCPA Director	1/28/25	Upon Receipt

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		Subtotal	$47,500
		Sales Tax	N/A
		Total	$47,500

REMIT TO: Washington County Sheriff's Office
500 Western Maryland Parkway
Hagerstown, MD. 21740
Attn: Pam Delosier

MAKE CHECKS PAYABLE TO: Washington County Treasurer

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Approval of the Purchase of Flock Safety Platform LPR's

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
CONSENT_FORM_-_FLOCK_GROUP.pdf	CONSENT FORM
QUOTE_-_FLOCK_GROUP.pdf	QUOTE
SOLE_SOURCE_-_FLOCK_GROUP.pdf	SOLE SOURCE LETTER

PURCHASE / CONTRACT / CONSENT FORM

City of Hagerstown Mayor and Council

Regular Session Date: _____ Special Session Date: February 11, 2025

Originating Department: Police Division (if applicable): _____

Department Director or Manager: Paul J. Kifer, Chief of Police

Account/Project Name: Flock Safety Platform LPR's

Account No: 4510000 5832 CIP Control No. C0130

Budget Amount: $215,000.00 Account Balance: $52,599.00 Unbudgeted Amount: $_____

Fiscal Year: 2025 Source of Funds: _____

Quantity	Description	Value
1	Flock Safety Platform (6 wing LPR's and 2 stand alone Falcon LPR's)	$ 15,000.00
	TOTAL VALUE OF PROJECT	$ 15,000.00

ABOVE TO BE USED FOR: _____

RECOMMENDED VENDOR: Business Name: Flock Group, Inc. (#5761)

Business Address: 1170 Howell Mill Road, Suite 110

City/State/Zip: Atlanta, Georgia 30318

Bid/Proposal/Quote No.: Q-120283 Sole Source? X Yes ____ No

OTHER VENDORS		
Firm	**City/State**	**Total Amount**
Sourcewell Contract		

PLEASE INDICATE WHICH FOCUS AREA OF THE MAYOR & COUNCIL'S STATEGIC PLAN THIS PURCHASE/CONTRACT APPLIES TO		
Indicate with an X	**FOCUS AREA**	**GOAL STATEMENT**
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	MISC. PROJECTS, GOALS AND LEGISLATIVE PRIORITIES	The City of Hagerstown takes a creative approach at finding solutions.

REVIEWED AND APPROVED AS FOLLOWS:

(1) Department Director and Division Manager

COMMENTS This is a purchase of License Plate Readers to add to our existing LPR equipment, giving us the ability to better capture data from passing vehicles for investigations. This is a CIP budget purchase an all purchasing rules were followed.

2/4/25

Signature / Date

Signature / Date

(2) Purchasing Agent

COMMENTS

Signature / Date

(3) Chief Financial Officer

COMMENTS

Signature / Date

(4) City Administrator

COMMENTS

Signature / Date

Flock Safety + MD - Hagerstown PD

Flock Group Inc.
1170 Howell Mill Rd, Suite 210
Atlanta, GA 30318

MAIN CONTACT:
Shane MacGregor
shane.macgregor@flocksafety.com
4344206138

Created Date: 01/16/2025
Expiration Date: 02/15/2025
Quote Number: Q-120283
PO Number:

flock safety

flock safety

Budgetary Quote

This document is for informational purposes only. Pricing is subject to change.

Bill To: 50 N Burhans Blvd Hagerstown, Maryland 21740

Ship To: 50 N Burhans Blvd Hagerstown, Maryland 21740

Billing Company Name: MD - Hagerstown PD
Billing Contact Name:
Billing Email Address:
Billing Phone:

Subscription Term: 12 Months
Payment Terms: Net 30
Retention Period: 30 Days
Billing Frequency: Annual Plan - First Year Invoiced at Signing.

Hardware and Software Products

Annual recurring amounts over subscription term

Item	Cost	Quantity	Total
Flock Safety Platform			**$15,000.00**
Flock Safety Flock OS			
FlockOS ™ - Community	Included	1	Included
Flock Safety LPR Products			
Flock Safety Falcon ®	Included	2	Included
Flock Safety Wing ™ LPR	Included	6	Included

Professional Services and One Time Purchases

Item	Cost	Quantity	Total
One Time Fees			
Flock Safety Professional Services			
Professional Services - Standard Implementation Fee	$0.00	2	$0.00
Professional Services - Wing Implementation Fee	$0.00	6	$0.00

Subtotal Year 1:	$15,000.00
Annual Recurring Subtotal:	$15,000.00
Discounts:	$1,800.00
Estimated Tax:	$0.00
Contract Total:	$15,000.00

Taxes shown above are provided as an estimate. Actual taxes are the responsibility of the Customer. This is not an invoice – this document is a non-binding proposal for informational purposes only. Pricing is subject to change.

Billing Schedule	Amount (USD)
Year 1	
At Contract Signing	$15,000.00
Annual Recurring after Year 1	$15,000.00
Contract Total	$15,000.00

*Tax not included

Discounts Applied	Amount (USD)
Flock Safety Platform	$0.00
Flock Safety Add-ons	$0.00
Flock Safety Professional Services	$1,800.00

Product and Services Description

FlockOS Features	Description
FlockOS ™ - Community	An integrated public safety platform that detects, centralizes and decodes actionable evidence to increase safety, improve efficiency, and connect the community.
Flock Safety Falcon ®	Law enforcement grade infrastructure-free (solar power + LTE) license plate recognition camera with Vehicle Fingerprint ™ technology (proprietary machine learning software) and real-time alerts for unlimited users.
Professional Services - Standard Implementation Fee	One-time Professional Services engagement. Includes site and safety assessment, camera setup and testing, and shipping and handling in accordance with the Flock Safety Standard Implementation Service Brief.
Flock Safety Wing ™ LPR	Wing software integration transforms traditional IP cameras into Flock Safety enabled LPR cameras. Includes Vehicle Fingerprint ™ computer vision and Advanced Search Package (Convoy Analysis, Multi Geo Search, Visual Search)
Professional Services - Wing Implementation Fee	

FlockOS Features & Description

FlockOS Features	Description
Community Network Access	The ability to request direct access to feeds from privately owned Flock Safety Falcon® LPR cameras located in neighborhoods, schools, and businesses in your community, significantly increasing actionable evidence that clears cases.
Unlimited Users	Unlimited users for FlockOS
Time & Location Based Search	Search full, partial, and temporary plates by time at particular device locations
License Plate Lookup	Look up specific license plate location history captured on Flock devices
Vehicle Fingerprint Search	Search footage using Vehicle Fingerprint™ technology. Access vehicle type, make, color, license plate state, missing / covered plates, and other unique features like bumper stickers, decals, and roof racks.
ESRI Based Map Interface	Map-based interface that consolidates all data streams and the locations of each connected asset, enabling greater situational awareness and a common operating picture.
Real-Time NCIC alerts sent to Shared Agencies	Alert sent to any shared community Law Enforcement agency when a vehicle entered into the NCIC crime database passes by a Flock camera
Unlimited Custom Hot Lists	Ability to add a suspect's license plate to a custom list and get alerted when it passes by a Flock camera

flock safety

Sole Source Letter for Flock Safety® ALPR Cameras and Solution

Flock Safety® is the sole manufacturer and developer of the Flock Safety® ALPR Camera. Flock Safety® is also the sole provider of the comprehensive monitoring, processing, and machine vision services which integrate with the Flock Safety® ALPR Camera.

The Flock Safety® ALPR camera and devices are the only Law Enforcement Grade ALPR System to offer the following combination of proprietary features:

1. Vehicle Fingerprint Technology®:
    - Patented proprietary machine vision to analyze vehicle license plate, state recognition, and vehicle attributes such as color, type, make and objects (roof rack, bumper stickers, etc.) based on image analytics (not car registration data)
    - Machine vision to capture and identify characteristics of vehicles with a paper license plate and vehicles with the absence of a license plate
    - Ability to 'Save Search' based on description of vehicles using our patented Vehicle Fingerprint Technology without the need for a license plate, and set up alerts based on vehicle description
    - Only LPR provider with "Visual Search" which can transform digital images from any source into an investigative lead by finding matching vehicles based on the vehicle attributes in the uploaded photo
    - Flock Safety Falcon Flex™: an infrastructure-free, location-flexible license plate reader camera that is easy to self install. Flock Safety Falcon Flex™ ties seamlessly into the Flock Safety® ecosystem with a small and lightweight camera with the ability to read up to 30,000 license plates and vehicle attributes on a single battery charge

2. Integrated Cloud-Software & Hardware Platform:
    - Ability to capture two (2+) lanes of traffic simultaneously with a single camera from a vertical mass
    - Best in class ability to capture and process up to 30,000 vehicles per day with a single camera powered exclusively by solar power
    - Wireless deployment of solar powered license plate reading cameras with integrated cellular communication weighing less than 5lbs and able to be powered solely by a solar panel of 60W or less
    - Web based footage retrieval tool with filtering capabilities such as vehicle color, vehicle type, vehicle manufacturer, partial or full license plate, state of license plate, and object detection

- Utilizes motion capture to start and stop recording without the need for a reflective plate
- Motion detection allows for unique cases such as bicycle capture, ATV, motorcycle, etc.
- On device machine processing to limit LTE bandwidth consumption
- Cloud storage of footage
- Covert industrial design for minimizing visual pollution

3. Transparency & Ethical Product Design:
   - One-of-a-kind "Transparency Portal" public-facing dashboard that details the policies in place by the purchaser, as well as automatically updated metrics from the Flock Safety® system
   - Built-in integration with NCMEC to receive AMBER Alerts to find missing children
   - Privacy controls to enable certain vehicles to "opt-out" of being captured

4. Integrated Audio & Gunshot Detection:
   - Natively integrated audio detection capabilities utilizing machine learning to recognize audio signatures typical of crimes in progress (e.g., gunshots)

5. Live Video Integration:
   - Ability to apply computer vision to third-party cameras using Flock Safety Wing® LPR, transforming them to evidence capture devices using the same Vehicle Fingerprint® technology offered on the Flock Safety Falcon® ALPR cameras
   - Flock Safety Wing® Livestream integrates live stream traffic cameras, publicly or privately owned livestream security cameras into one cloud-based situational awareness dashboard to increase response time in mission-critical incidents
   - Manage various government intelligence including ALPR, livestream cameras, CAD, automatic vehicle location (AVL) on Flock Safety Wing® Suite
   - Ability to access live and recorded video using Flock Safety Condor™, a subscription video solution which allows officers to remotely view instant replay of downloadable live on-scene video with PTZ controls and 25X optical zoom without the need for additional camera network set-up, installation, or up-keep

6. Situational Awareness:
   - FlockOS™ is the world's first and only public safety operating system compatible with Flock Safety™ live streaming fixed and PTZ Condor camera, Flock Safety Raven™ gunshot audio detection, while seamlessly integrating first and

third-party data across video, LPR, and audio to deliver real-time intelligence and retroactive crime solving in a single-pane real-time crime center
- Ability to enhance situational awareness capacity by layering all intelligence streams onto the FlockOS™ ESRI-based map
- FlockOS™ features Flock Safety™ unique Real-Time Routing feature that analyzes various data sources to determine where a suspect vehicle has been and its' direction of travel providing users with possible outcomes based on a confidence threshold

7. Partnerships:
   - Flock Safety® is the only LPR provider to officially partner with AXON to be natively and directly integrated into Evidence.com
   - Flock Safety® is the only LPR provider to be fully integrated into a dynamic network of AXON's Fleet 3 mobile ALPR cameras for patrol cars and Flock Safety Falcon® cameras
   - Access to additional cameras purchased by our HOA and private business partners, means an ever-increasing amount of cameras and data at no additional cost

8. Warranty & Service:
   - Lifetime maintenance and support included in subscription price
   - Flock Safety® is the only fully integrated ALPR one-stop solution from production of the camera to delivery and installation
   - Performance monitoring software to predict potential failures, obstructions, tilts, and other critical or minor issues

Thank you,

Garrett Langley CEO, Flock Safety®

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Approval of a Memorandum of Understanding with the Washington County Forensic Response Team (FRT)

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
MOU_-_FORENSIC_RESPONSE_TEAM.pdf	Motion: FRT

WASHINGTON COUNTY, MARYLAND
FORENSIC RESPONSE TEAM (FRT)
MEMORANDUM OF UNDERSTANDING

I. PARTIES

This Memorandum of Understanding is between Meritus Medical Center, Hagerstown Police Department, Washington County Sheriff's Office, Maryland State Police, Hancock Police Department, Smithsburg Police Department, Boonsboro Police Department, Maryland Natural Resources Police Department, Maryland Department of Corrections, Maryland State Police Crime Laboratory, Washington County Department of Social Services, Safe Place Children's Advocacy Center, Citizens Assisting and Sheltering the Abused (CASA), Washington County State Attorney's Office, and Maryland Coalition Against Sexual Assault (MCASA).

Unless otherwise agreed to, all information-sharing between the Parties described in this MOU will flow between these points of contact. The Parties agree to share a contact list with their point of contact for implementation of this MOU and to notify the Parties of any changes to their points of contact as soon as practicable.

II. PURPOSE

1. Facilitate a county-wide response team to physical and sexual violence of patients of all ages and standardize the quality of care and evidence collection. Such a response can help victims obtain access to comprehensive immediate care, minimize trauma, and encourage the use of community resources available to them.

2. Address the needs of victims while promoting the criminal justice system response. Stabilizing, treating, and engaging the victim as an essential partner in the criminal investigation are central aspects of this protocol. The objective is to promote better and more victim-centered care, support, and evidence collection (if warranted), to increase reporting and ultimately hold more offenders accountable for their actions.

3. Delineate the separate roles and responsibilities of responders and establish procedures for interagency collaboration, thus strengthening relationships between agencies and creating objective uniform standards that will improve overall victim care and investigation and prosecution of cases.

III. STATEMENT OF PRINCIPLES

The Parties agree to the following set of principles:

A. Improving Communication, Coordination, and Collaboration: The Parties agree to enhance communication, coordination, and collaboration to remedy sexual assault, intimate partner, and other violence and hate crimes. This should be done to the extent allowed by law and/or per agency policies while protecting the victim's confidential information.

B. Upholding Civil Rights, Civil Liberties, and Victims' Rights: The Parties agree to comply with state and federal laws in a manner that protects individuals' civil rights and liberties while prosecuting crimes and championing justice for survivors. The Parties explicitly recognize the distinctions between criminal law

and civil law in the handling of sexual assault and violence that arise under both state and federal statutory frameworks.

C. Centering the Victim's Needs: The Parties agree to institute specialized, trauma-informed responses developed in consultation with community-based victim advocates and delineated in this agreement.

D. Ensuring Accountability & Auditing: To promote greater transparency, the Parties have, or will implement a means to monitor, record, and accurately maintain all reports of violent crimes, hate crimes, and sexual assaults, their outcomes, and processes, while maintaining confidentiality where the law provides.

F. Specialized Training and Knowledge: The Parties agree that physical and sexual assaults require specialized, trauma-informed training for the Parties and other first responders.

G. Respecting the Unique Needs of Undocumented Individuals: Parties should strive to promote policies and practices that address the unique needs of undocumented individuals, including implementing culturally and linguistically appropriate law enforcement services.

H. Recognize the Unique Needs of Underserved Populations: The International Association of Forensic Nurses (IAFN) recognizes the following populations as underserved due to unique healthcare challenges. These are listed below, but not limited to:

a. Men

b. Inmates

c. LGBTQ+

d. Patients with disabilities

e. Culturally diverse populations

f. Mental health populations

g. Patients with

language/communication barriers

h. People who are trafficked

i. Patients who are in the military

IV. VICTIM-CENTERED, TRAUMA-INFORMED AND OFFENDER-FOCUSED RESPONSE

A collaborative response to physical or sexual assault must be victim-centered. This means that all responders recognize that he/she is accountable to the victim. This is particularly important because one reason victims do not report abuse is the fear of not being believed. It is important to the safety of the entire community that victims regard reporting to law enforcement and participating in the criminal justice system as a safe and viable option.

Every responder in every discipline is informed about the effect of trauma on any individual. Any type of trauma can affect an individual's memory and ability to recall events and give detailed information. For

all responders, this means being educated about the effect of trauma on an individual and treating each alleged victim with consideration, professionalism, and compassion.

Common reactions that may occur during the assault, immediately following an assault, and for a considerable amount of time after the assault, but are not limited to:

- Anger
- Anxiety
- Hypervigilance
- Fear for the safety of self and loved ones
- Preoccupation with circumstances surrounding the assault
- Flashbacks in which the individual mentally re-experiences the event
- Physical symptoms including muscle aches, headaches, fatigue, etc.
- Disbelief at what has happened - feeling numb to the situation
- Memory problems - especially concerning the traumatic event
- Misperception of time
- Increased startle response
- Misplaced feelings of guilt, shame, and/or self-doubt

Responders must also be offender-focused in response to physical or sexual violence. An offender-focused response acknowledges that offenders purposefully, knowingly, and intentionally target victims whom they believe they can successfully assault. Responders must recognize that offenders often choose victims based on the victim's accessibility, vulnerability, and a perception by the perpetrator that the victim's report of the assault will lack credibility. This is seen by the offender as an assurance of their ability to escape accountability for the offense. Offenders hope that community responders will participate in victim blaming, not educate themselves about the offenders, and not have a solid understanding of the effects of trauma on an individual. All of these can combine to allow the offender to re-offend.

If Washington County's collaborative response to the crime of physical and sexual assault can balance the needs of the victim with the expectations of the criminal justice system, while maintaining the focus on holding offenders accountable for their actions, the goals of a victim-centered response will be met.

V. INITIATING A COLLABORATIVE FORENSIC RESPONSE TEAM (FRT) APPROACH

A collaborative team approach seeks to lessen the traumatizing nature of the assault. Through coordination of the medical, support services, and investigation process, the FRT aims to reduce repeated questioning of the victim, to ensure the physical and psychological well-being of the victim, and to increase the effective collection and preservation of evidence.

The Forensic Response Team (FRT) consists of a core team of responders, including:

- Meritus Medical Center (MMC)
- Hagerstown Police Department (HPD)
- Washington County Sheriff's Office (WCSO)
- Maryland Natural Resources Police (NRP)
- Hancock Police Department
- Boonsboro Police Department
- Smithsburg Police Department
- Maryland State Police (MSP)
- Washington County Department of Social Services
- Safe Place Children's Advocacy Center
- Citizens Assisting and Sheltering the Abused (CASA)
- Maryland Coalition Against Sexual Assault (MCASA)
- Washington County State Attorney's Office

Each responder needs to understand the specific roles and responsibilities of each FRT agency. The goal is for responders at every level to call on each other for assistance and direction as well as to hold each other accountable on behalf of the victim.

VI. ROLES AND RESPONSIBILITIES OF THE FORENSIC RESPONSE TEAM (FRT)

The Washington County Forensic Response Team Protocol addresses the roles and responsibilities of responders concerning victims of all ages.

Each of these responders has a role in responding to and caring for patients/victims, investigating the crime, and/or holding offenders accountable. Together, these responders form the core FRT and respond to disclosures of a crime.

Each responder should be able to explain their role in the investigation, along with the roles of the other responders.

While this protocol addresses the role of the core FRT, it is important to recognize that responders at every level play a significant role in the recovery process of survivors and in helping to recover a sense of peace and security in the life of the survivor and community at large.

VII. THE ROLE OF LAW ENFORCEMENT

- *Hagerstown Police Department (HPD)*
- *Washington County Sheriff's Office (WCSO)*
- *Maryland State Police (MSP)*

- *Maryland Natural Resources Police (NRP)*
- *Hancock Police Department*
- *Boonsboro Police Department*
- *Smithsburg Police Department*
- *Maryland Department of Public Safety and Correctional Services (DOC)*

The role of a law enforcement officer includes:

1. Protecting the safety and well-being of the victim
2. Ensuring the victim receives proper medical attention
3. Participating in FRT planning and implementing activities
4. Obtaining initial witness statements
5. Identifying whether or not a crime has occurred
6. Conducting an impartial investigation
7. Training patrol officers and detectives in the FRT and trauma-informed approach and implementing first responder training
8. Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
9. Developing and maintaining, both, an agency and FRT database
10. Committing positive, constructive problem-solving for the benefit of the victim and the community
11. Committing to effective case review to identify trends, themes, and system problems
12. Ensure a culturally competent system of care and include a trauma-informed approach to victims and families by all agencies

VIII. THE ROLE OF THE VICTIM ADVOCATE

Citizens Assisting and Sheltering the Abused (CASA, Inc.)

The Victim Advocate provides essential support to victims of violence. They are trained to assess victim needs and to provide counseling, advocacy, information, referrals, and support. They serve as important liaisons between the Forensic Nurse Examiner, law enforcement, and prosecutors throughout the entire criminal justice process.

Victim advocates are an important resource for explaining victim's rights They assess ongoing victim safety issues and provide referrals to medical, counseling, and social service resources.

In Washington County, Victim Advocates are on-call 24 hours/day.

The roles and responsibilities of a Victim Advocate include: (Victim advocates only respond to sexual assault and intimate partner violence)

1. In coordination with the Forensic Nurse Examiner, assess and accommodate the special needs of the patient/victim, including but not limited to, any needs relating to language or culture, physical or mental ability, age or gender
2. Provide supportive, information concerning available options for follow-up counseling and reporting methods
3. Provide crisis intervention, support, and referrals to the patient/victim, and with permission, to family and friends
4. Determine the need for safety planning and assess whether the patient/victim needs food, shelter, clothing, transportation, and will access or assist in accessing services and/or resources
5. May be present while the Forensic Nurse Examiner conducts medical and forensic history, and the examination if the victim/patient consents
6. May be present while Law Enforcement conducts the initial victim statement and the comprehensive interview if the victim/patient consents
7. In the event that the victim/patient chooses the anonymous reporting method, the advocate may provide information, in coordination with the Forensic Nurse Examiner, on evidence collection, evidence holding period and timeline, method for future contact, and how anonymous reporting may affect any possible future prosecution
8. Making a commitment to positive, constructive problem-solving for the benefit of the victim and the community
9. Making a commitment to effective case review to identify trends, themes, and system problems
10. Ensure a culturally competent system of care and including a trauma-informed approach to victims and families by all agencies

Victim Advocate's Commitment to Implementing and Maintaining the FRT:

- Participating in FRT planning and implementation activities
- Providing education for forensic nurse examiners
- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency database
- Developing and maintaining a FRT database
- Committing to positive, constructive problem-solving for the benefit of victims of violence in the community
- Committing to effective case reviews to identify trends, themes, and systematic problems

- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of violence

IX. THE ROLE OF THE FORENSIC NURSE EXAMINER (FNE)

Meritus Medical Center Forensic Nurse Program

The Forensic Nurse Examiner (FNE) is an advanced trained registered nurse who serves the patient/victim by providing prompt, objective, compassionate and comprehensive medical treatment and forensic evaluation within a coordinated community response.

The FNE's examination of the patient/victim may assist with the investigation and prosecution of the case, but is foremost intended to assist the patient/victim in her/his recovery. The physical and psychological well-being of the patient is always given precedence over forensic needs.

Assessment, examination and evidence collection should be performed only by Maryland certified FNEs. The examination and evidence collection of the victim is complicated and time consuming. If done by healthcare providers who have a limited understanding of the many needs and concerns of sexual assault victims, it is sometimes as intrusive, invasive and as traumatizing as the assault.

The collection of evidence and the documentation of injury cannot be done in retrospect. If the evidence collection is done improperly or the chain of custody is not properly maintained, the result may be a thwarted investigation and unsatisfactory prosecution. Expertise is also important to establish credibility when testifying in a court of law.

A FNE does not provide an opinion on the merits of the case, although a FNE will conduct and document each examination knowing that fact and/or expert testimony in court may ultimately be required. Competent adult victims of sexual assault in Washington County have the following reporting options:

- Reporting the assault to law enforcement and having evidence collected
- Choosing NOT to report and NOT having evidence collected
- Choosing to have evidence collected anonymously and stored for up to 75 years

Whatever decision is made by the victim should be supported by the FNE. The victim who decides not to report or who is undecided should be assessed and treated in the same manner as the victim who is reporting.

The roles and responsibilities of a Forensic Nurse Examiner include:

1. Perform forensic nursing duties autonomously in the hospital and community-based settings. This includes the attainment of forensic evidence according to policy and protocol
2. Assess the patient for acute medical needs and provide stabilization and treatment for acute injuries and/or consultation. At times, treatment of other injuries may be delayed to ensure that evidence is preserved

3. Conduct a physical medical and forensic examination in a supportive and objective manner to treat the patient and collect evidence according to policy and protocols
4. Provide supportive, unbiased information concerning available options for medical care, emergency contraception, sexually transmitted infection prophylaxis, follow-up counseling, and reporting methods.
5. Provide information on the evidence holding period and timeline, and method for future contact if and when the patient/victim chooses to revert to the standard reporting method
6. With the victim's consent, obtain photographs
7. Advocate for patients' rights to informed decision-making and self-determination, maintain therapeutic relationships and professional boundaries, work in collaboration with a multitude of other public/healthcare professionals
8. Serve as an expert witness and fact witness in forensic cases that involve participation, evaluation and care of a victim or perpetrator of a crime. Must comply with subpoenas relating to testimony of involved forensic cases
9. Coordinates with the Victim Advocate relating to intimate partner violence to determine whether or not the victim is safe both physically and emotionally and will assist as needed in determining the need for safety planning
10. Attend meetings designed to enhance the cooperation between lay, legal, crime lab, victim support, and forensic nursing professionals.
11. Committing to positive, constructive problem-solving for the benefit of the victim and the community
12. Committing to effective case review to identify trends, themes, and system problems
13. Ensure a culturally competent system of care and including a trauma-informed approach to victims and families by all agencies

Forensic Nurse Examiner's Commitment to Implementing and Maintaining the FRT:

- Participating in FRT planning and implementation activities
- Establishing and obtaining education for forensic nurse examiners
- Ensuring victim advocacy and continuity of care for survivors of sexual assault and intimate partner violence by involving rape crisis center advocates
- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency database
- Developing and maintaining a FRT database

- Committing to positive, constructive problem-solving for the benefit of victims of violence in the community
- Committing to effective case reviews to identify trends, themes, and systematic problems
- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of violence

X. THE ROLE OF THE PROSECUTOR

Washington County State Attorney's Office

The State Attorney is committed to ensuring the public safety and the safety of victims through effective and efficient prosecution of cases. It is the role of the prosecutor to lead victims through the criminal justice process and be their voice in the pursuit of justice, recognizing that every case and every victim is unique. It is very important to the prosecutor to seek convictions that will hold offenders accountable for their actions and to seek sentences that adequately punish the actor for the crime committed while at the same time protecting the constitutional and legal rights of the accused.

Prosecutors play a pivotal role in the outcome of a crime with the most critical decision being the decision to prosecute or not prosecute after evaluating whether there is enough evidence to proceed in court.

If charges are filed, the victim is afforded many rights pursuant to the Victims' Rights Act. The State Attorney's Office, with assistance from Victim Advocates, strives to keep the victim notified and informed on all developments in the case. The victim has the opportunity to appear and be heard in court proceedings and has a direct line of communication with prosecutors.

Although the ultimate decision of how the case will proceed rests within the sole discretion of the State Attorney, input from the victim is an important component in the decision-making process and carries considerable weight in determining the best course of action.

Victims should feel comfortable that prosecutors will explain the various stages of the court proceedings to them and prepare them to testify in court should it become necessary. Steps are taken to ensure that the victim is safe in the courtroom setting. Each victim presents with unique circumstances of victimization. The State Attorney's Office strives to listen to what each victim of violence has to say, answer any questions, address any concerns each victim may have, and make the best possible decision on how to proceed on behalf of the victim.

Washington County's team approach to prosecuting offenders best serves victims while promoting accountability and punishment for perpetrators of the crime.

Prosecutor's Commitment to Implementing and Maintaining the FRT:

- Participating in FRT planning and implementation activities
- Providing education for forensic nurse examiners
- Ensuring victim advocacy and continuity of care for survivors of sexual assault and intimate partner violence by involving rape crisis center advocates

- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency database
- Developing and maintaining a FRT database
- Committing to positive, constructive problem-solving for the benefit of victims of violence in the community
- Committing to effective case reviews to identify trends, themes, and systematic problems
- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of violence

XI. THE ROLE OF WASHINGTON COUNTY CHILD PROTECTIVE SERVICES, DEPARTMENT OF HUMAN SERVICES

Child Protective Services (CPS) is a specific social service provided by DSS to assist children believed to be neglected or abused by parents or other adults having permanent or temporary care or custody, or parental responsibility. The program also offers service to household or family members who may require intervention to decrease the risk of any continuing physical, sexual, or mental abuse or neglect. The priority of CPS is to safely maintain a child in their home and to protect the child from further harm and maltreatment.

- Protect children and assist parents or caretakers in providing proper care and attention to children
- Remedy and decrease the risk of continuing abuse and neglect
- Provide an alternate plan of care for children when parents or caretakers are unable to provide proper and safe care for them

Commitment to Implementing and Maintaining the FRT:

- Participating in FRT planning and implementation activities
- Providing education for forensic nurse examiners
- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency database
- Developing and maintaining a FRT database
- Committing positive, constructive problem-solving for the benefit of child victims in the community
- Committing to effective case reviews to identify trends, themes, and system problems
- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of agency

Confidentiality

Information contained in records or reports concerning child abuse or neglect is protected. Federal and State laws restrict the circumstances under which information contained in records and reports may be disclosed. Mandated reporters and local department staff must comply with Maryland confidentiality laws provided in Family Law Article §5-707 and the Human Services Article §§1-201-1-203, Annotated Code of Maryland when asked to disclose or discuss any information contained in records concerning child abuse and neglect.

XII. THE ROLE OF WASHINGTON COUNTY CHILD ADVOCACY CENTER - SAFE PLACE

Safe Place, Washington County Child Advocacy Center's mission is to provide all reported victims of child sexual abuse in Washington County and their non-offending caretakers with comprehensive forensic interviews, medical treatment, and mental health treatment with a goal of preventing future abuse. Safe Place Child Advocacy Center also serves victims of other forms of maltreatment, including severe physical abuse and severe neglect concerns, as well as youth who are victims, or at-risk, of human sex and labor trafficking.

Safe Place is committed to ending child sexual abuse in Maryland. It can be done if we, as adults, learn more about this crime of secrecy and take responsibility for protecting our children. At Safe Place, we know far too well that children cannot protect themselves from sexual predators and need their families and communities to step in and protect them from abuse.

Commitment to Implementing and Maintaining the FRT:

- Participating in FRT planning and implementation activities
- Providing education for forensic nurse examiners
- Ensuring victim advocacy and continuity of care for children of abuse, neglect and risk of harm
- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency database
- Developing and maintaining a FRT database
- Committing positive, constructive problem-solving for the benefit of the child victim in the community
- Committing to effective case reviews to identify trends, themes, and system problems
- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of agency

XIII. THE ROLE OF MARYLAND COALITION AGAINST SEXUAL ASSAULT (MCASA)

Maryland Coalition Against Sexual Assault (MCASA) is the federally recognized sexual assault coalition for the State of Maryland. It includes all of the state's 17 comprehensive rape crisis centers as well as other members. MCASA supports professionals and service providers who work with sexual assault

survivors by providing technical assistance and training. Additionally, MCASA provides policy advocacy, training, outreach, and prevention. In 2003, MCASA launched the Sexual Assault Legal Institute (SALI) to deliver legal services for victims of sexual violence. SALI also offers training and technical assistance for attorneys, members of the coalition, and other professionals working with victims. Contingent on continued funding, the Maryland Coalition Against Sexual Assault and its Sexual Assault Legal Institute will:

MCASA's Commitment to Implementing and Maintaining the FRT:

- Monitoring public policy and encouraging a "victim-centered" approach.
- Promoting justice for survivors and accountability for offenders through legislative advocacy
- Promoting public awareness of sexual violence issues and rape crisis and recovery center services.
- Maintain a resource library related to sexual assault.
- Provide technical assistance to professionals and serve as a clearinghouse for information on sexual violence-related issues
- Participating in FRT planning and implementation activities
- Providing education for forensic nurse examiners
- Participating in bi-monthly FRT meetings to ensure smooth operations, problem-solving, and case review
- Developing and maintaining an agency and FRT database
- Committing positive, constructive problem-solving for the benefit of the sexual assault victim in the community
- Committing to effective case reviews to identify trends, themes, and system problems
- Ensuring a culturally competent system of care including a trauma-informed approach to victims and families of agency

MCASA's Sexual Assault Legal Institute (SALI)

- Provides direct legal services for victims and survivors of sexual violence.
- Offers technical assistance and produces training for attorneys, rape crisis and recovery center staff and volunteers, and other professionals working with survivors.

XIV. Term of Agreement

Performance under this Agreement shall commence on October 1, 2024 and shall continue until September 30, 2029.

XV. FORENSIC RESPONSE TEAM CONTACT INFORMATION:

Meritus Medical Center - Forensic Nursing Program

Jennifer McNew - Manager

301-790-8832

Jennifer.McNew@meritushealth.com

Hagerstown Police Department

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Email afleegal@hagerstownpd.org

Washington County Sheriff's Office

Detective David Haugh

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Email: Dhaugh@washco-md.net

Maryland State Police

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Maryland Natural Resources Police

Lieutenant William Davis

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Email: bill.davis1@maryland.gov

Boonsboro Police Department

Chief David Rizer

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Hancock Police Department

Chief Richard Miller

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240-527-9862 - Cell

Email: rmiller@townofhancock.org

Smithsburg Police Department

Chief Robert Marker

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The Maryland Department of Public Safety and Correctional Services

Intelligence and Investigative Division

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Washington County Child Protective Services

Barbara Shevokas - Program Manager CPS and Family Preservation

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Washington County Children's Advocacy Center – Safe Place

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Citizens Assisting and Sheltering the Abused (CASA, Inc.)

Ashley Sizemore – Director of Advocacy Services

Phone: 301-739-4990 x 133

Email: Ashleys@casainc.org

Maryland Coalition Against Sexual Assault (MCASA)

Lisae Jordan – Executive Director

Phone: 301-565-2277

Email: lcjordan@mcasa.org

Washington County State Attorney's Office

Christina Remsburg – Assistant State Attorney

Phone 240-313-2000 x 2969

Email: cremsburg@washco-md.net

In witness thereof, the parties have agreed to the implementation of this Forensic Response Team Protocol as of the date first above written.

_____ _____

Meritus Medical Center Forensic Nurse Program Date

_____ _____

Hagerstown Police Department Date

Washington County Sheriff's Office Date

Maryland State Police Date

Maryland Natural Resources Police Date

Boonsboro Police Department Date

Hancock Police Department Date

Smithsburg Police Department Date

Maryland Department of Corrections Date

Washington County Child Protective Services Date

Safe Place Children's Advocacy Center Date

Citizens Assisting and Sheltering the Abused (CASA) Date

_____ _____

Maryland Coalition Against Sexual Assault (MCASA) Date

_____ _____

Washington County State Attorney's Office Date

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Request for Lights at Wheaton Park – *Scott Myers, Fellowship of Christian Athletes*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Hagerstown Sister City – *Mike Keifer, Liaison with Hagerstown, Indiana*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Pangborn Park Fishing Discussion - *Eric Deike, Director of Public Works*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
Pangborn_Park_Fishing_Council_Packet.pdf	Pangborn Park Fishing Discussion
PangbornParkPond_LetterofSupport_MDNR.pdf	Letter Support: Md Dept Natl Resources
Pangborn_Pond_Letter_BHCWG.pdf	Letter Support: Big Hunting Group

CITY OF HAGERSTOWN, MARYLAND

Public Works Department

www.hagerstownmd.org

TO: Scott Nicewarner, City Administrator

FROM: Eric B. Deike, Director of Public Works

DATE: February 4, 2025

RE: Pangborn Park Fishing Discussion

MAYOR AND COUNCIL ACTION REQUESTED

Staff is seeking direction from the Mayor and Council on the future of fishing at Pangborn Park.

DISCUSSION

Pangborn Park is 1 of 22 parks and playgrounds within the City of Hagerstown's Parks. The park consists of 8.28 acres of property in the northeast quadrant of the City and is bordered by Pangborn Blvd. The park includes playground equipment, tennis courts (including a pickleball court), volleyball courts, pavilions, and a small pond.

The following is from the dedication pamphlet:

"PANGBORN PARK
June 10, 1939

Through the vision and generosity of Thomas W. Pangborn and John C. Pangborn the seven and one-half acre tract of land situated in the northeastern section of our community was given to the city several years ago for the establishment of a public park. Under the terms of the grant, the site was to be a formal garden, combined with a fully equipped recreational field and complete picnic facilities.

The work was sponsored by the City with the co-operation of the Works Progress Administration. Under their guidance the task of transforming the site to its present state was accomplished. The effective grading, the colorful planting and the well-planned appointments of the Park as you see them today testifies to the praise-worthy success of this undertaking."

At some point in time or even from 1939, fishing was allowed to occur in the pond. There are currently restrictions on who may fish in the lake. Fishing is restricted to children under 16, seniors 65 and older, and blind persons. The pond is managed as a Put-and-Take Trout fishing area, with a daily creel limit of 5 trout per day, no minimum size and no tackle restrictions. Anyone 16 and over is required to have a fishing license. This includes seniors.

The pond is located within walking distance of many residential properties including those along Pangborn Blvd., Monet Drive, Papa Court, and View St. to name a few. Accessibility to the pond is open

allowing the younger fisherman to easily cast while they learn to fish. Those in wheelchairs or with other mobility issues have easy access to the water given that three-quarters of the pond have a walkway directly next to the water. Fishing along a stream or lake is generally not easy to access given the terrain and landscaping.

The local nonprofit organization, MiHi Inc. (Many Individuals Helping Individuals) has held an annual fishing frenzy at Pangborn pond for 20+ years. MiHi supports recreational, housing and educational projects for the disabled. The event is held in June and is open to children, families, people with disabilities, and senior citizens. The event has been a huge success. Former Councilmember N. Linn Hendershot, who was himself disabled, was always a part of the Fishing Frenzy.

The pond is only 1 of 2 locations within the City's Park system that provides the opportunity to fish. The other is Kiwanis Park, located to the southeast and to the rear of the commercial park. There are no close City residential neighborhoods within walking distance of Kiwanis Park. Access is to Antietam Creek via a small watercraft ramp. Fishermen would have to fish off the ramp, enter the water, or fish off the stream banks which are definitely not user friendly or accessible. Fishing is not allowed at City Park.

During Council discussions on strategic planning, a goal was mentioned to provide DEI training. The letter "A" was added to that list for "accessibility." There is no other accessible fishing area within the City boundaries. The pond at Pangborn is it.

In recent history, there has been a concern about the danger to the local wildlife at Pangborn lake from fishing lines. The lines get entangled in the legs of the geese that use the lake. The fishing lines can be anything from an annoyance to being outright deadly for the animals. Catching the geese to remove the fishing lines can be difficult if not impossible.

Staff have taken the concerns seriously. Signs around the lake alert fisherman to the danger of the fishing lines. Collection tubes have been installed for fisherman to recycle their fishing lines, or the lines can be disposed of in trash cans. Unfortunately, fishing lines can be snagged on debris in the water or in the tree limbs above making it near impossible to retrieve.

The concern for the geese has only recently come to our attention. While staff does not wish to see any animal in duress, there have only been a select number of incidents in the previous 2 years. Our staff only knows of 2 or maybe 3 occurrences where geese were entangled with fishing line.

We also acknowledge the reality of those individuals who ignore the rules, and fish the lake at will. More often than not, those older than 16 but not a senior citizen fish the lake. Gear is left behind, fishing line is left entangled, and some act with shear carelessness. Those detrimental actions can be found throughout any park or area within the City.

The Parks Division of Public Works does not have staff on site daily nor do they have enforcement staff. The best staff can do is ask an "illegal" fisherman to leave the area or to contact the police. There are simply too many parks, and playgrounds (291 acres) and too few staff to oversee the spaces on a continual basis.

FINANCIAL IMPACT

There is little to no financial impact if fishing remains or is banned from Pangborn lake.

RECOMMENDATION

It is the recommendation of staff to allow fishing to continue at Pangborn Park. The location of the park within residential neighborhoods; its accessibility by the young, seniors and handicap; and its uniqueness within the City of Hagerstown boundaries are all excellent reasons to keep fishing at this location.

Att: Parks & Rec Amenities Chart
Photos of Pangborn Park Pond
Special Management Areas eRegulations Page
Map of City Parks

PARKS & REC AMENITIES CHART

Hagerstown PARKS & RECREATION

	BBQ Grills	Basketball Courts	Bike Paths	Birdwatching	Creek Access	Dog Friendly	Fenced Dog Park	Fishing w/Restrictions	Gardens	History/ Art/ Culture	Hockey Rink (Indoor/Outdoor)	Horseshoe Pits	Indoor Rec/ Indoor Courts	Lakes/Waterfowl	Little League Fields	Misting Pad	Outdoor Fitness Equipment	Pavilions*	Pickleball	Playground Equipment	Pool/ Splashpad	Restrooms (Public)	Skatepark/ BMX Track	Soccer Fields	Softball Fields	Stage/ Band Shell	Tennis Courts	Volleyball Court	Walking Trails
Bloom Park										■																			
City Park*	■		■			■			■	■				■				■		■		■			■	■	■		■
Cultural Trail						■				■							■												■
Fairgrounds Park*	■	■	■			■	■				■		■		■		■	■		■		■	■	■	■				■
Field House (opens 12/2024)													■																
Funkhouser Park	■	■													■					■									■
Greenawalt Park										■										■									
Hager Park*	■		■			■				■					■			■		■									■
Hamilton Playground	■	■				■												■		■								■	
Hellane Park	■	■	■			■									■			■		■									■
Kiwanis Park				■	■	■		■	■	■								■											■
Long Meadows Park									■	■																			■
Memorial Park										■																			■
Mills Park	■		■	■		■												■		■									■
National Road Park										■										■									
Oswald Park						■				■																			■
Pangborn Park*	■		■	■		■		■	■			■		■				■	■	■		■			■		■	■	■
Ridge Avenue Playground	■	■																■		■									
Staley Park	■														■			■		■	■								■
Terrapin Park						■														■									■
Thomas Kennedy Park									■	■																			
University Plaza																										■			
Wheaton Park*	■	■								■		■				■		■		■					■	■	■		■

*Pavilion reservations are accepted for City Park, Pangborn Park, Wheaton Park, Hager Park, and Fairgrounds Park, mid-April thru mid-October

Pangborn Park pond

Fishing Frenzy

Saturday, June 13 | 8am–Noon

Thanks to MIHI, enjoy this free event at Pangborn Park! Registration begins at 8am, fishing 9am–12pm. Awards for catching: the largest and smallest fish, the largest trout, and the largest five trout! For more info visit mihi.org or call 301.745.6444.

Special Management Areas—All Species

Youth, Senior and Blind Angler Fishing Areas

Areas:

- Laurel Run (Moscow), Allegany County.
- Pangborn Pond, Washington County.
- Rising Sun Pond, Cecil County—restrictions in effect from March 1 through May 15. On May 16, the area has no age restriction.
- Boonsboro Pond, Washington County—behind Boonsboro Free Library.

Restrictions:

- Fishing is limited to anglers who are under 16 years old, 65 years and older, or blind.
- Put-and-Take Trout Fishing Area regulations apply in these areas.

Youth and Blind Fishing Areas

Areas:

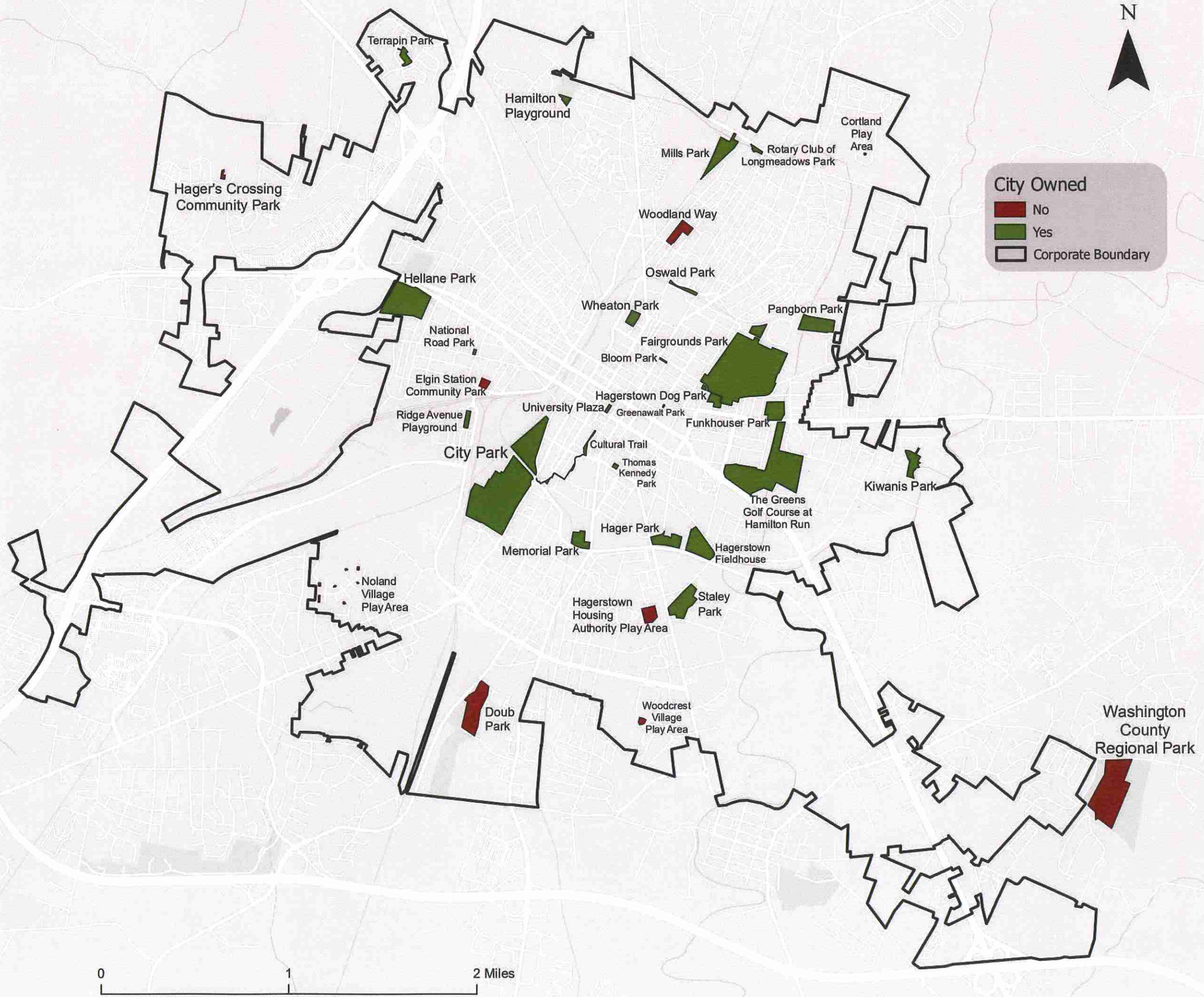
- Carroll Creek, Frederick County—from the red post located 300 yards upstream of Baughmans Lane, downstream to the dam at College Avenue.
- George's Creek, Allegany County—within Town Park in Westernport.
- Glades Park Pond, Garrett County—on Liberty Street in Oakland.
- Little Tonoloway Creek, Washington County—within Weidmeyer Park in Hancock.
- Little Antietam Creek, Washington County—at Keedysville, from Coffman Farms Road downstream to MD Route 34.
- Parkview Pond, Garrett County—off Hershberger Lane in Grantsville

Name	Acres
Bloom Park	0.234637
City of Hagerstown's City Park	65.418001
Cortland Play Area	0.071051
Cultural Trail	1.72028
Doub Park	13.653094
Elgin Station Community Park	1.332553
Fairgrounds Park	68.434265
Funkhouser Park	5.960561
Greenawalt Park	0.075712
Hager's Crossing Community Park	0.483064
Hager Park	5.526095
Hagerstown Dog Park	2.382423
Hagerstown Fieldhouse	9.335562
Hagerstown Housing Authority Play Area	3.563902
Hamilton Playground	1.090172
Hellane Park	21.36581
Kiwanis Park	4.399717
Memorial Park	4.075364
Mills Park	7.880791
National Road Park	0.254874
Noland Village Play Area	0.762321
Oswald Park	1.208443
Pangborn Park	8.280131
Ridge Avenue Playground	1.409489
Rotary Club of Longmeadows Park	0.791471
Staley Park	9.189049
Terrapin Park	2.094778
The Greens Golf Course at Hamilton Run	41.913997
Thomas Kennedy Park	0.366739
University Plaza	0.442376
Washington County Regional Park	
Wheaton Park	2.363099
Woodcrest Village Play Area	0.728715
Woodland Way	4.43953

Total Park Acreage: 291.24 Acres

City Owned Acreage: 266.21 Acres

Not City Owned Acreage: 25.03 Acres



MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Wes Moore, Governor
Aruna Miller, Lt. Governor
Josh Kurtz, Secretary
David Goshorn, Deputy Secretary

February 4, 2025

City of Hagerstown,

The Maryland Department of Natural Resources (MDNR) Freshwater Fisheries Program supports continuing to allow fishing access at Pangborn Park Pond. Current regulations allow for public fishing by youth (<16 years old), blind, and senior (>65 years old) anglers. It is one of only a handful of locations in that state that have this special management regulation for these specific groups of anglers. The layout of Pangborn Park Pond is perfect for these anglers because a paved trail around the pond allows for easy water access from the bank. Recent pond renovation work has cleared out debris and helped improve habitat conditions. For young anglers just getting started in fishing, it is an ideal location to gain experience. Many of our senior anglers, who have limited mobility, are extremely happy to have Pangborn Park Pond available as a safe, easily accessible fishing location.

MDNR Freshwater Fisheries routinely stocks Pangborn Park Pond to provide fishing opportunities. The pond is stocked several times every spring with hatchery raised adult rainbow trout as part of the Put-and-Take Program. It is a very popular fishing location following these stocking events. Additionally, Pangborn Park Pond has been stocked with trout for Youth Fishing Rodeos. These kid friendly programs are great opportunities to introduce the sport and allow young children to catch their first fish. Following the pond renovation work, several thousand juvenile sunfish were stocked to provide a year-round gamefish species for anglers.

MDNR Freshwater Fisheries hopes that the City of Hagerstown will consider the benefits of continuing to allow public fishing access at Pangborn Park Pond. The pond allows specific groups of anglers, who may have difficulty accessing other locations, a convenient location to fish. Many licensed anglers use and rely on this in Washington County. MDNR Freshwater Fisheries plans to continue stocking efforts at Pangborn Park Pond to provide a high-quality fishery.

Thank you for the opportunity to comment and please let me know if you have any questions.

Sincerely,

Michael Kashiwagi

Maryland Department of Natural Resources
Freshwater Fisheries Program
Western II Regional Manager

February 5, 2025

To The City of Hagerstown,

I'm writing as the Coordinator of the Big Hunting Creek Working Group, which is an interorganizational group devoted to improving stream conditions and the trout fishery in the central Maryland area. We have representatives from the Potomac Valley Fly Fishers, the Brotherhood of the Jungle Cock, Antietam Fly Fishers, Free State Fly Fishers, and Trout Unlimited. We also have government representatives from the Maryland Dept. of Natural Resources, Catoctin Mountain Park, Cunningham Falls State Park, and the US Geological Survey.

I'm writing to you to express our full support for keeping the current fishing regulations in effect for Pangborn Park Pond. This pond provides a valuable recreational resource for Hagerstown anglers and others from around the region. Pangborn Park Pond is one of only a very few special management areas specific for youth, blind, and senior anglers and provides easy bank and fishing access for youth and seniors. It has also hosted a very popular Youth Fishing Rodeo. Prohibiting fishing at this location would negatively affect a large number of anglers and deprive them of a resource that is not really replaceable.

Thank you for allowing us to express our support for keeping the current fishing regulations in effect. I stand ready to discuss it with you at your convenience.

Signed,

Kevin Haney, Coordinator
Big Hunting Creek Working Group
kevinhaney1@outlook.com
301-305-5456

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
AFSCME Local 3373 Labor Contract Tentative Agreement – *Donald Francis, HR Director*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
AFSCME_Local_3373_Labor_Contract_-_Tentative_Agreement.pdf	MEMO: AFSCME Local 3373 Tent Agree

CITY OF HAGERSTOWN, MARYLAND

Don Francis, SHRM-SCP, SPHR, IPMA-SCP
Director of Human Resources
One East Franklin Street • Hagerstown, MD 21740
E-mail: dfrancis@hagerstownmd.org
Telephone: 301.739-8577, ext. 109 • Website: www.hagerstownmd.org

DATE: February 11, 2025

TO: Scott Nicewarner, City Administrator

FROM: Don Francis, Director of Human Resources

RE: AFSCME Local 3373 Labor Contract Tentative Agreement

The City's negotiation team has reached a tentative agreement with the American Federation of State, County and Municipal Employees Local 3373. This collective bargaining agreement is in the process of being voted on and ratified by the union's membership during the week of February 10, 2025. If the Mayor and Council find the tentative agreement acceptable, it will be scheduled for a formal vote during the regular session on February 25, 2025. I recommend the Mayor and Council approve and adopt this collective bargaining agreement. Attachment 1 contains a summary of the agreement.

The cost of the FY26 wage enhancement to the General Fund is $1.48M (100 sworn officer positions). One third of those costs ($556K) are directly related to the additional 9 police officer positions approved by M&C.

3373 Contract Changes Effective July 1, 2025				
Tentative Agreement Reached January 16, 2025				
Article	**Section**	**Old Language**	**New Language**	**Reason for Change**
Cover				Updated dates and Council 3
Table of Contents				Re-Align
1	1	AFSCME Council 67	American Federation of State County and Municipal Employees, Council 3	Correct reporting struction
5	1		If the City of Hagerstown elects to convert to bi-weekly pay, the pay day will be every other Friday.	Add bi-weekly pay option-City proposal
5	2		For assignments with multiple fixed relief day schedules, the city will begin collection request for relief days (regular days off) each October 1st and said RDO shall be set by November 1according to seniority.	City proposal
5	2	If an employee request and is granted a transfer during the year, that employees' relief days are subject to modification at the discretion of the Department. Regular annual leave that was scheduled in accordance with the rules and regulations and the contract agreement will be honored when practical.	If an employee request and is granted a transfer during the year, that employees' relief days are subject to modification at the discretion of the Department. ~~Regular annual leave that was scheduled in accordance with the rules and regulations and the contract agreement will be honored when practical.~~	City Proposal
5	2	If an employee is reassigned during the year from a fixed RDO schedule to a rotating day off assignment, their days off will be in accordance with the shift or unit they're being transferred to, and previously scheduled annual leave will be honored. The affected employee will be provided fourteen (14) days' notice before the transfer will take effect. This may be extended to a maximum of twenty-eight (28) days if the employee produces proof of an evident hardship.	If an employee is reassigned during the year from a fixed RDO schedule to a rotating day off assignment, their days off will be in accordance with the shift or unit they're being transferred to, ~~and previously scheduled annual leave will be honored~~. The affected employee will be provided fourteen (14) days' notice before the transfer will take effect. This may be extended to a maximum of twenty-eight (28) days if the employee produces proof of an evident hardship.	Deleted per city proposal
5	2	If an employee is transferred from a patrol shift to another patrol shift every effort will be made to transfer the employee to a shift in the same leave group (e.g. A shift to B Shift and C Shift to D Shift), and their days off will be inunit they're being transferred to and previously scheduled annual leave will be honored.	~~If an employee is transferred from a patrol shift to another patrol shift every effort will be made to transfer the employee to a shift in the same leave group (e.g. A shift to B Shift and C Shift to D Shift), and their days off will be inunit they're being transferred to and previously scheduled annual leave will be honored.~~	Deleted per city proposal
5	4	When a position in the patrol division is needed to work beyond the standard shift, the City shall make a reasonable effort to rotate the availability of overtime. over a six- month period among patrol officers working said shift.	When a position in the patrol division is needed to work beyond the standard shift, the City shall make a reasonable effort to rotate the availability of overtime. ~~over a six- month period among patrol officers working said shift.~~	Ease of process

3373 Contract Changes Effective July 1, 2025				
Tentative Agreement Reached January 16, 2025				
Article	**Section**	**Old Language**	**New Language**	**Reason for Change**
5	4	. However, no member shall be drafted two (2) consecutive times within a six month cycle. The distribution order shall renew each January 1 and July 1.	. However, no member shall be drafted two (2) consecutive times within a six month cycle. ~~The distribution order shall renew each January 1 and July 1.~~	Deleted per union 1
5	8	An employee assigned to work special assignments under outside contractual agreements such as dances, basketball, football, baseball games, etc., will be compensated at the rate of one and one-half times the current top pay rate. All functions funded through Police Department Budget will be compensated at the officer's rate of pay in effect at time of service. The Chief of Police or his designated representative shall make a reasonable effort to distribute special assignment overtime equally to all members of the Department, proportionately to union and non-union employees.	~~Effective November 20, 2023, an employee assigned to work special assignments under outside contractual agreements such as dances, basketball, football, baseball games, etc., will be compensated at the rate of $65.00 per hour or one and one half (1 ½) times the current top pay rate, whichever is higher.~~ Effective November 20, 2023, an employee assigned to work special assignments under outside contractual agreements such as dances, basketball, football, baseball games, etc., will be compensated at the rate as reflected in a Special Order, but not less than one and one-half times the current top pay rate.	Side agreement 2023. Aligns process for outside contract rates.
5	12	Field Training Officers shall receive $75.00 per day when accompanied by a trainee. To be considered for an FTO position, a patrolman must have 3 years' experience.	Field Training Officers shall receive $10 per hour day when accompanied by a trainee. To beconsidered for an FTO position, a patrolman must have 3 years' experience.	Change in FTO pay
5	13	Any member that is on stand-by status shall be compensated fifty dollars ($50) a day for each day of stand-by, accept as noted in Article 5, Section 6, Court-time Pay.	Any member that is on stand-by status shall be compensated one hundred dollars ($100) a day for each day of stand-by, accept as noted in Article 5, Section 6, Court-time Pay.	increases standby pay by $50
6	1	Whenever a change in the employees share of the health insurance premium for the Level Plan results in an employee receiving less net pay, the City will adjust the employee's gross pay so that there will be no change in the employee's net pay. This would only apply when the employee has maintained the same level of coverage (e.g.: single, family, etc.).	Employees with individual coverage will pay up to, but no more that 20% of employees portion of the premium cost. Except for the single premium rate described in paragraph one above, whenever a change in the employees share of the health insurance premium for the level plan, employees and the City will share premium increases evenly except that the employee increase will not exceed %25 of the employee's current year's premium rate.	Allows for the adjustment of healthcare premiums upto 25% of current year's premiums.
6	1		FOR EXAMPLE PURPOSES ONLY Example #1- An employee is currently paying $100 per month for the level plan. The employees' portion of the premium increase for the next plan year is $21 so the employee will pay $121.00 in contributions for the next plan year.	added

3373 Contract Changes Effective July 1, 2025				
Tentative Agreement Reached January 16, 2025				
Article	**Section**	**Old Language**	**New Language**	**Reason for Change**
6	1		Example #2: An employee is currently paying $100.00 per month for the Level Plan. Next year's total employee premium increase is $30 dollars. The employee's contribution for the next plan year will be $125.00. This is because the increase will not exceed 25% of what the employee is currently paying.	added
6	1		**In the event that any other employee group (union or non-union) is provided a more generous premium rate, AFSCME Local 3373 will receive that rate as well.	added
6	1		~~For the term of this agreement, any change in the employee's portion of premiums for the level plan, will be proportionate to the increase or decrease for said policy will net be increased more than 2% (of the employee's premium amount) per year.~~	delete
6	1	The maximum cost to the City for the employee choosing to use a physician other than the city doctor. Employees who choose touse their own physician must first obtain blood work, which shall include complete blood count (CBC) and General Chemical Profile (GCP), through the City's doctor. The employeemay then take their blood work results to their personal physician.	which shall include complete blood count (CBC) and General Chemical Profile (GCP),	Added blood test allowance
6	3	For retirees and their spouses who are covered on the City's health insurance prior to theemployee's retirement from the City and who are 65 years and older, a defined contribution stipend of $350 per month per healthcare plan will be provided by the City.	For retirees and their spouses who are covered on the City's health insurance prior to theemployee's retirement from the City and who are 65 years and older, a defined contribution stipend of $300 per month per healthcare plan will be provided by the City.	Retire stipend reduced to $300 per month. Previous side agreement. 2023.
7	1 thru 4		Added Staffing Article	Adds minimmum staffing language, drafting info & emergency mobilization
8	1		Any member mandated to work the Independence Day event for the City of Hagerstown (on July 4th) shall be paid two (2) times their rate of pay	Added language for July 4
9	1	There shall be no vacation time accrual earned or accrued during the first six (6) months of continuous service.	. Upon completion of six (6) months of service, employees will be credited with 40 hours of vacation time.	Added language to mirror current practice.
9	3	Pay for all vacation will be based on the rate of pay of the employee at the time of the beginning of the vacation including shift differential if any.	Compensation for vacation time off will be based on the employees' rate of pay, including shift differential.	Language change

3373 Contract Changes Effective July 1, 2025				
Tentative Agreement Reached January 16, 2025				
Article	**Section**	**Old Language**	**New Language**	**Reason for Change**
9	9	Vacation, Personal leave and holiday leave requests shall be submitted between the dates of December 1 through March 1 and will be granted on a seniority basis.	Vacation, Personal leave and holiday leave requests shall be submitted between the dates of November 1 (or when RDOs are set) 1 through March 1 and will be granted on a seniority basis. The most senior member shall have two (2) of the employees working days or four (4) calendar days to schedule their leave.	Language modifies leave book process.
10	1		i. Employees hired before July before July 1, 2025, with a balance exceeding a total value of $12,000.00 eligible to participate but will be paid their entire balance of sick leave to vacation funds accumulated prior to that day.	Added language limiting Sick to Vacation payout to $12,000 for those hired after 1, July 2025.
10	1		ii. Employees may accrue a balance not to exceed a total value of $12,000.00.	
10	1		An employee hired after July 1, 2025 that retires or leave the City on good terms will be paid out their unused sick to vacation balance, not to exceed $12,000.00. Employees that are discharged from the City are not eligible for sick-to-vacation payout.	
17	2		Increased clothing allowance from $750 to $1,000	Inflation of costs
17	5		An employee whose vest appears worn, frayed, misshapen and/or damaged may request the vest be inspected by the current vendor and possibly replaced prior to the manufacturer's expiration date. Replacement prior to the expiration date is the sole discretion of management.	Modifies vest replacement when necessary.
17	7	As of now, the Maryland Law is changing and not yet completely published. However, until such time as the law is published, the City of Hagerstown Police Department will conform with the Maryland Police Reform Act of 2021	The City of Hagerstown Police Department will conform with the Maryland Police Reform Act of 2021	Changed to comply with MD State Law.
18			Changed duration of Agreement dates	
Appendix A		Pay and Scale	Added: The City and AFSCME Local 3373 agree to meet not later than July30, 2027 (Beginning of year 3) to evaluate sworn salary and local pay market comparison to assure that the pay scale remains competitive. Additionally, either side may request negotiations at any time if the pay scale is assessed to be 15% below local market rates for sworn personnel.	Modified payscale with new wages and added wage opener if/when needed.

The City and AFSCME Local 3373 agree to meet not later than July30, 2027 (Beginning of year 3) to evaluate sworn salary and local pay market comparison to assure that the pay scale remains competitive. Additionally, either side may request negotiations at any time if the pay scale is assessed to be 15% below local market rates for sworn personnel.

Annual Longevity Steps: "1st Year" refers to the 1st through 365th day of employment. "2nd Year" is the 366th through 730th day of employment.

STEPS	FY 26	FY 27	FY28
STARTING	$61,796.80	62,982.40	$64,230.40
STEP 2	$63,648.00	$64,916.80	$66,227.20
STEP 3	$67,475.20	$68,806.40	$70,200.00
STEP 4	$71,510.40	$72,945.60	$74,401.60
STEP5	$73,652.80	$75,129.60	$76,627.20
STEP 6	$75,878.40	$77,376.00	$78,936.00
STEP 7	$78,145.60	$79,705.60	$81,307.20
STEP 8	$80,496.00	$82,097.60	$83,740.80
STEP 9	$82,908.80	$84,552.00	$86,257.60
STEP 10	$85,384.00	$87,089.60	$88,836.80
STEP 11	$87,942.40	$89,710.40	$91,499.20
STEP 12	$90,584.00	$92,393.60	$94,244.80
STEP 13	$93,308.80	$95,180.80	$97,073.60
STEP 14	$96,096.00	$98,030.40	$99,985.60
STEP 15	$98,987.20	$100,963.20	$102,980.80
STEP 16	$98,987.20	$100,963.20	$102,980.80
STEP 17	$98,987.20	$100,963.20	$102,980.80
STEP 18	$98,987.20	$100,963.20	$102,980.80
STEP 19	$98,987.20	$100,963.20	$102,980.80
STEP 20	$104,936.00	$107,016.00	$109,158.40
STEP 21	$104,936.00	$107,016.00	$109,158.40
STEP 22	$104,936.00	$107,016.00	$109,158.40
STEP 23	$104,936.00	$107,016.00	$109,158.40
STEP 24	$104,936.00	$107,016.00	$109,158.40
STEP 25	$111,217.60	$111,217.60	$111,217.60

- Yearly increases will take effect the first Monday of the new Fiscal Year
- All step increases take effect on the Monday following the employees' anniversary date.

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Edgemont Reservoir - *Nancy Hausrath, Director of Utilities*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
MEMO_EDGEMONT_DISCUSSION_02112025.pdf	MEMO EDGEMONT RESERVOIR
EDGEMONT_SPILLWAY__STUDY_FINAL_RPT_2016.pdf	SPILLWAY EVALUATION 2016
EDGEMONT_RESERVOIR_PMP_EVALUATION_DRAFT_2019.pdf	2019 PMP REPORT
WARNER_HOLLOW_DAM-EDGEMONT_2019_PROJECT_ESTIMATE.pdf	2019 MEMO
PLAN_VIEW_1991_EDGEMONT_DRAWING.pdf	1991 PLAN VIEW DRAWING
PLAN_VIEW_PRELIMINARY_DRAWINGS.pdf	PRELIMINARY DESIGN PLAN VIEW

CITY OF HAGERSTOWN, MARYLAND

Utilities Department
1 Clean Water Circle • Hagerstown, MD 21740
Telephone: 301-739-8577, ext. 650
Website: www.hagerstownmd.org

February 5, 2025

To: Scott Nicewarner, City Administrator

From: Nancy Hausrath, Director of Utilities
Tyler Puffenberger, Deputy Director of Utilities

Action: Discussion – Edgemont Reservoir

At the direction of the Mayor and City Council, staff met with Hazen and Sawyer to discuss the Edgemont Reservoir Project and the water appropriation permit to enable the City to use the reservoir as the source water for the Breichner Plant. I attached the memo from August 2019 because there has not been significant change.

The most positive update is that Maryland Department of the Environment (MDE) has received the Final Draft of the Statewide Probable Maximum Precipitation (PMP)Study Report. Hazen and Sawyer are assisting with the review to include possible changes associated with climate change/climate resiliency. As a reminder, the City has completed three (3) PMP Evaluations using Maryland, Pennsylvania, and Virginia planning and design criteria. Included with this memo is the 2019 PMP Study and the 2016 Geotechnical Study.

In conversation with Hazen and Sawyer, they indicated they did not expect the new Maryland Study to significantly impact the current preliminary design (plan view is attached). I find it helpful to compare the proposed design with the design from the 1991 reservoir improvements – the plan view drawing of the earther dam and emergency spillway is attached for comparison.

Staff have been working with MDE since 2018 on the development of appropriation based on historical climate data. The most recent appropriation permit application requested average daily appropriation of 2.75MGD with a maximum withdraw of 4.8MGD. The current appropriation 0.7MGD daily average and 4.8MGD maximum withdraw. is MDE will require the City to maintain Maryland Method Flow-by at all times – this work is incomplete at this time but could be as high as 2.2cfs (current flow-by is 0.2cfs). It is important to note that Raven Rock is a cold water fishery and there is concern for thermal pollution associated with the dam naturally spilling during the summer months.

Staff submitted a new funding application as requested by MDE for the Edgemont work. The application was submitted in January 2025 with a total funding request of $34,100,000. Included in this application is $4,100,000 local share for engineering services (study, design, bidding, and construction management) and $3,000,000 construction contingency. Construction estimate is $27,000,000.

Staff will be available to discuss work completed and answer questions.

Report of
Geotechnical Exploration

Edgemont Reservoir
Spillway Floor and Toe Seepage Near MW-5
Washington County, Maryland

Triad Project No. 03-06-0643

Prepared For:

City of Hagerstown Utilities
Department – Water Division
51 West Memorial Boulevard
Hagerstown, Maryland 21740

Prepared by:

TRIAD ENGINEERING, INC.

1075-D Sherman Avenue
Hagerstown, Maryland 21740
www.triadeng.com

January 11, 2016

January 11, 2016

Ms. Nancy Hausrath
City of Hagerstown Utilities
Department – Water Division
51 West Memorial Boulevard
Hagerstown, Maryland 21740

RE: Report of Geotechnical Exploration
Edgemont Reservoir
Spillway Floor and Toe Seepage Near MW-5
Washington County, Maryland
Triad Project No. 03-06-0643

Dear Ms. Hausrath:

In accordance with your request, we have completed a geotechnical exploration at the Edgemont Reservoir in Washington County, Maryland. The work was authorized by your Purchase Order Number 20150488-00 issued on December 8, 2014. The subsurface exploration was performed to evaluate the subsurface conditions at the site for the limited purposes of determining the appropriate remedial action for the spillway floor and toe seepage. This study was also recommended by MDE in their letter dated August 21, 2014 to identify the causes of seepage and develop a recommended course of action. It is emphasized that subsurface conditions may vary dramatically between test locations, and Triad makes no representations as to subsurface conditions other than those encountered at the specific test locations.

This report has been prepared for the exclusive use of the City of Hagerstown for specific application to the Edgemont Reservoir in Washington County, Maryland. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above.

We appreciate the opportunity to assist you on this project and trust this report satisfies your needs at this time. Please feel free to contact us if you have questions concerning this report, or if we can provide further assistance.

Sincerely,

TRIAD ENGINEERING, INC.

Bradley A. Reynolds, P.E.
Regional Manager

Stephen J. Gyurisin, P.E.
Project Engineer

"Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 40821, Expiration Date: 6/16/2017."

TABLE OF CONTENTS

Edgemont Reservoir
Spillway Floor and Toe Seepage Near MW-5
Washington County, Maryland
Triad Project No. 03-06-0643

FOREWORD

This report has been prepared for the exclusive use of the City of Hagerstown for specific application to the Edgemont Reservoir in Washington County, Maryland. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or re-use of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the field exploration at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

PROJECT PURPOSE AND SCOPE

Seepage in the vicinity of MW-5 was first discovered in early 2014. Since this seepage was discovered, a drain pipe was installed to observe the seepage and quantify the flow rate and has been continuously monitored by Triad and the City since its discovery. In order to further explore the cause and extent of the observed seepage near MW-5, additional geophysical survey work, test borings, installation of new monitoring wells and further monitoring of the seepage and groundwater elevations has been performed. The additional exploration was performed to aid in the determination of the most appropriate remedial action for the observed seepage. As part of the exploration, Triad has also reviewed all past documentation associated with the seepage to include a report titled "Edgemont Reservoir Investigation of Leakage with Remedial Grouting", dated November 1968, prepared by Whitman Requardt and Associations, a report titled "Edgemont Dam (Ogee-Weir) Geophysical Survey", dated May, 1995, prepared by Whitman, Requardt and Associates, correspondence from MDE and the detailed geotechnical exploration performed by Triad, dated February 2, 2009.

Two distinct areas of the spillway have shown signs of distress, including cracking and settlement. These two locations have also been monitored routinely since they were

first observed. In order to further explore the observed cracking within the spillway floor, the observed spillway retaining wall movement and the seepage under the spillway floor Triad performed 3 concrete cores within the spillway floor within areas of obvious distress and adjacent to the existing retaining wall and performed Wildcat penetrometer testing. A ground penetrating radar (GPR) scan to locate rebar as well as to image any potential voids or seepage paths was also performed. The exploration scope was performed to aid in the determination of the most appropriate remedial action for the spillway seepage, observed spillway floor cracking and the observed retaining wall movement.

Based on the most recent annual inspection performed by MDE on May 19, 2015, the current condition of the dam is considered unacceptable due to ongoing seepage problems at the right abutment and under the spillway. In summary, The Edgemont Reservoir is classified as a High Hazard Dam meaning that failure of the dam could lead to catastrophic damage and loss of life. Based on the current EAP and detailed breach analysis completed in October 2015, a total of 77 property owners would be affected if a failure of the embankment would occurred. In addition, 13 bridge/culvert type structures and up to 8 miles of roadway would be inundated during a breach. Any structural damage to the railroad bridge could result in a long-term delay of the railroad track use. The following sections of this report will evaluate and determine the most appropriate remedial action to restore the embankment to a condition acceptable to MDE.

FIELD EXPLORATION

Spillway Floor

The first phase of our exploration consisted of a Ground Penetrating Radar (GPR) scan of the spillway floor within areas to be evaluated to delineate the approximate location of the existing reinforcement steel. The GPR scan identified reinforcement steel within the top portion of the slab. The GPR scan indicated that reinforcement steel was spaced approximately 12 inches on center each way. The GPR reflects the first object identified, as a result scanning past the rebar was not possible. Due to the size of the reinforcement steel and difficultly coring through the steel, the GPR testing was performed to estimate the location of the reinforcement steel and assist in positioning of the subsequent cores to avoid as much of the reinforcement steel as possible.

The second phase of our exploration included performing concrete cores and Wildcat probes. The Wildcat probe testing equipment consists of a 35 pound drop hammer connected to steel rods with a cone shaped tip at the end of the rods. The steel rods are driven into the subsurface materials by dropping the hammer 15 inches by freefall. The number of blows (drops) to drive the rods a distance of 10 cm is recorded in increments. The Wildcat probes were performed to evaluate the condition of the subgrade materials, determine the extent of any soft soil zones and estimate a depth of existing weathered rock and/or possible bedrock.

In summary, three (3) locations within the concrete spillway floor were cored utilizing a 4 inch diameter diamond impregnated core barrel. The thickness of the concrete cores ranged from 12 inches to 18 inches. Void space was encountered below the cores at 2

of the locations. Within the void space a tape measure was extended in multiple directions approximately 5 feet. Void space is present below the existing retaining wall and is anticipated to extend beyond 5 feet in areas. Below the slab/void space crushed gravel was observed. A summary of conditions encountered at each test location is provided in the table below.

Core No.	Concrete Thickness (in.)	Void Space under concrete (in.)	Wildcat Probes
C-1	12	7	Very Loose materials encountered from 1.6 to 2.4 feet
C-2	14	None	Very Dense Materials Encountered
C-3	18	6	Very Loose materials encountered from 1.4 to 1.7 feet.

Wildcat probes were performed after removal of the cores. The Wildcat logs are provided in Appendix B. In summary, medium to very dense materials were generally encountered at each core location with isolated very loose to loose wet soil zones located at core locations C-1 and C-3 as summarized above. Very dense subgrade conditions were encountered at core location C-2 below the existing aggregate. Upon completion of the coring and Wildcat probes, monitoring well covers were set flush with the spillway floor for further observation. The approximate test locations are shown on Figure A-2 contained in Appendix A.

Toe Seepage Near MW#5

The first phase of the exploration included performing two-dimensional (2-D) electrical resistivity testing at the same location along the toe of the embankment as performed during our previous exploration. The electrical resistivity survey was completed to compare the results with the previous exploration and to aid in determining the locations for additional monitoring wells in the area of the observed seepage. The results of the electrical resistivity survey are shown in the cross sections in Appendix A.

The electrical resistivity survey was performed utilizing an R-8/IP@ Automatic Earth Resistivity System. The electrode spacing was 5 feet with a total array spread of 390 feet. Effective imaging depths are approximately 24 percent of the total array length, i.e. approximately 65 feet, and effective resolution is approximately 50 percent of the electrode spacing. Resistivity imaging data was processed and inverted using AGI=s proprietary 2D resistivity inversion software, EarthImager, to generate the inverted resistivity section. Two-dimensional electrical resistivity imaging is a geophysical technique utilized to measure the in-situ resistivity of earth materials, i.e. an assessment of how difficult it is to pass an induced electrical current through the subsurface. Resistivity is nothing more than the inverse of conductivity. Therefore, resistivity imaging is a measurement of the conductivity of the subsurface materials at a site. Generally, soils are more conductive than competent bedrock and can be imaged with this technique. Zones of increased seepage in soil and bedrock will generally exhibit

elevated moisture. Consequently, they are more conductive than the surrounding bedrock or other soils.

In summary, results of the resistivity testing along the downstream toe of the slope generally correspond well with the existing surface conditions and previously performed resistivity testing with a slightly more pronounced area of seepage on the most recently performed resistivity testing in the vicinity of MW-5. The shallow groundwater conditions and new surface seeps located in the vicinity of monitoring well MW-5 correspond well within the lower resistive materials illustrated on the resistivity section.

Based on the results of the resistivity testing and location of the existing seeps, 3 borings and monitoring wells were installed to help further evaluate the existing seepage and determine the appropriate remediation. In general the subsurface soils consisted of tan brown clayey silt, sandy gravel and silty sand and gravel in a medium dense to very dense condition and moist to wet. Wet soil conditions were encountered in all borings. Detailed descriptions are provided on the boring logs included in Appendix B. The approximate test locations are shown on Figure A-2 contained in Appendix A.

CONCLUSIONS AND RECOMMENDATIONS

The subsurface information obtained from the field exploration, evaluation and review of previous studies, our past experience with similar projects, and the noted design criteria were the basis for our assessment of the geotechnical issues currently existing at the site. Our geotechnical recommendations associated with the spillway floor and observed seepage near MW-5 are summarized here-in.

During our field exploration 3 monitoring well covers were installed within the spillway floor and 3 monitoring wells were constructed near MW-5. At this time, we recommend that the reservoir continue to be allowed to fluctuate naturally in order to obtain additional data from the recently installed well covers and monitoring wells. However, the city should be prepared to lower the reservoir prior to a major storm event. We recommend that the new monitoring wells be gauged with existing wells. Concurrent with the monitoring well gauging, the monitoring well covers within the spillway floor should be removed to allow for visual inspection of the conditions under the spillway.

Spillway Floor

As previously mentioned, cracking within the spillway floor and settlement of the western spillway concrete retaining wall (left wall if looking downstream) has been observed. This exploration was performed to evaluate the subsurface conditions, investigate the cause of the settlement and to determine the most appropriate remediation method. Settlement within these areas was first observed during the initial field exploration performed in 2006. Monitoring points on the wall were ultimately established and have been intermittently monitored. No significant signs of wall movement have been recorded. However visual observations of concrete cracking and spalling of the spillway floor adjacent to the wall appear to have worsened slightly.

In summary, based on the results of the field exploration void space below the spillway floor was encountered at core locations C-1 and C-3 and ranged in thickness from 6 to 7 inches. The void space also extends under the existing retaining wall foundation and distances of up to 5 feet surrounding the core locations of C-1 and C-3. The voids encountered at the core locations are also relatively consistent with the seepage flow paths and mass deficiencies as mapped by the original geophysical exploration previously performed and summarized as part of the Geotechnical Report dated February 2, 2009. For reference a copy of Figure 5, Gravity and SP Data Comparison, from the geophysical exploration is included in Appendix A.

It is apparent that the seepage under the spillway has caused subsurface erosion and settlement over the past 20 years to create the voids. In addition, during the monitoring of the new observations wells, flow was observed below the spillway floor within C-1. The flow was observed after a precipitation event and it is our opinion that the flow is a direct result of the precipitation event and buildup of water behind the retaining wall. This can be verified by past observations of the wells with no flow at the same reservoir level of 6.6 feet below the top of OGEE weir. The flow direction post precipitation event was observed to come from under the western spillway wall trending towards the center of the spillway. It is our opinion that the settlement within the spillway floor and settlement of the western spillway wall are a direct result of the observed voids, and possibly softening of the subgrade bearing soils. These conditions likely exist due to the existing seepage issues both during higher reservoir elevations and from precipitation events resulting in settlement and erosion of the subgrade materials.

As previously mentioned, the reinforced concrete encountered in the cores within the spillway floor ranged from 12 to 18 inches thick. Due to the thickness of the concrete and reinforcement, the spillway floor concrete is generally spanning across the majority of the existing void space without showing any visual signs of settlement with the exception of the area near the western spillway concrete retaining wall where excessive surface cracking and settlement has been observed.

Although the void space appears to be isolated to the left side of the spillway floor in close proximity to the retaining wall, the overall extent of the void space has not been determined at this time. Therefore, we recommend that additional probes be performed to evaluate the extent of the existing voids. The probes should be performed on an initial 20 foot grid pattern across the bottom of the spillway floor. Where voids are encountered below the concrete, additional probes should be performed to further delineate the area of the voids. The probes should be performed utilizing a 1 inch bit and hammer drill. Upon completion of the probes, additional cores and well covers should be installed as necessary. The final location of the cores and well covers will be determined at the completion of the probe investigation. At this time, we anticipate that an additional 3 cores and well covers will be installed. The monitoring period should extend through June of 2016.

Upon completion of the additional exploration and monitoring period, final recommendations for remediation of the spillway floor and retaining wall will be provided. At a minimum, all void space located below the spillway floor and retaining wall foundation should be filled by pressure injecting a low slump grout. This will be

required to stabilize, support and maintain structural integrity of the slab and retaining wall foundation. Detailed recommendations for the grouting operations will be provided upon completion of the additional probing and monitoring period.

Consideration to performing an extensive grouting program to reduce the amount of seepage under the spillway and through the embankment should be evaluated. However, the final determination would be based on continued monitoring of the reservoir to include the settlement of the spillway floor and retaining wall, seepage control through the spillway and seepage control at the toe of the embankment. If performed we anticipate that this type of grouting program would include, at a minimum, a grout curtain along the upstream side of the ogee weir extending beyond each headwall a minimum distance of 100 feet, grouting directly below the spillway floor, grouting under the existing retaining wall foundation and through the existing embankment and into the embankment foundation soils. This curtain wall would consist of a series of drilled and pressure grouted columns that would extend into the underlying bedrock. The spacing between the grout columns would vary depending on the overall grout volume required at each specific location. If selected, Triad would consult a qualified grouting contractor and develop a detailed grouting program and associated cost estimate.

Toe Seepage Near MW-5

As previously mentioned, in early 2014 a new area of seepage has been observed at the toe of the dam near MW-5. Due to the seepage development, further exploration of the area was performed. The exploration included performing resistivity testing along the toe of the embankment, performing additional borings and ultimately installing additional monitoring wells. The work was performed to determine the most appropriate remediation method to control the existing seep. Monitoring of the seepage flow has been performed by the City of Hagerstown every 2 weeks when the reservoir elevation is below 6.5 feet and every day when above 6.5 feet. The reservoir level is monitored by SCADA and text message alarms which are sent to City personnel a minimum of once daily as well as at alarm levels when the reservoir reaches the critical level of -6.5 where seepage typically begins. Additionally, City staff receives alarm messages at -4.5 feet, -3.0 feet and -0.5 feet, with a follow up message one hour after any alarm so that the rate of change is known.

The City has been monitoring the seepage flow and groundwater elevations of the new wells for approximately 6 months. When active, the water observed from the seep has been clear with no visual signs of sediment. The seepage is generally not present when the reservoir elevation is below the level of 7 feet below the top of the weir. The results of the most recent monitoring period are included in Appendix C of this report. In summary, the new wells are showing similar trends in groundwater elevations in relation to original wells with the shallowest elevations present within MW-7 located directly north of the new seep. MW-8, located to the south of the existing seep has ground water elevations just slightly shallower then the existing water elevations within MW-4. Based on the new well data and visual observations, it is our opinion that the seepage is generally isolated to the area near MW-5.

Although the seepage has been clear and generally concentrated in the area of MW5, the seepage discharges in an uncontrolled manner at the toe of the embankment. The discharge point is in the general vicinity of the large sycamore tree that was removed from the toe of the embankment in 2010. Due to the uncontrolled discharge, there is the potential for undesirable subgrade softening, settlement and erosion at the toe of the embankment. This condition will ultimately lead to stability issues within the embankment and should be remediated.

Therefore, we recommend that a toe drain be constructed to containerize and discharge the seepage in a controlled manner. Due to the seepage occurring at the toe of the embankment and the existing water lines it may be necessary to construct a portion of the toe drain as a berm. Preliminary construction details have been provided in Appendix D of this report.

As previously mentioned, based on the data obtained over the past monitoring period, the elevation of approximately 6 to 7 feet below the top of weir is generally an elevation where the existing seepage at the toe of the embankment stops flowing at the surface. At this time, several options have been discussed to help maintain the reservoir elevation at a consistent elevation of approximately 6 feet below the top of weir. These options have included the preliminary evaluation of installing a notch in the existing weir to a depth of 6 feet below the top of weir or installation of an actuating valve attached to the 24 inch main discharge pipe. A final decision of the most suitable option will be decided after the monitoring period and further discussions with MDE.

Summary of Recommendations

Provided below is a summary of the recommendations outlined in this report. The recommendations are categorized by priority and timelines should ultimately be established after discussions with MDE and further monitoring. Therefore, this task list should be considered a preliminary task list that is subject to change.

1a Spillway Floor Evaluation

Additional probes should be performed to evaluate the extent of the existing voids located below the spillway floor and retaining wall foundation. The probes should be performed on an initial 20 foot grid pattern across the bottom of the spillway floor. Where voids are encountered below the concrete, additional probes should be performed to further delineate the area of the voids. The probes should be performed utilizing a 1 inch bit and hammer drill. Upon completion of the probes, additional cores and well covers will be installed as necessary. The final location of the cores and well covers will be determined at the completion of the probe exploration. At this time, we anticipate that an additional 3 cores and well covers will be installed.

1b Construct Blanket/Toe drain

Due to the existing seepage condition, a blanket/toe drain should be constructed to containerize and discharge the seepage in a controlled manner. Due to the seepage occurring at the toe of the embankment and the existing water lines it

will be necessary to construct a portion of the toe drain as a berm. Preliminary construction details have been provided in Appendix D of this report.

1c Control Reservoir Elevation

At this time, the existing reservoir elevation is fluctuating naturally to allow for monitoring of the existing and new wells and seepage flow at various reservoir elevations. If significant precipitation events are anticipated, the City manually lowers the reservoir elevation by using the 12 inch lines that discharge at the existing Breichner Plant. However, at the completion of the monitoring period it is required that the reservoir be maintained at an elevation of 6 feet below the top of weir on a consistent basis. Several options have been discussed to help maintain the reservoir elevation at a consistent elevation of approximately 6 feet below the top of weir. These options include installing a notch in the existing weir to a depth of 6 feet below the top of weir or installation of an actuating valve attached to the 24 inch main discharge pipe or potentially the 12 inch pipe valves located at the existing Breichner Plant. Either option will increase the volume of water that can be controlled when lowering the reservoir elevation. It should be noted that cutting a notch in the weir is a permanent change to the weir. If, in the future, the City wishes to utilize the full capacity of the reservoir elevation the notch would need to be filled. Whereas installation of an actuating valve allows the City the flexibility to raise the reservoir elevation higher than 6 feet below the top of weir without additional future work. A final decision of the most suitable option will be decided after the monitoring period and discussions with MDE.

4) Filling Voids Under Spillway Floor and Retaining Wall Foundation

Upon completion of the additional exploration and monitoring period, final recommendations for remediation of the spillway floor and retaining wall will be provided. At a minimum, all void space located below the spillway floor and retaining wall foundation should be filled by pressure injecting a low slump grout. This will be required to stabilize, support and maintain structural integrity of the slab and retaining wall foundation. Detailed recommendations for the grouting operations will be provided upon completion of the additional probing and monitoring period.

5) Perform Extensive Grouting Program

Provided that the recommendations above are performed and the reservoir elevation is maintained at a minimum depth of 6 feet below the top of weir, extensive grouting may not be required. However, the final determination would be based on continued monitoring of the reservoir to include the settlement of the spillway floor and retaining wall, seepage control through the spillway and seepage control at the toe of the embankment upon completion of the recommendations summarized above. If these existing conditions cannot be remediated and controlled, an extensive grouting program will be required upstream of the existing OGEE weir, within the existing spillway, under the existing retaining wall and through the existing embankment and into embankment foundation materials.

6) Complete Removal of the Embankment/Structures and Restoration
In order to completely eliminate any risks associated with the reservoir and possible failure of the embankment complete removal of the embankment and associated structures would be required. If performed, restoration of the stream and area would be required.

At a minimum, task items 1a, 1b, 1c and 4 should be performed to reduce the risk of the embankment and spillway instability due to current seepage issues and settlement. The initial immediate task actions should include 1a, 1b and 1c. Upon completion of task 1a, task 4 design can be completed and the grouting work can also be performed.

Upon completion of tasks (1a-1c and 4) and further monitoring of seepage flows, monitoring well levels and spillway floor and wall settlement, a final determination of the need for the extensive grouting program (task 5) can be determined. This determination will also be based on the ultimate need of the water source.

At this time it is unclear about the long term viability of the Breichner Plant and the ultimate need of the Edgemont water source. If the Breichner Plant is ultimately upgraded and full capacity of the reservoir is required, we recommend that the extensive grouting operations be completed to maintain stability of embankment and spillway by substantially reducing the existing seepage.

If it is determined that the Breichner Plant is not needed and planned upgrades are not performed we recommend that strong consideration be given to performing a complete removal of the embankment and structures and performing restoration of the existing stream and surrounding area to eliminate any the risks associated with embankment failure.

The following table outlines the recommended repair actions and the associated estimated design and construction costs.

Item	Estimated Costs
1a. Spillway Floor Evaluation	$18,000 to $25,000
1b. Construct Blanket/Toe drain	$40,000 to $60,000
1c. Control Reservoir Elevation	$75,000 to $250,000
4. Filling Voids Under Spillway Floor and Retaining Wall Foundation	$75,000 to $150,000
5. Perform Extensive Grouting Program	$2,000,000 to $2,500,000
6. Complete Removal of the Embankment/Structures and Restoration	$3,000,000 to $4,000,000

* Estimated Costs should be considered approximate. Refined costs can be obtained at the completion of the study period.

** It is important to note that this reservoir is the raw water source for the W.M. Breichner Water Treatment Plant. The Breichner Plant serves as a backup plant to the R.C. Willson Plant in Williamsport. The current appropriation permitted by MDE for the Breichner Plant is a daily average of 0.75 million gallons per day with a peak day of 4.5 million gallons. This is considerably less than the total customer demand for the City water production which is approximately 12 million gallons per day.

At this time, the Breichner Plant is not operable and needs several upgrades prior to being returned to service. These upgrades include the transition to chloramines for secondary disinfection, enhanced filtration, a new SCADA system, and various other upgrades. The current estimated costs for those renovations are approximately $3,500,000 to $5,000,000. If the City decides to commit the funds to upgrade the Breichner Plant, the City should also perform extensive grouting in addition to the initial rehabilitation to reduce the risk of failure in the embankment or spillway at the reservoir. The combination of the plant upgrades and restoration work at the reservoir would result in estimated costs of $5,700,000 to $7,800,000 to return the plant to service with a structurally sound water source.

Consideration has also been given to performing a hydrogeological evaluation of the groundwater conditions at the existing Breichner Plant and exploring the viability of using groundwater as a primary and/or secondary water source. The evaluation would consist of a subsurface exploration to locate areas of potential groundwater for the installation of high volume groundwater wells. The wells would be pump tested to determine the viability of using groundwater as the source for the Breichner Plant. Fees associated with the evaluation, installation of wells and pump testing would be on the order of $150,000 to $250,000. Assuming the wells are a viable option, if the City wishes to proceed in this direction, additional upgrades to the Breichner plant would need to be considered based on the groundwater characteristics and new permit appropriations would need to be established with MDE.

Funding Sources

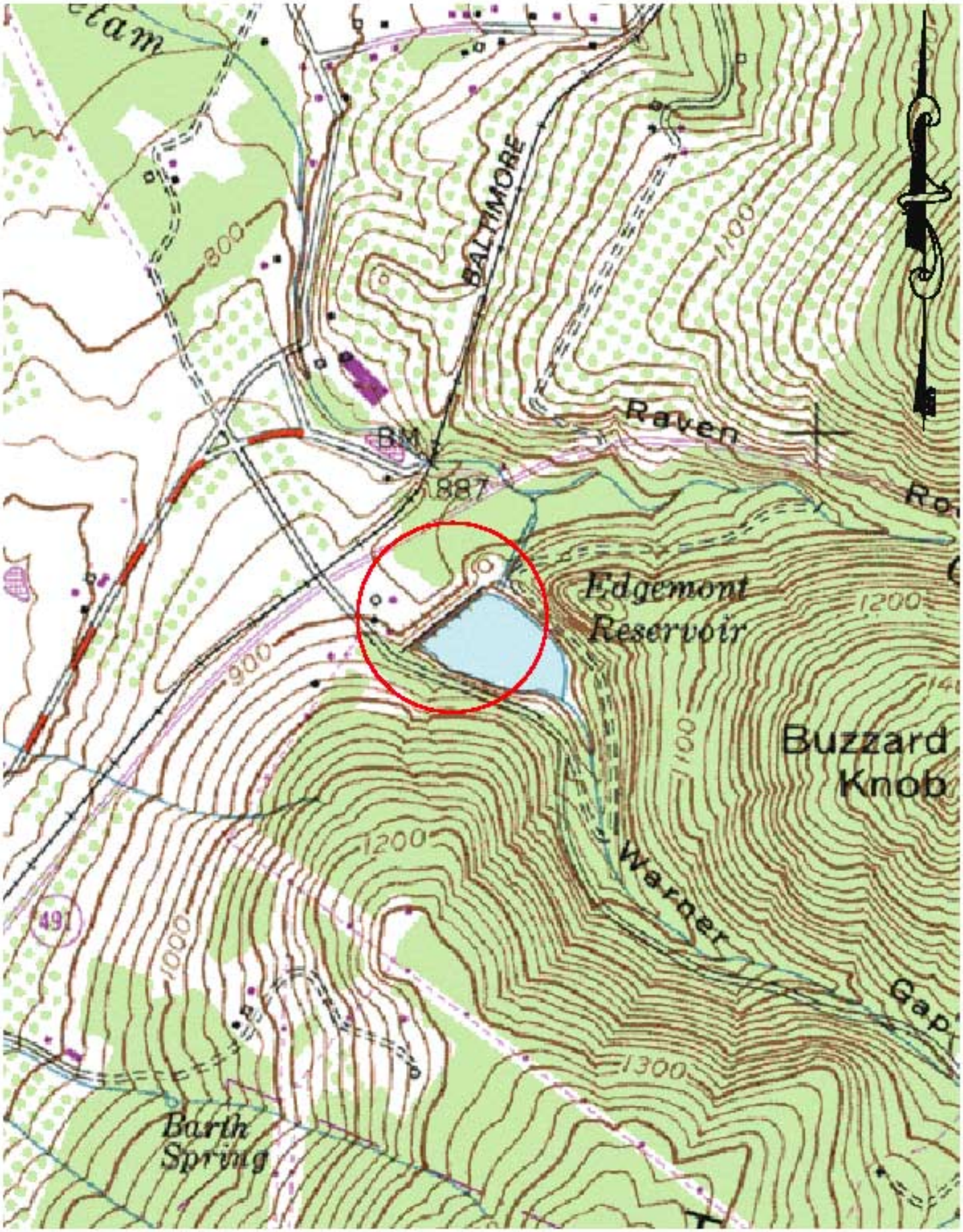
The City submitted a funding application to the Safe Drinking Water Act (SDWA) program for improvements to or removal of the Edgemont Reservoir due to deficiencies observed and documented by the MDE Dam Safety Division during annual inspections. The FY16 funding application was declined because the SDWA program will not fund raw water storage projects. Please see the response letter from MDE regarding this project included in Appendix C.

The City will continue to pursue funding opportunities that are available and recognizes the potential consequences associated with the dam being in poor repair. The City remains committed to addressing the deficiencies noted in this report and the inspection by the MDE Dam Safety Group and will continue to work with MDE to restore the dam to the agencies' satisfaction.

TRIAD ENGINEERING, INC.

APPENDIX A

Illustrations



TRAD TRAD ENGINEERS, INC.	WARNER GAP HOLLOW DAM	SCALE: 08-07-07	= Approximate Site Location	Job No.: 03-08-0843	Plate No.: A-1
	SITE LOCATION PLAN	WASHINGTON COUNTY, MARYLAND		REVISED: September 2004	

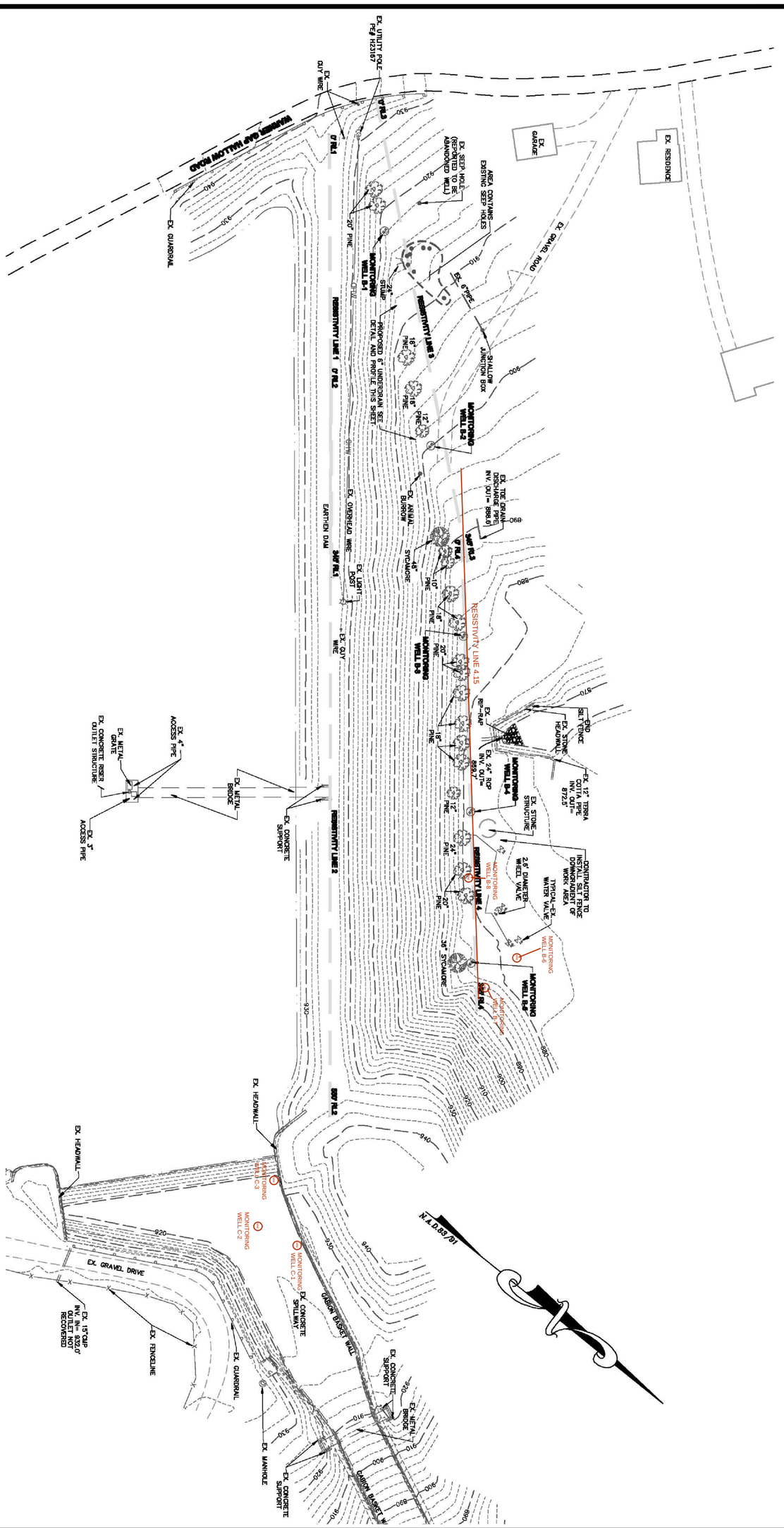


FIGURE : A-2

TRIAD ENGINEERING, INC.
www.triadeng.com

TEST LOCATION PLAN
EDGEMONT RESERVOIR
WASHINGTON COUNTY
MARYLAND

Approximate Test Location

PROJECT NO: 03-13-0452

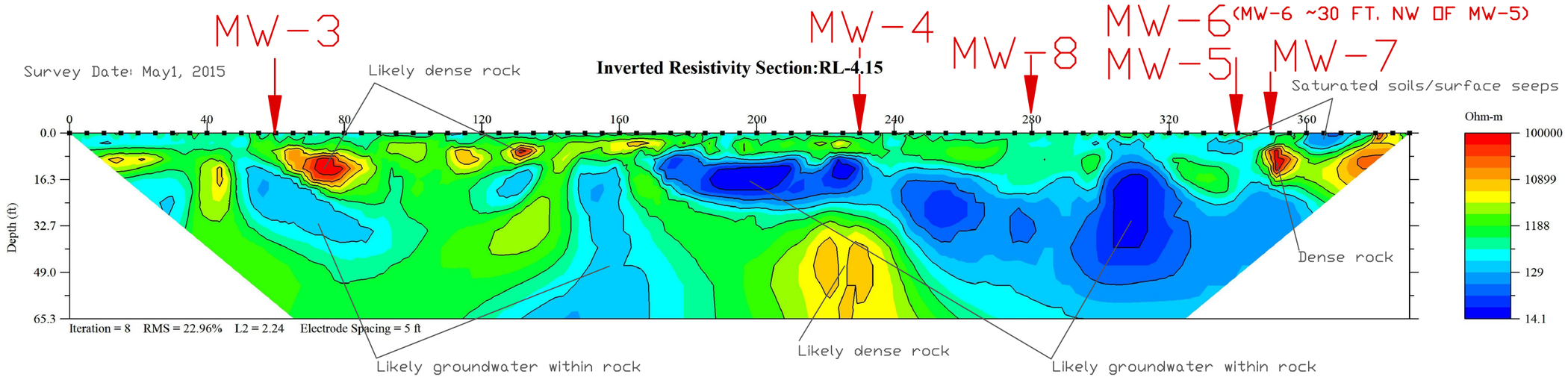
DRAWN BY:	CHECKED BY:
JRW	SJG
DATE: 6/30/15	SCALE: 1"=50'

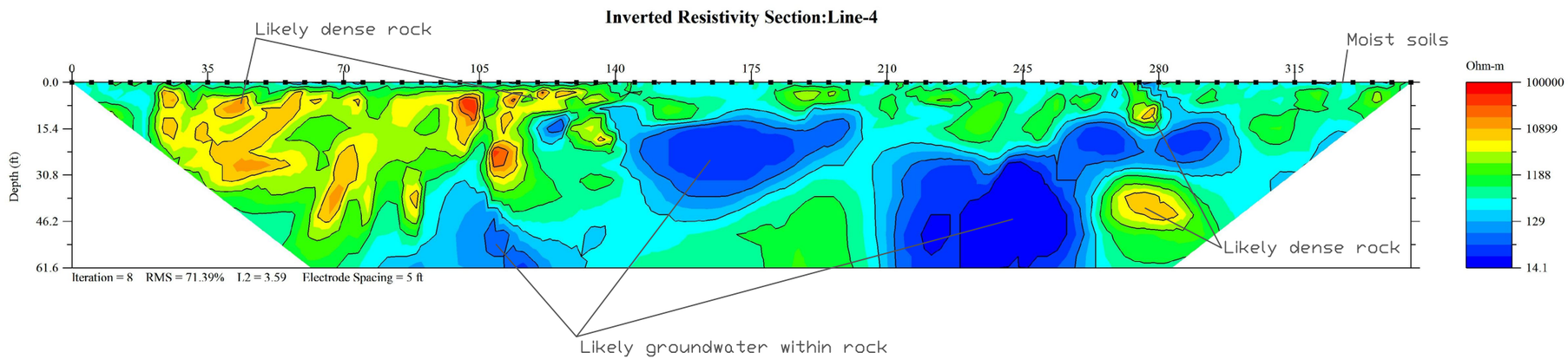
TRIAD ENGINEERING, INC.

1075-D SHERMAN AVENUE
HAGERSTOWN, MD 21740
PH: 301.797.6400 FAX: 301.797.2424

OFFICE LOCATIONS
MARYLAND ○ PENNSYLVANIA ○ VIRGINIA ○ WEST VIRGINIA

GENERAL NOTES: In summary, generally higher resistivity values are interpreted to represent non-porous, competent bedrock (red to yellow) while lower resistivity values (blue to green), are interpreted to represent moist or saturated soils and soil and/or water filled fractures.





TRIAD ENGINEERING, INC.
1075-D SHERMAN AVENUE
HAGERSTOWN, MD 21740
PH: 301.797.6400 FAX: 301.797.2424
OFFICE LOCATIONS
MARYLAND ○ PENNSYLVANIA ○ VIRGINIA ○ WEST VIRGINIA

Approximate Well Location

PROJECT NO: 03-13-0452 | DRAWN BY: JRW | CHECKED BY: BAR | DATE: 12-17-15 | SCALE: N/A

ELECTRICAL RESITIVITY CROSS SECTION
EDGEMONT RESEVOIR
WASHINGTON COUNTY
MARYLAND

TRIAD ENGINEERING, INC.
www.triadeng.com

FIGURE : A-3

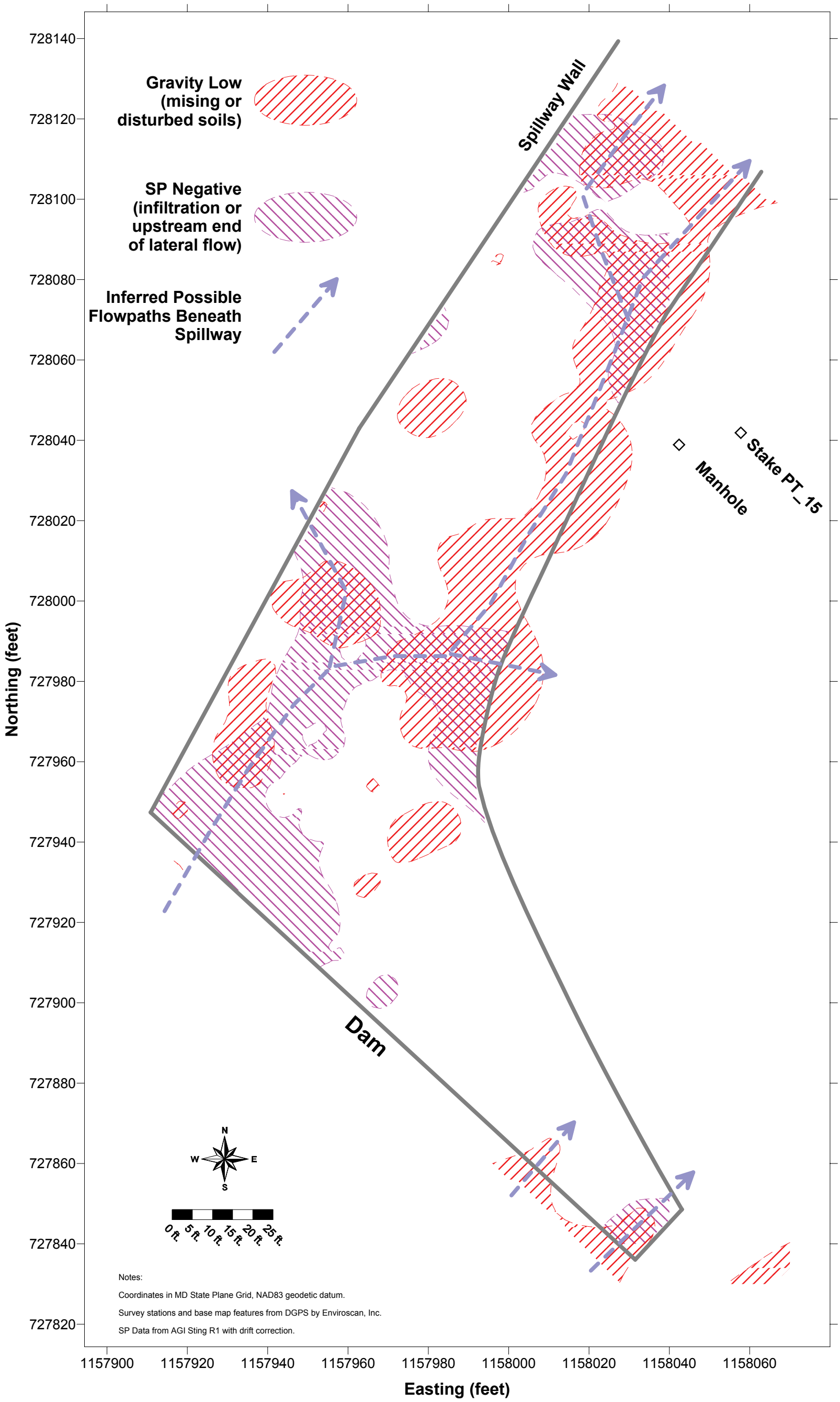


Figure 5

Gravity and SP Data Comparison

Spillway
Warner Gap Hollow Dam
Smithsburg, MD

Enviroscan, Inc.
Project No. 080635
Rev. 05/29/07

ENVIROSCAN, INC.

TRIAD ENGINEERING, INC.

APPENDIX B

Field Exploration

TRIAD ENGINEERING, INC.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		**Consistency – Fine-grained Soils**	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	#4	Very Soft	#2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	**Plasticity Index (PI)**	**Rock Hardness**	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Very Weathered	#50/.5
Medium	5 to 20	Weathered	50/.4
High	20 to 40	Soft	50/.3
Very High	over 40	Medium hard	50/.2 to 50/.1
		Hard	Auger Refusal

Moisture Description
Dry - Dusty, dry to touch
Slightly Moist - damp
Moist - no visible free water
Wet - visible free water, saturated

FIGURE NO. 1

TRIAD ENGINEERING, INC.

BORING LOG

Project Number: **03-13-0452** Project Name: **Edgemont Reservoir** Boring No.: **MW-6**
Inspector: JRW Boring Location: See Figure A-2
Date Started: 5/22/15 Drill/Method: Truck/HSA
Date Completed: 5/22/15 Driller: NEGLEYS Ground Elev.:

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 9.2 ft. | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.4	5.0" TOPSOIL				
							Tan brown clayey **SILT**, medium stiff, trace gravel, moist				
	2	X	3-3-4	78%							
5.0						5.0	- RESIDUUM -				
	3	X	8-18-13	61%			Tan brown silty **GRAVEL**, dense, little sand, wet				
	4	X	10-13-14	89%			- medium dense, moist				
10.0	5	X	9-50/5"	100%			- very dense				
						11.0	- RESIDUUM -				
							REFUSAL AT 11.0 FEET				
15.0											
20.0											

TRIAD_C - REVISED 03-13-0452.GPJ 03-11-0062 EMMITSBURG WWTP ENR UPGRADE.GPJ 6/29/15

TRIAD ENGINEERING, INC.
1075 D Sherman Avenue
Hagerstown, MD 21740
P: 301-797-6400
F: 301-797-2424

Remarks: Groundwater encountered at 9.2 feet upon completion of drilling.

BORING LOG

Project Number: **03-13-0452** Project Name: **Edgemont Reservoir** Boring No.: **MW-7**
Inspector: JRW Boring Location: See Figure A-2
Date Started: 5/22/15 Drill/Method: Truck/HSA
Date Completed: 5/22/15 Driller: NEGLEYS Ground Elev.:

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.2	2.0" TOPSOIL				
							Brown sandy **GRAVEL**, medium dense, dry				
	1		15-12-5	56%							
5.0											
	2		11-14-14	89%			- wet				
	3		11-16-27	56%			- dense				
10.0											
	4		17-50/5"				- very dense				
	5		50/3"	100%							
15.0						15.0	- RESIDUUM -				
							BORING TERMINATED AT 15.0 FEET				
20.0											

TRIAD_C - REVISED 03-13-0452.GPJ 03-11-0062 EMMITSBURG WWTP ENR UPGRADE.GPJ 6/29/15

Remarks: Boring dry during and upon completion of drilling.

TRIAD ENGINEERING, INC.
1075 D Sherman Avenue
Hagerstown, MD 21740
P: 301-797-6400
F: 301-797-2424

BORING LOG

Project Number: **03-13-0452** Project Name: **Edgemont Reservoir** Boring No.: **MW-8**
Inspector: JRW Boring Location: See Figure A-2
Date Started: 5/26/15 Drill/Method: Truck/HSA
Date Completed: 5/26/15 Driller: NEGLEYS Ground Elev.:

Shelby Tube | Standard Split Spoon | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
							Tan brown silty **SAND AND GRAVEL**, very dense, moist				
5.0	1		10-50/1"	43%							
	2		10-15-25	39%			- dense				
10.0	3		11-11-15	0%			- wet				
						13.5	- RESIDUUM -				
	4		16-17-36				Brown sandy **GRAVEL**, very dense, wet				
15.0						15.0	- RESIDUUM -				
							BORING TERMINATED AT 15.0 FEET				
20.0											

TRIAD_C - REVISED 03-13-0452.GPJ 03-11-0062 EMMITSBURG WWTP ENR UPGRADE.GPJ 6/29/15

TRIAD ENGINEERING, INC.
1075 D Sherman Avenue
Hagerstown, MD 21740
P: 301-797-6400
F: 301-797-2424

Remarks: Boring dry during and upon completion of drilling. Auger refusal at 5 feet, boring offset. Auger refusal at 6 feet, boring offset.

WILDCAT DYNAMIC CONE LOG

Triad Engineering, Inc.
1075D Sherman Avenue
Hagerstown, MD 21740

PROJECT NUMBER: 03-13-0452
DATE STARTED: 05-28-2015
DATE COMPLETED: 05-28-2015

HOLE #: WC-1
CREW: JRW/BAR
PROJECT: Edgemont Resevoir
ADDRESS: Warner Hollow Road
LOCATION: Wash. Co., MD

SURFACE ELEVATION: 26" Below Slab Sur.
WATER ON COMPLETION: 31" BSS
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	CLAY
	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
	50	222.0	••	-	VERY DENSE	HARD
1 ft	60	266.4	••	-	VERY DENSE	HARD
	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
	3	13.3	•••	3	VERY LOOSE	SOFT
2 ft	3	13.3	•••	3	VERY LOOSE	SOFT
	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
	55	244.2	••	-	VERY DENSE	HARD
3 ft						
1 m						
4 ft						
5 ft						
6 ft						
2 m						
7 ft						
8 ft						
9 ft						
3 m 10 ft						
11 ft						
12 ft						
4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

Triad Engineering, Inc.
1075D Sherman Avenue
Hagerstown, MD 21740

PROJECT NUMBER: 03-13-0452
DATE STARTED: 05-28-2015
DATE COMPLETED: 05-28-2015

HOLE #: WC-2
CREW: JRW/BAR
PROJECT: Edgemont Resevoir
ADDRESS: Warner Hollow Road
LOCATION: Wash. Co., MD

SURFACE ELEVATION: 16" Below Slab Sur.
WATER ON COMPLETION: dry
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	CLAY
-	50	222.0	••	-	VERY DENSE	HARD
-	50	222.0	••	-	VERY DENSE	HARD
- 1 ft						
-						
-						
- 2 ft						
-						
-						
- 3 ft						
- 1 m						
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

WILDCAT DYNAMIC CONE LOG

Triad Engineering, Inc.
1075D Sherman Avenue
Hagerstown, MD 21740

PROJECT NUMBER: 03-13-0452
DATE STARTED: 05-28-2015
DATE COMPLETED: 05-28-2015

HOLE #: WC-3
CREW: JRW/BAR
PROJECT: Edgemont Resevoir
ADDRESS: Warner Hollow Road
LOCATION: Wash. Co., MD

SURFACE ELEVATION: 24" Below Slab Sur.
WATER ON COMPLETION: 35" BSS
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY SAND & SILT	TESTED CONSISTENCY CLAY
-	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
- 1 ft	25	111.0	••••••••••••••••••••••••••••••	-	DENSE	HARD
-	2	8.9	••	2	VERY LOOSE	SOFT
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
- 2 ft	20	88.8	••••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	21	93.2	••••••••••••••••••••••••••	-	MEDIUM DENSE	VERY STIFF
- 3 ft	19	84.4	••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
- 1 m						
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

TRIAD ENGINEERING, INC.

APPENDIX C

City of Hagerstown Information

Document Path: H:\watersewer\Matt Mohler\Water\Edgemont Reservoir\GIS\SpillwayWorksheet.mxd

CITY OF HAGERSTOWN

UTILITIES DEPARTMENT

CITY OF HAGERSTOWN EDGEMONT RESERVOIR

SPILLWAY CORINGS

SCALE: 1 in = 20 ft	PROJECT NO: N/A
DRAWN BY: MJM	DWG NO: FIG 1
DATE: 9/15/2015	

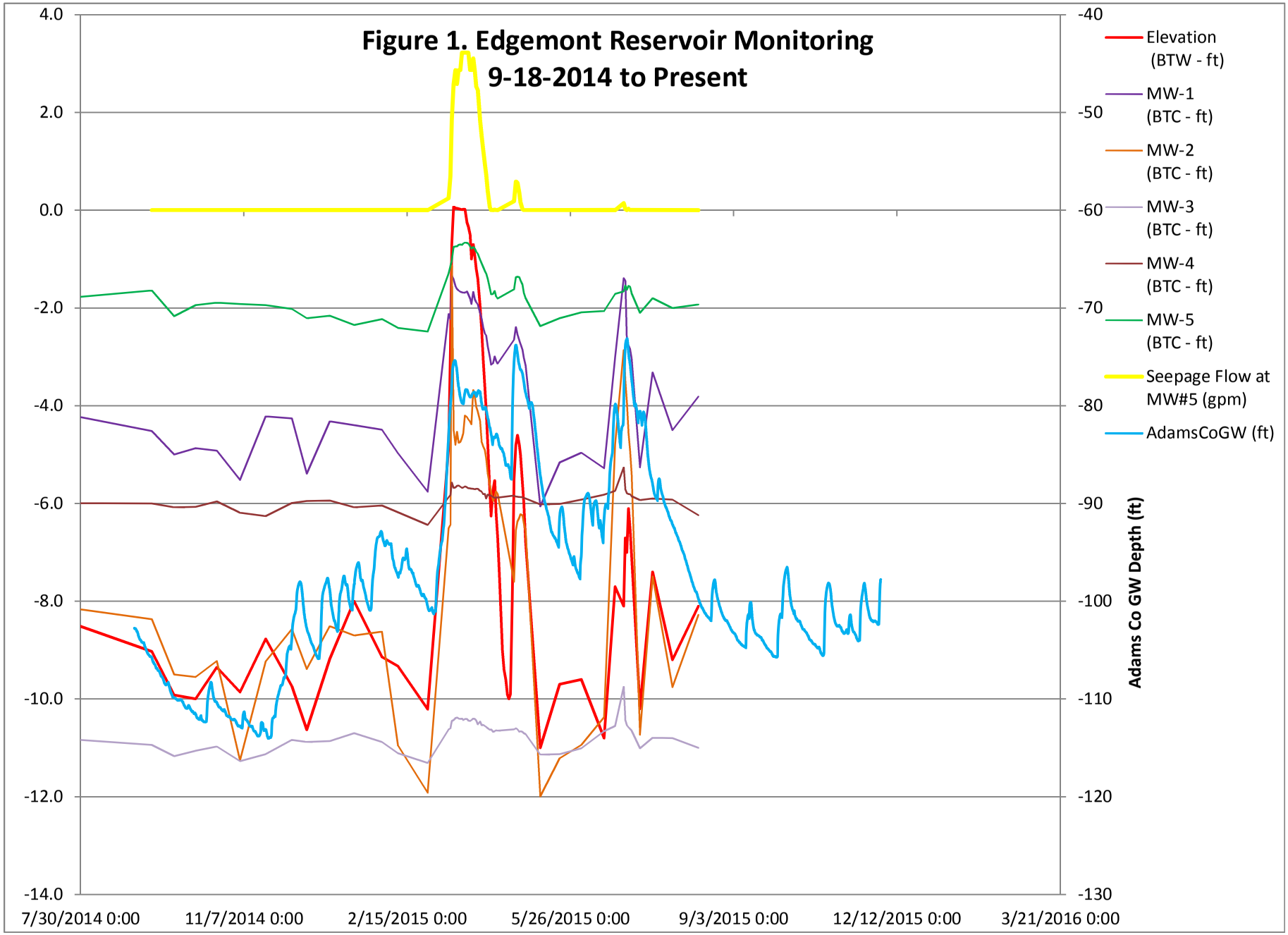


Figure 1. Edgemont Reservoir Monitoring
9-18-2014 to Present
4.0
2.0
0.0
-2.0
-4.0
-6.0
-8.0
-10.0
-12.0
-14.0
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
Adams Co GW Depth (ft)
7/30/2014 0:00
11/7/2014 0:00
2/15/2015 0:00
5/26/2015 0:00
9/3/2015 0:00
12/12/2015 0:00
3/21/2016 0:00
Elevation (BTW - ft)
MW-1 (BTC - ft)
MW-2 (BTC - ft)
MW-3 (BTC - ft)
MW-4 (BTC - ft)
MW-5 (BTC - ft)
Seepage Flow at MW#5 (gpm)
AdamsCoGW (ft)

MDE

MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230
410-537-3000 • 1-800-633-6101 • www.mde.maryland.gov

Larry Hogan
Governor

Boyd Rutherford
Lieutenant Governor

Ben Grumbles
Secretary

July 22, 2015

Ms. Nancy Hausrath
Water Operations Manager
City of Hagerstown
51 West Memorial Blvd.
Hagerstown MD 21740

Re: Federal FY15/State FY17 Funding Application for Edgemont Reservoir Improvement Project Rank #36

Dear Ms.Hausrath:

Thank you for submitting the subject capital project for federal FY 2015/State FY 2017 financial assistance offered through the Maryland Water Quality Financing Administration (MWQFA). The purpose of this letter is to inform you that the project is considered ineligible for financial assistance from the Drinking Water Revolving Loan Fund under a provision of the Code of Federal Regulations Title 40: Protection of Environment Part 35 – State and Local Assistance, Subpart L – Drinking Water State Revolving Funds §35.3520:

> *...(e) Ineligible projects. The following projects are ineligible for assistance from the Fund:...(3) Reservoirs or rehabilitation of reservoirs, except for finished water reservoirs and those reservoirs that are part of the treatment process and are on the property where the treatment facility is located.*

Please contact me at (410) 537-3908 or elaine.dietz@maryland.gov if you have any questions regarding your project, the application review process, or financial assistance. Thank you again for your interest in funding from MWQFA.

Sincerely,

Elaine K. Dietz
Elaine K. Dietz, Chief
Capital Planning & Financing Division
Maryland Water Quality Financing Administration

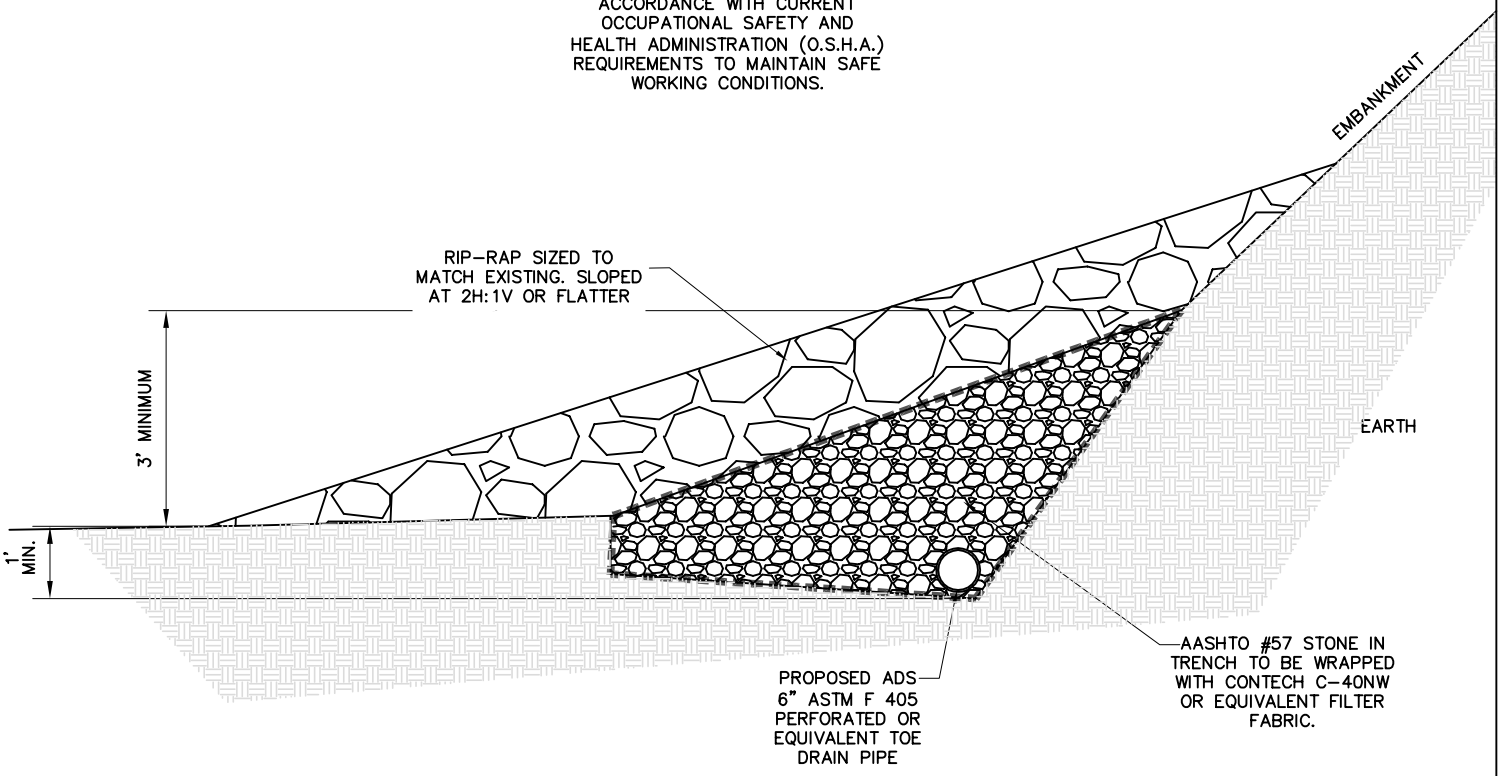
cc: Walid Saffouri, MDE OBIF
Saeid Kasraei, MDE WMA

TRIAD ENGINEERING, INC.

APPENDIX D

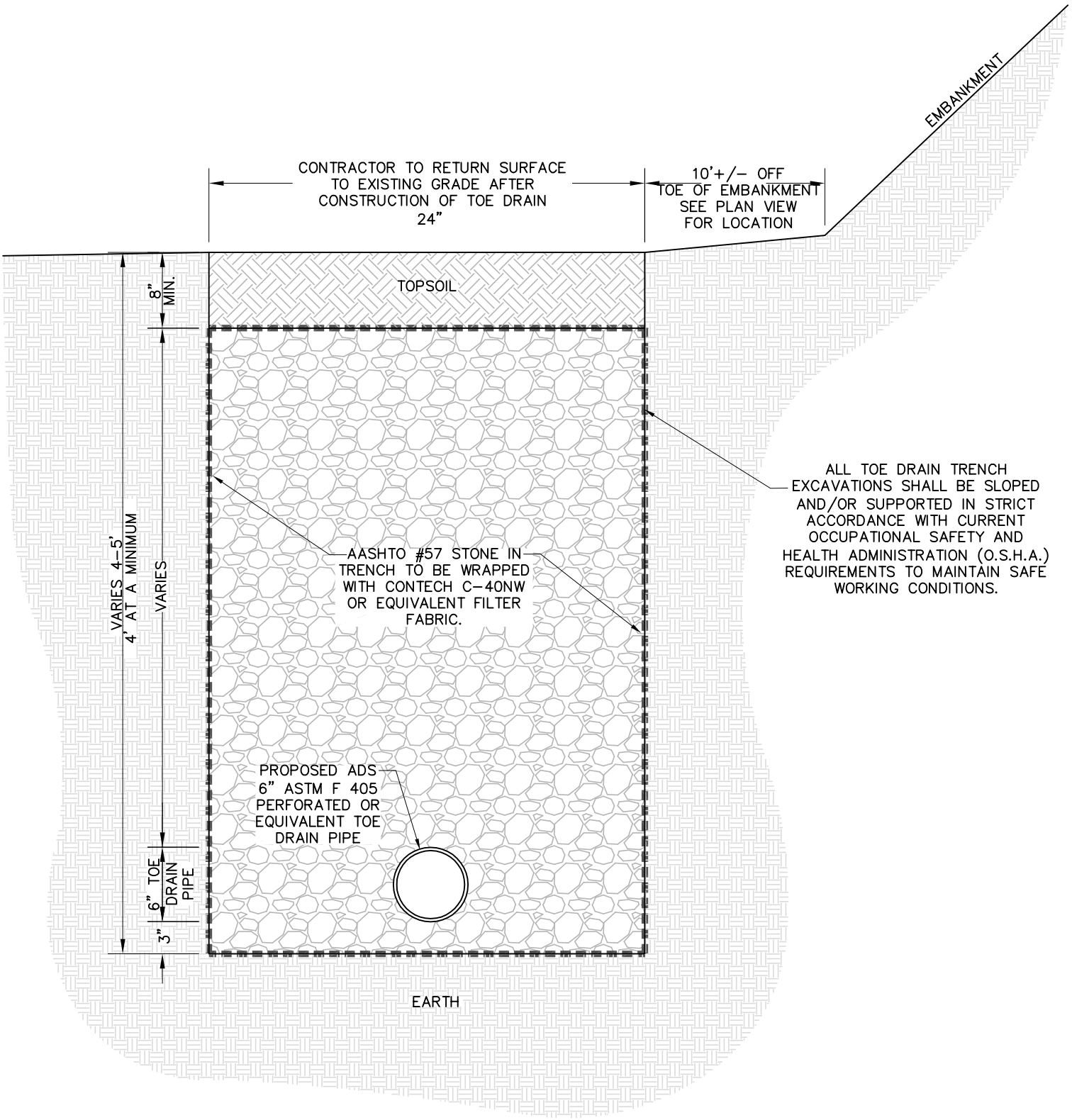
Blanket and Toe Drain

ALL TOE DRAIN TRENCH EXCAVATIONS SHALL BE SLOPED AND/OR SUPPORTED IN STRICT ACCORDANCE WITH CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.) REQUIREMENTS TO MAINTAIN SAFE WORKING CONDITIONS.



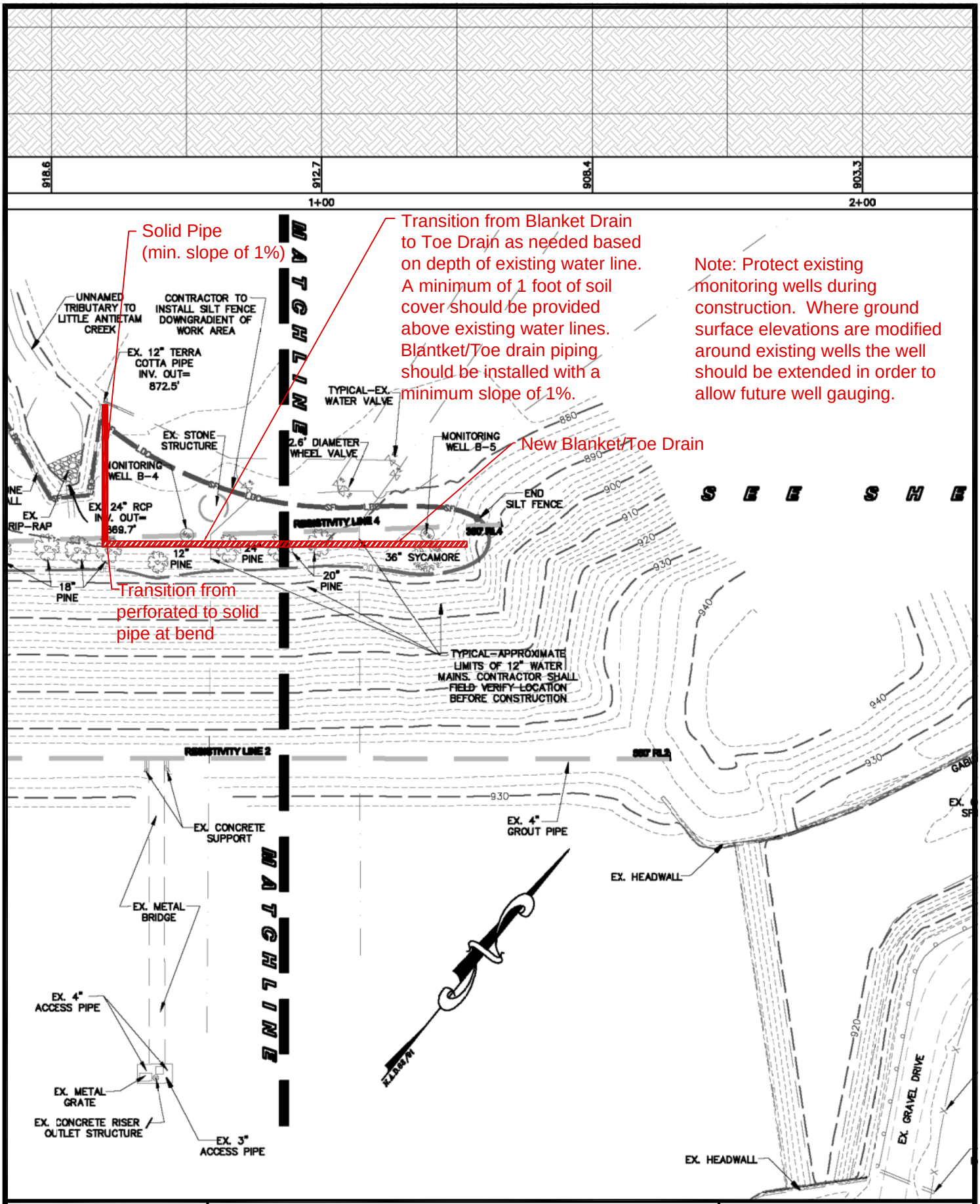
NOT TO SCALE

TYPICAL CROSS SECTION OF PROPOSED BLANKET DRAIN



NOT TO SCALE

TYPICAL CROSS SECTION OF PROPOSED TOE DRAIN



Aprx. Blanket/Toe Drain Location

Preliminary Location Plan

DRAWN BY:	CHECKED BY:
SJG	BAR
DATE: 10/14/15	SCALE: N/A

Edgemont Resevoir Blanket/Toe Drain Location
Washington County, MD

PROJECT NO: 03-06-0643

TRIAD ENGINEERING, INC.
www.triadeng.com
1075-D SHERMAN AVENUE
HAGERSTOWN, MD 21740

Hazen *Technical Memorandum*

December 31, 2019 - Draft

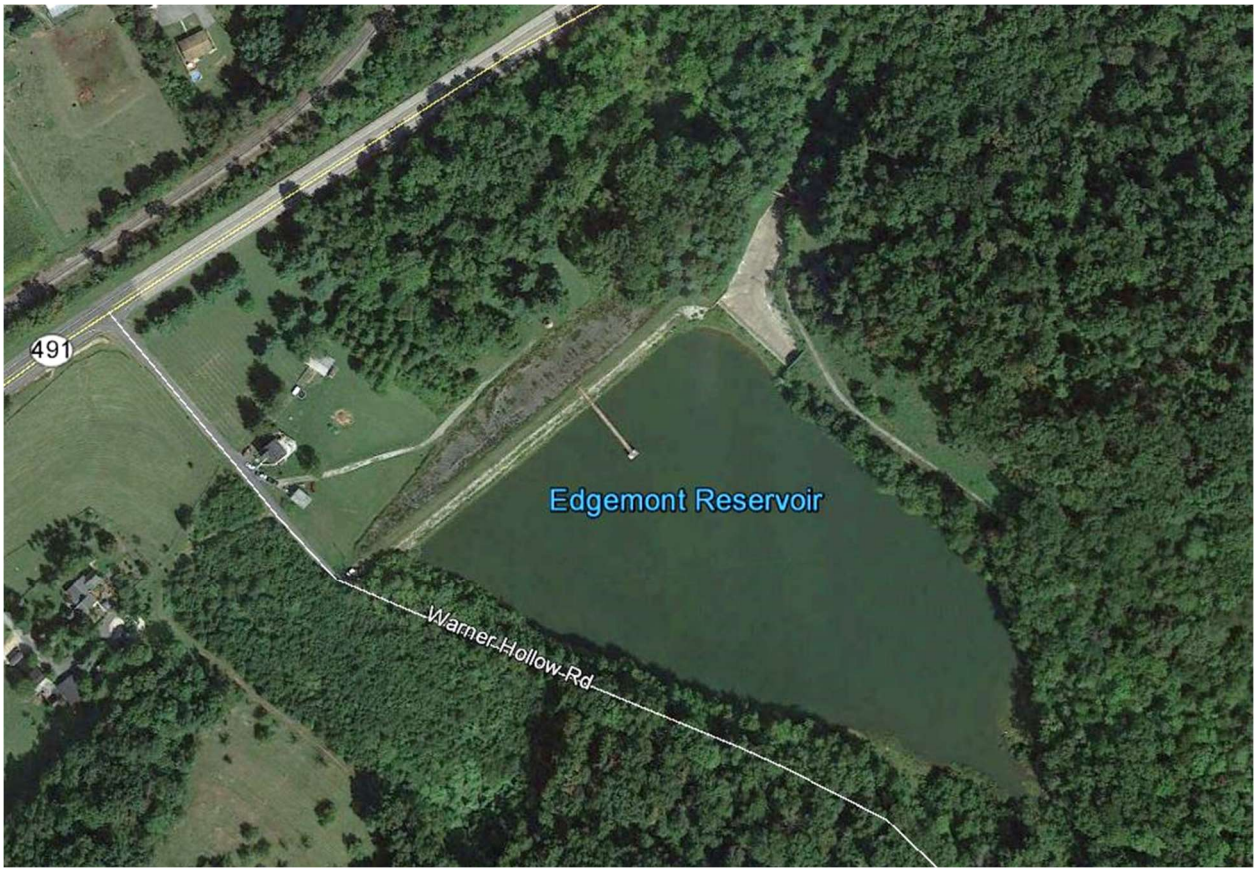
To: John Roche, PE
Maryland Department of the Environment
Dam Safety Program

From: Jeremy Hise, PE
Jeffery Powers, PE
Ann Nunnelley, EIT

cc: Nancy Hausrath, Director of Utilities
Bill Luhn, Water Operations Manager
City of Hagerstown

Edgemont Reservoir – Warner Gap Hollow Dam

Probable Maximum Precipitation Evaluation



30065-014

Background

As part of the Edgemont Reservoir Rehabilitation project Hazen and Sawyer (Hazen) developed a Design Storm Evaluation Report for submittal to the Maryland Department of the Environment (MDE). The dam is a Category I structure and is, therefore, required by The Code of Maryland Regulations (COMAR) to safely pass the Probable Maximum Precipitation (PMP). It was determined from this evaluation that the storm capable of producing the largest inflow to the reservoir is the 72-hour duration PMP developed using *Hydrometeorological Report No. 51, Probable Maximum Precipitation Estimates - United States East of the 105th Meridian* (HMR-51) and *Hydrometeorological Report No. 52, Application of Probable Maximum Precipitation Estimates – United States East of the 105th Meridian* (HMR-52).

The Design Storm Evaluation Report also included a preliminary analysis of the dam's hydraulic capacity, which concluded that the existing spillway cannot safely pass the PMP. As a result, Hazen recommended that the existing spillway be replaced with a higher capacity spillway to improve the safety of the structure and bring it into compliance with MDE requirements. A preliminary spillway design was presented to the City of Hagerstown (City) in March 2019 for review. Given the magnitude of rehabilitation necessary to pass the PMP and potential increases in construction costs, the City requested a meeting with MDE Dam Safety to discuss design constraints.

The MDE Dam Safety meeting took place on April 19, 2019, and several options were discussed regarding how to bring the structure into compliance. It was decided that the 6-hour duration PMP, as opposed to the 72-hour presented in the Design Storm Evaluation Report, is an appropriate design storm for the dam given the short time of concentration for the reservoir's drainage basin. It was also noted that additional PMP analyses based on the recent state-specific Virginia and Pennsylvania PMP studies may result in a sizeable reduction in the peak inflow of the design storm.

In response to the meeting with MDE Dam Safety, Hazen evaluated the 6-hour duration HMR-51/52 distribution PMP, the 6-hour TR-20/TR-60 distribution PMP, the updated Virginia PMP, and the recently-released Pennsylvania PMP for Edgemont Reservoir. This Technical Memorandum (TM) presents the findings of this PMP evaluation with an emphasis on the Virginia and Pennsylvania PMP studies and their applicability to the project site.

Virginia PMP Study Review

In 2014, Virginia passed legislation that authorized a new Virginia PMP Study to be completed by December 2015. In accordance with this regulation, a statewide PMP study was completed under the direction of the Virginia Soil and Water Conservation Board and a Technical Review Board of experts to provide advice and expertise throughout the development of the study. The final report was prepared by Applied Weather Associates, LLC (AWA), the Executive Summary of which is provided in the appendices of this TM.

Due to the nature of the drainage basins along the Virginia state borders, the PMP study incorporates areas extending into the surrounding states including a portion of central Maryland and southcentral Pennsylvania. **Figure 1** shows that the Edgemont Reservoir drainage basin falls well within the boundaries of the Virginia PMP study domain.

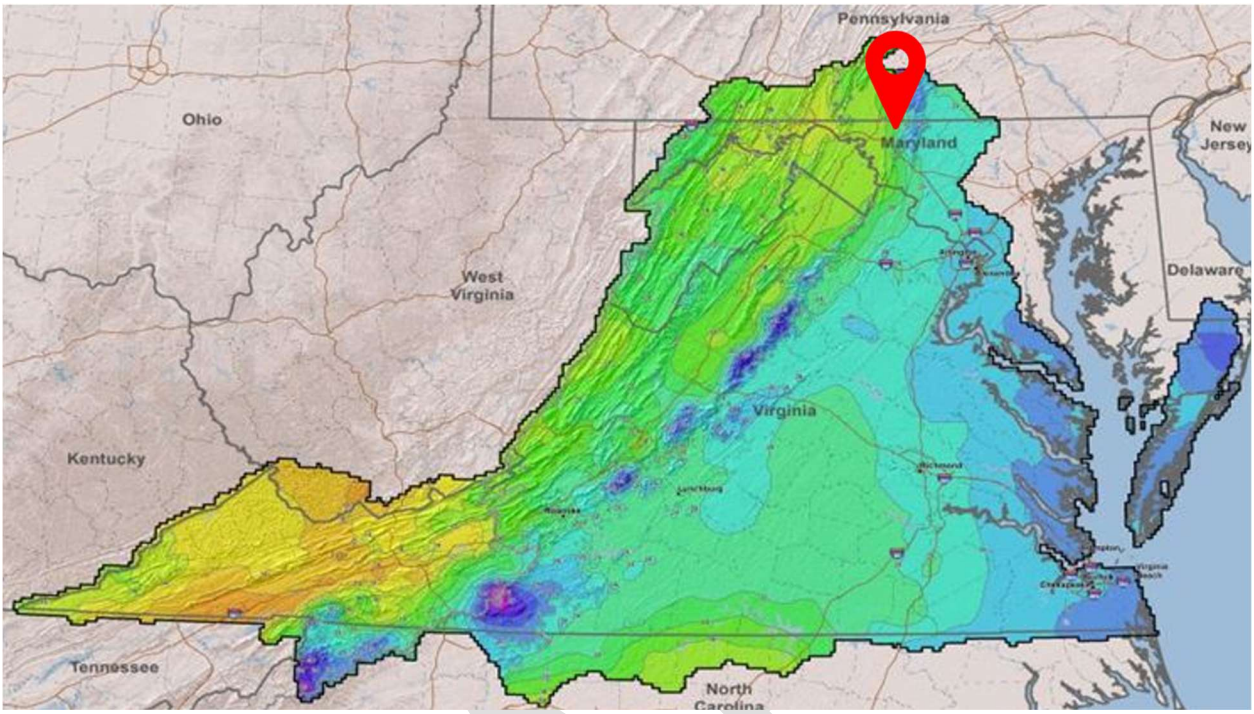


Figure 1: Virginia PMP Study Domain - Edgemont Reservoir Project Site Indicated

The Executive Summary of the Virginia PMP Study states:

> *The storm based approach identified extreme rainfall events that have occurred in regions considered transpoitionable [sic] to locations in Virginia. These are storms that had meteorological and topographical characteristics similar to extreme rainfall storms that could occur over any location within the project domain.*

As part of the Study, a PMP Evaluation Tool and Database were developed to aid in the implementation of the study for applicable projects across the state. The tool is a Python scripted model designed to be run with ArcGIS. PMP values are created by the tool for general, tropical, and local storm types at user-supplied durations. Additionally, a PMP Temporal Distribution Calculation Worksheet was released in October 2018 as a supplement to the tool.

Hazen ran the PMP Tool and completed the Temporal Distribution Calculation Worksheet for the Edgemont Reservoir drainage basin. The results showed that the rainfall depth and inflow volume from the 6-hour HMR-51/52 PMP are very similar to those of the 6-hour Virginia PMP (less than 2% variation). However, due to the differences in temporal precipitation distribution (see **Figure 3**), the Virginia PMP Study shows a reduction in peak inflow to the reservoir of approximately 35% versus the HMR-51/52 distribution and 25% versus the TR-20/TR-60 distribution. If applied, the updated PMP could represent a significant cost savings to the City due to reduction in required spillway capacity.

Pennsylvania PMP Study Review

In 2019, the Pennsylvania Division of Dam Safety published the *Probable Maximum Precipitation Study for Pennsylvania*. This study was also conducted by AWA, which is the same group that prepared the Virginia PMP Study. Similar to Virginia, the study provides gridded PMP values for any drainage basin within Pennsylvania, including regions adjacent to the state that drain into basins within Pennsylvania. The Edgemont Reservoir drainage basin is fully included in the Pennsylvania PMP Study domain (see **Figure 2**).

Figure 2: Pennsylvania PMP Study Domain - Edgemont Reservoir Project Site Indicated

An ArcGIS-compatible PMP Evaluation Tool and Database were also created to accompany the Pennsylvania PMP Study Report, as well as a PMP Distribution Spreadsheet. Hazen applied these tools to the Edgemont Reservoir drainage basin, and the results showed that the rainfall depth and inflow volume from the 6-hour Pennsylvania PMP are approximately 7.5% and 9% less than those of the 6-hour HMR-51/52 PMP, respectively. However, similar to the Virginia PMP, due to the difference in temporal distribution determined by the Pennsylvania PMP study, the peak inflow to the reservoir is approximately 30% less than that resulting from the HMR-51/52 distribution and 20% less than the inflow from the TR-20/TR-60 distribution.

Summary

It is clear from this analysis that temporal distribution of the PMP makes a significant impact on the peak inflow to Edgemont Reservoir. **Figure 3** provides a comparison of the four distributions that were studied in this analysis, which include those from HMR-51/52, TR-20/TR-60, the Virginia PMP Study, and the Pennsylvania PMP Study. Results of the state-specific analyses prepared by AWA reflect the most current practices used for defining PMP, including comprehensive storm analyses procedures, extensive use of geographical information systems (GIS), explicit quantification of orographic effects, updated maximum dew point climatologies for storm maximization and transposition, and an updated understanding of the weather and climate throughout the states. These processes combined with the ArcGIS-based PMP Evaluation Tools and Databases provided temporal distributions that are more specific to the Edgemont Reservoir drainage basin.

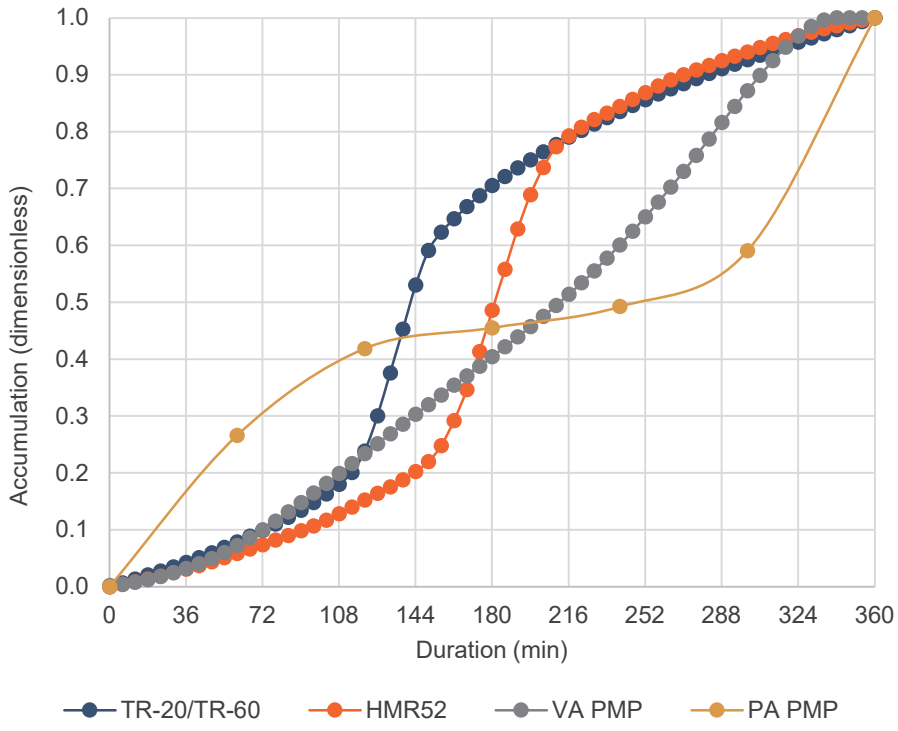


Figure 3: PMP Temporal Distribution Comparison

This graph also demonstrates that there are discrepancies between the results of the Virginia and Pennsylvania PMP Studies. The Virginia PMP Study was accepted in 2016, while the Pennsylvania PMP Study was published and accepted in 2019. Section 13.2 of the *Probable Maximum Precipitation Study for Pennsylvania* explicitly states that "Efforts have been made to be consistent with previous work. However, the PMP depths provided in this study should be considered more reliable in cases where differences occur." **Figure 4** below is taken from the Pennsylvania PMP Study and demonstrates discrepancies in precipitation depths between the Pennsylvania and Virginia PMP studies where the study domains overlap. Since there is a difference in the rainfall depth over the Edgemont Reservoir drainage basin, the Pennsylvania PMP results will supersede those of the Virginia PMP.

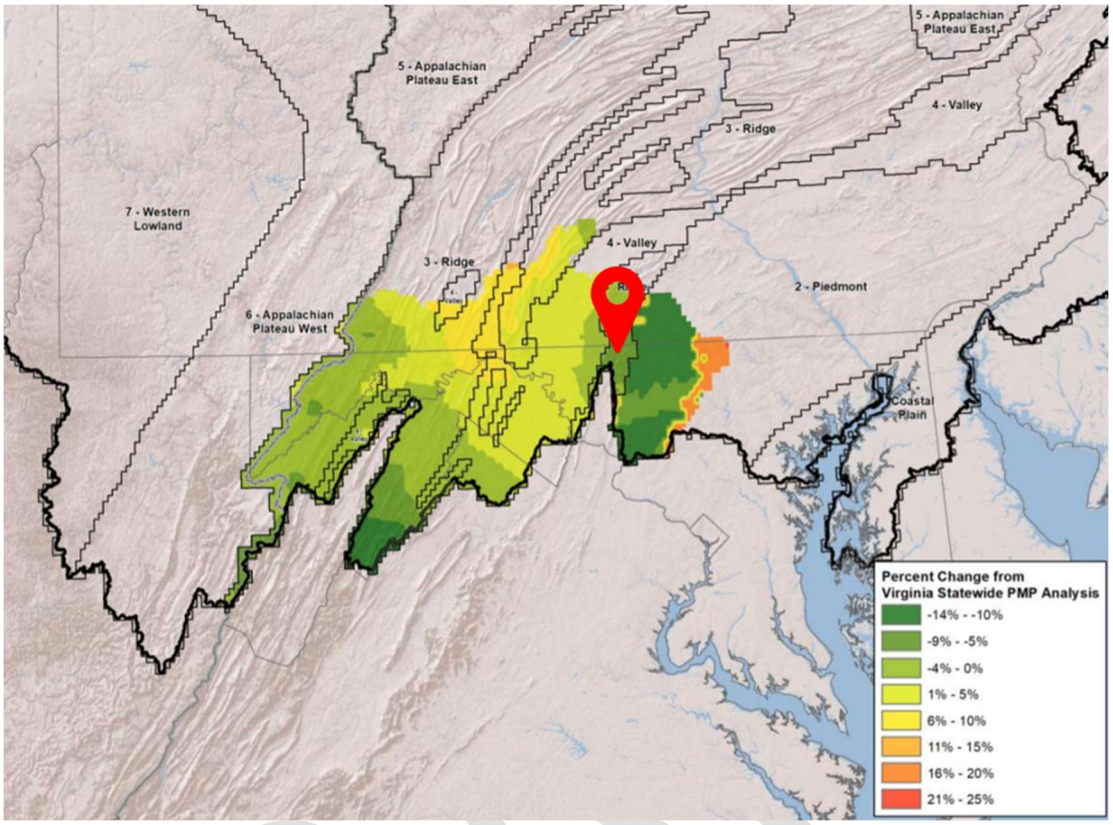


Figure 4: Percent Change in Combined Storm Type 100 Square Mile 6-hour PMP from Virginia and Pennsylvania Statewide PMP Analyses

A summary of the PMP Analysis results are presented in **Table 1**, and detailed information including the Virginia and Pennsylvania PMP calculation worksheets and the HEC-1 Outputs are provided in the appendices of this TM.

Table 1: PMP Analysis Summary

Distribution (100% PMP)	Duration	Rainfall Depth (in)	Peak Inflow (cfs)	Hydrograph Volume (1000 cf)
HMR-51/52	72-hour*	39.83	15,690	188,216
HMR-51/52	6-hour	27.07	14,618	119,781
TR-20/TR-60	6-hour	27.07	12,727	119,781
VA PMP Study	6-hour	26.62	9,571	117,398
PA PMP Study	6-hour	25.02	10,046	109,902

*Presented in Design Storm Evaluation Report

Closing

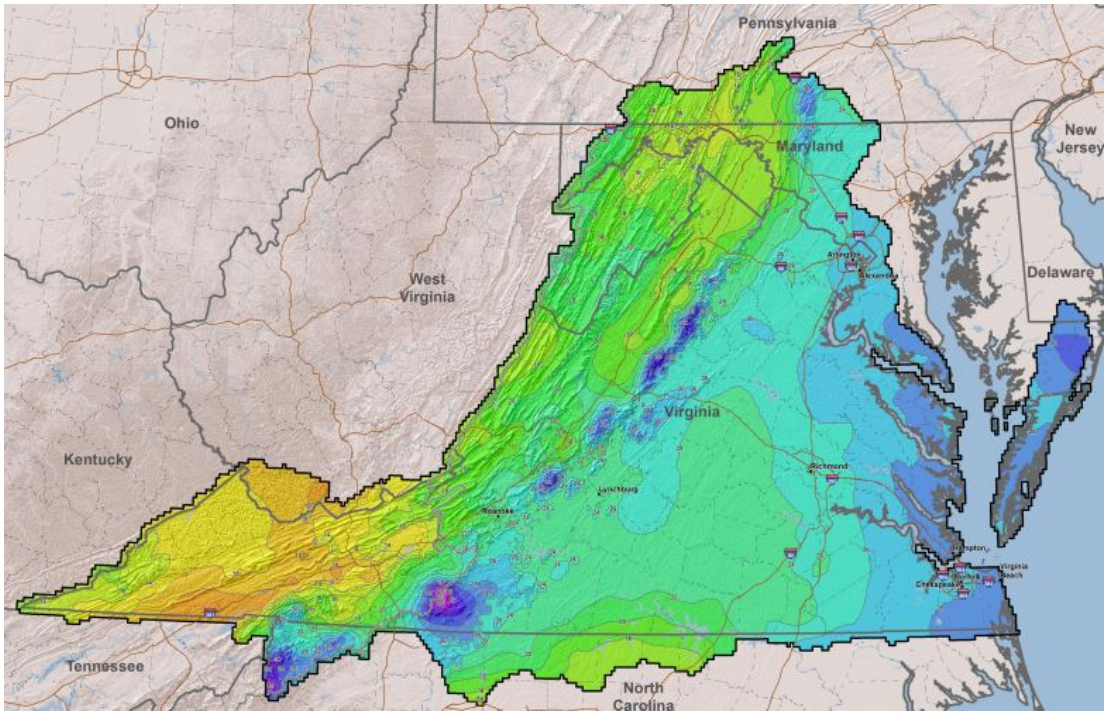
Hazen appreciates the opportunity to present the results of our Virginia and Pennsylvania PMP Evaluations to MDE Dam Safety. Each of these studies utilize a large set of storm data taking into account variations in topography, climate, and storm types and are intended to replace PMP values provided in HMR-52 for the

overall study domains. It is our assessment that, while both the Virginia and Pennsylvania PMP Studies are applicable to the Edgemont Reservoir project since its drainage basin falls within the PMP study domains, the Pennsylvania PMP results supersede previous studies and should be considered for the inflow design storm to Edgemont Reservoir. We look forward discussing these findings and continuing to collaborate on this important City of Hagerstown project.

Appendices:

- Virginia PMP Study Executive Summary
- Virginia PMP Watershed Calculation Worksheet
- Virginia PMP Temporal Distribution Calculation Worksheet
- Pennsylvania PMP Study Executive Summary
- Pennsylvania PMP Evaluation GIS Tool Output
- PMP Distribution Analysis
- HEC-1 Model Output – 6-hour HMR-51/52 Distribution
- HEC-1 Model Output – 6-hour TR-20/TR-60 Distribution
- HEC-1 Model Output – 6-hour Virginia PMP Study Distribution
- HEC-1 Model Output – 6-hour Pennsylvania PMP Study Distribution

Probable Maximum Precipitation Study for Virginia



Prepared for

Virginia Department of Conservation and Recreation

600 East Main Street, 24th Floor, Richmond, VA 23219-2094

(804) 371-6095

www.dcr.virginia.gov

Prepared by

Applied Weather Associates, LLC

PO Box 175, Monument, CO 80132

(719) 488-4311

www.appliedweatherassociates.com

Bill Kappel, Project Manager and Chief Meteorologist
Doug Hultstrand, Senior Hydrometeorologist
Jacob Rodel, Staff GIS Analyst
Geoff Muhlestein, Senior GIS Analyst
Kristi Steinhilber, Staff Meteorologist
Dana McGlone, Staff Meteorologist
Bryon Lawrence, Staff Meteorologist

November 2015

Executive Summary

During the 2014 Virginia General Assembly Session, the legislature passed (House Bill 1006 and Senate Bill 582) and the Governor approved on April 1, 2014 (Chapters 475 and 489 of the 2014 Virginia Acts of Assembly), legislation that authorized a new Virginia Probable Maximum Precipitation Study to be completed by December 1, 2015. The legislation directed "*[t]hat the Department of Conservation and Recreation, on behalf of the Virginia Soil and Water Conservation Board, shall utilize a storm-based approach in order to derive the Probable Maximum Precipitation (PMP) for locations within or affecting the Commonwealth. The PMP revisions shall be based on accepted storm evaluation techniques and take into account such factors as basin characteristics that affect the occurrence and location of storms and precipitation, regional and basin terrain influences, available atmospheric moisture, and seasonality of storm types. The results shall be considered by the Virginia Soil and Water Conservation Board in its decision to authorize the use of the updated PMP values in Probable Maximum Flood calculations, thus replacing the current PMP values.*"

In accordance with this legislative direction, Applied Weather Associates (AWA), on behalf of the Virginia Soil and Water Conservation Board, completed a statewide Probable Maximum Precipitation (PMP) study for Virginia. A Technical Review Board of experts, with additional ad-hoc participation by cooperating state and federal agencies, was established by the Department to provide advice and expertise throughout the development of the study. The Technical Review Board met to review and discuss study progress and results in July and November of 2014 and April and October of 2015 and accepted AWA's estimates for probable maximum precipitation (PMP) for Virginia.

This study produced gridded PMP values for the project domain at a spatial resolution of approximately 2.5-square miles. Variations in topography, climate and storm types across the state were explicitly taken into account. A large set of storm data were analyzed for use in developing the PMP values. These values replace those provided in Hydrometeorological Reports (HMRs) 40, 51, 52, and 56 (1965, 1978, 1982, and 1986 respectively). The full PMP values for regions east of the Appalachian crest are valid from June through October. For areas west of the Appalachian crest, the seasonality is similar, except that 100% of PMP from the general storm type can occur from September 15 through May 15 and the local storm can occur as early as April 15. Results of this analysis reflects the most current practices used for defining PMP, including comprehensive storm analyses procedures, extensive use of geographical information systems (GIS), explicit quantification of orographic effects, updated maximum dew point climatologies for storm maximization and transposition, and an updated understanding of the weather and climate throughout the state.

The approach used in this study followed the same philosophy used in the numerous site-specific, statewide, and regional PMP studies that AWA has completed in the last fifteen years. This was the storm-based approach and it follows the same general procedures used by the National Weather Service (NWS) in the development of the HMRs. The World Meteorological

Organization (WMO) Manual on Estimation of PMP recommends this same approach. The storm based approach identified extreme rainfall events that have occurred in regions considered transpositionable to locations in Virginia. These are storms that had meteorological and topographical characteristics similar to extreme rainfall storms that could occur over any location within the project domain. Detailed storm analyses were completed for the largest of these rainfall events.

The data, assumptions, and analysis techniques used in this study have been reviewed and accepted by the Technical Review Board and the Virginia Department of Conservation and Recreation. Although this study produced deterministic values, it must be recognized that there is some subjectivity associated with the PMP development procedures. Examples of decisions where scientific judgment was involved include the determination of storm maximization factors and storm transposition limits. For areas where uncertainties in data analysis results were recognized, conservative assumptions were applied unless sufficient data existed to make a more informed decision. All data and information supporting decisions in the PMP development process have been documented so that results can be reproduced and verified.

Sixty-six rainfall events were identified as having similar characteristics to rainfall that could potentially control PMP values at various locations within the state. Several storm events had multiple Depth-Area-Duration (DAD) zones (also referred to as SPAS DAD zones) that were used in the PMP determination process. A total of 78 storm DAD centers were used in the development of PMP for the state. This includes 31 tropical storm rainfall centers, 25 general storm rainfall centers, and 23 local storm rainfall centers. Note, the storm centered near Big Meadows, VA during October 1942 exhibited characteristics of both local and general storm types and was therefore evaluated as part of both the general and local storm PMP determination process.

Seventy-eight individual storm centers were analyzed using the Storm Precipitation Analysis System (SPAS), which produced several standard products, including DAD values, storm center mass curves, and total storm isohyetal patterns. National Weather Service (NWS) Next Generation Weather Radar (NEXRAD) data were used in storm analyses when available (generally for storms which occurred after the mid-1990's).

Standard procedures were applied for in-place maximization and moisture transposition adjustments (e.g. HMR 51 Section 2.3 and Section 2.4). New techniques and new datasets were used in other procedures to increase accuracy and reliability when justified by utilizing advancements in technology and meteorological understanding, while adhering to the basic approach used in the HMRs and in the WMO Manual. Updated precipitation frequency analyses data available from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 were used for this study. These were used to calculate the Orographic Transposition Factors (OTFs) for each storm. The OTF procedure provided explicit evaluations of the effects of terrain on rainfall and corrected for the lack of analysis in the "stippled' region of HMR 51. The OTF procedure, through its correlation process, provided quantifiable and reproducible analyses of the effects of terrain on rainfall. Results of these three factors (in-place maximization, moisture transposition, and orographic transposition) were applied for each storm at each of the grid points for each of the area sizes and durations used in this study to define the PMP values.

Maximization factors were computed for each of the analyzed storm events using updated dew point and sea surface temperature climatologies representing the maximum moisture equivalent to the 100-year recurrence interval for dew points or +2 sigma for sea surface temperatures that could have been associated with each rainfall event. The dew point climatology included the maximum average 6-, 12-, and 24-hour 100-year return frequency values, while the SST climatology provided the +2 sigma values. The most appropriate duration consistent with the duration of the storm rainfall was used. HYSPLIT model trajectories and NWS weather maps were used as guidance in identifying the storm representative moisture source region.

To store, analyze, and produce results from the large datasets developed in the study, the PMP calculation information was stored and analyzed in individual Excel spreadsheets and a GIS database. This combination of Excel and GIS was used to query, calculate, and derive PMP values for each grid point for each duration for each storm type. The database allowed PMP to be calculated at any area size and/or duration available in the underlying SPAS data.

When compared to previous PMP values provided in HMRs 40, 51, 52, and 56, the updated values from this study resulted in a wide range of reductions at most area sizes and durations, with some regions recognizing minor localized increases. PMP values are highest near the coast and along the Blue Ridge. These regions have exhibited past extreme rainfall accumulations that are the result of both moisture availability and topographic enhancement. Regions along and near the coast are also affected by coastal convergence processes which act to enhance lift and provide an additional mechanism for enhanced rainfall production versus other locations in the study domain. Minimum values are seen in the most protected interior valleys and in the transition region of the Piedmont between the coast to the Blue Ridge. This is expected because of the lack of decrease in moisture and reduced or negative orographic effects relative to other regions.

Commonwealth-wide it was found that on average, PMP values for local storms showed a 16% reduction at 6-hour 10-square miles and a 21% reduction at 12-hour 10-square miles. For the longer durations, larger area sizes, Commonwealth-wide reductions were 30% at 24-hour 200-square miles and 1000-square miles, and 25% at 72-hours 200-square miles and 1000-square miles. Tables E.1-E.3 provide the average percent difference (negative is a reduction) from HMR 51 across each of the transposition regions analyzed. After adoption of the study by the Virginia Soil and Water Conservation Board, and upon the effective date of associated regulations, impounding structure owners will have the opportunity to utilize this new data to review their spillway design capacity needs and determine rehabilitation requirements for their structures.

Table E.1 Local storm PMP percent difference from HMR 51 PMP at 6-hour and 12-hour 10-square miles. Grayed out rows represent regions where either tropical or general storm PMP values were controlling.

Local Storm 10 Sq Mi Average PMP						
Transposition Zone	HMR 51 6hr	PMP 6hr	Change 6hr	HMR 51 12hr	PMP 12hr	Change 12hr
1 - Interior Valley	27.6	19.7	-28.7%	32.2	21.2	-34.3%
2 - Cumberland Plateau	28.7	19.2	-33.2%	33.8	21.5	-36.6%
3 - Great Valley	28.9	17.1	-40.7%	34.1	19.2	-43.9%
4 - Blue Ridge West	28.9	19.7	-31.8%	34.1	22.1	-35.5%
5 - Blue Ridge East	27.8	19.8	-28.8%	32.5	21.3	-34.5%
6 - Piedmont	28.5	26.1	-8.5%	33.7	29.0	-13.9%
7 - Coastal Plain	28.6	29.6	3.7%	33.8	33.1	-2.1%
Statewide Domain	28.4	23.8	-16.2%	33.4	26.3	-21.4%

Table E.2 Tropical storm PMP percent difference from HMR 51 PMP at 24-hour and 72-hour 200- and 1000-square miles. Grayed out rows represent regions where either tropical or general storm PMP values were controlling.

Tropical Storm 200 Sq Mi Average PMP						
Transposition Zone	HMR 51 24hr	PMP 24hr	Change 24hr	HMR 51 72hr	PMP 72hr	Change 72hr
1 - Interior Valley	26.5	16.7	-37.1%	31.5	19.3	-38.8%
2 - Cumberland Plateau	27.4	12.3	-54.9%	33.1	16.0	-51.7%
3 - Great Valley	27.8	10.8	-61.1%	33.6	14.0	-58.4%
4 - Blue Ridge West	28.1	19.2	-31.9%	33.8	21.0	-38.2%
5 - Blue Ridge East	26.7	20.0	-25.0%	31.7	22.1	-30.4%
6 - Piedmont	28.4	20.3	-28.5%	33.8	25.9	-23.3%
7 - Coastal Plain	29.3	22.9	-21.6%	34.7	29.1	-16.1%
Statewide Domain	28.0	19.5	-30.3%	33.3	23.8	-28.7%

Tropical Storm 1000 Sq Mi Average PMP						
Transposition Zone	HMR 51 24hr	PMP 24hr	Change 24hr	HMR 51 72hr	PMP 72hr	Change 72hr
1 - Interior Valley	21.2	12.0	-43.5%	25.0	14.8	-41.1%
2 - Cumberland Plateau	22.2	10.8	-51.2%	26.5	14.3	-46.0%
3 - Great Valley	22.8	9.5	-58.1%	27.1	12.5	-53.8%
4 - Blue Ridge West	23.1	13.9	-40.1%	27.3	18.0	-34.4%
5 - Blue Ridge East	21.3	14.5	-32.2%	25.2	18.3	-27.8%
6 - Piedmont	23.4	17.5	-24.7%	27.5	23.1	-15.5%
7 - Coastal Plain	24.3	19.7	-18.6%	28.6	26.1	-8.6%
Statewide Domain	22.9	15.9	-30.5%	27.0	20.8	-23.3%

Table E.3 General storm PMP percent difference from HMR 51 PMP at 24-hour and 72-hour 200- and 1000-square miles. Grayed out rows represent regions where either tropical or general storm PMP values were controlling.

General Storm 200 Sq Mi Average PMP						
Transposition Zone	HMR 51 24hr	PMP 24hr	Change 24hr	HMR 51 72hr	PMP 72hr	Change 72hr
1 - Interior Valley	26.5	14.3	-46.1%	31.5	14.9	-52.6%
2 - Cumberland Plateau	27.4	16.0	-41.5%	33.1	17.9	-46.0%
3 - Great Valley	27.8	13.7	-50.6%	33.6	16.1	-52.2%
4 - Blue Ridge West	28.1	16.2	-42.4%	33.8	18.9	-44.3%
5 - Blue Ridge East	26.7	14.9	-44.0%	31.7	15.8	-50.2%
6 - Piedmont	28.4	17.9	-37.0%	33.8	19.3	-42.8%
7 - Coastal Plain	29.3	17.6	-39.9%	34.7	21.3	-38.7%
Statewide Domain	**28.0**	**16.6**	**-40.9%**	**33.3**	**18.4**	**-44.9%**

General Storm 1000 Sq Mi Average PMP						
Transposition Zone	HMR 51 24hr	PMP 24hr	Change 24hr	HMR 51 72hr	PMP 72hr	Change 72hr
1 - Interior Valley	21.2	12.5	-41.1%	25.0	14.2	-43.2%
2 - Cumberland Plateau	22.2	13.3	-40.0%	26.5	14.9	-44.0%
3 - Great Valley	22.8	11.4	-50.0%	27.1	14.3	-47.1%
4 - Blue Ridge West	23.1	13.7	-40.9%	27.3	17.4	-36.8%
5 - Blue Ridge East	21.3	13.1	-38.9%	25.2	14.9	-41.0%
6 - Piedmont	23.4	15.6	-32.9%	27.5	17.8	-35.1%
7 - Coastal Plain	24.3	15.7	-35.3%	28.6	18.3	-35.9%
Statewide Domain	**22.9**	**14.4**	**-36.9%**	**27.0**	**16.7**	**-38.2%**

Note : This sheet should be used in consultation with the *Guidance Document on New Probable Maximum Precipitation (PMP) Implementation* (March 23, 2016) and the *Certification Form: Review of New Probable Maximum Precipitation Values (Effective March 23, 2016) Using the PMP Evaluation Tool* .

Virginia 2015 PMP Watershed Calculation Worksheet (SEPTEMBER 2016 version)

Dam: Edgemont Reservoir Dam (NID MD00006)
Company: Hazen and Sawyer
Engineer: Ann Nunnelley, EIT

Date: 4/23/2019

NOTES

A. PLEASE ENSURE ALL RELEVANT SECTIONS ARE FILLED OUT (PLEASE SCROLL DOWN THROUGH ENTIRE WORKSHEET)
B. PLEASE ENSURE CELLS WITH EMBEDDED CALCULATIONS (CELLS WITH NO BLUE COLOR) ARE REFERENCING THE CORRECT NUMBERS. WHEN ADDING OR DELETING ROWS FOR GRID POINTS, CELLS WITH EMBEDDED CALCULATIONS MAY BE REFERENCING THE WRONG INFORMATION. PLEASE CHECK CALCULATION CELLS!
C. PLEASE ENSURE THAT ALL SUPPORTING DOCUMENTATION AND CALCULATIONS REQUIRED FOR THIS SUMMARY SHEET ARE INCLUDED IN SUBMITTAL (ESPECIALLY INFORMATION FOR SDF CALCULATIONS IN SECTIONS E AND F).

Example Cell	**Cells Requiring User Input are Highlighted in Blue**

Calculation Section A - Drainage Area to Dam

Information obtained from GIS shapefile / watershed boundary analysis or previously completed Dam Failure Analysis

Drainage Area	1504.06	2.350
	Acres	Sq. Miles

Calculation Section B - Original HMR 51/52 Values

Information obtained from previously computed HMR 51/52 program (previously completed Dam Failure Analysis)

6-hr HMR 51/52 PMP Value	27.1	in / 6-hr
12-hr HMR 51/52 PMP Value	31.3	in / 12-hr
24-hr HMR 51/52 PMP Value	34.8	in / 24-hr

Calculation Section C - New 2015 PMP Values

Information obtained from new 2015 PMP GIS Evaluation Tool (see the PMP section of the DCR Dam Safety website for more details)

General Storm Events

Grid Pts	Point X	Point Y	Zone	6 Hr. PMP	12 Hr. PMP	24 Hr. PMP	Controlling 6 Hr. Storm	Controlling 12 Hr. Storm	Controlling 24 Hr. Storm
1	-77.55	39.625	5	16.0	18.6	20.0	SPAS_1339_1	SPAS_1339_1	SPAS_1201_1
2	-77.525	39.625	5	16.0	18.6	20.6	SPAS_1339_1	SPAS_1339_1	SPAS_1201_1
3	-77.55	39.65	5	16.0	18.6	19.9	SPAS_1339_1	SPAS_1339_1	SPAS_1201_1
4	-77.525	39.65	5	16.0	18.6	20.6	SPAS_1339_1	SPAS_1339_1	SPAS_1201_1
5	-77.55	39.675	5	15.9	18.4	19.5	SPAS_1339_1	SPAS_1339_1	SPAS_1201_1

Average PMP Values:	15.9800	18.5600	20.1200

Local Storm Events

Grid Pts	Point X	Point Y	Zone	6 Hr. PMP	12 Hr. PMP	24 Hr. PMP	Controlling 6 Hr. Storm	Controlling 12 Hr. Storm	Controlling 24 Hr. Storm
1	-77.55	39.625	5	26.5	28.9	29.9	SPAS_1406_1	SPAS_1406_1	SPAS_1406_1
2	-77.525	39.625	5	27.5	29.9	30.9	SPAS_1406_1	SPAS_1406_1	SPAS_1406_1
3	-77.55	39.65	5	26.2	28.5	29.5	SPAS_1406_1	SPAS_1406_1	SPAS_1406_1
4	-77.525	39.65	5	27.3	29.7	30.7	SPAS_1406_1	SPAS_1406_1	SPAS_1406_1
5	-77.55	39.675	5	25.6	27.8	28.8	SPAS_1406_1	SPAS_1406_1	SPAS_1406_1

Average PMP Values:	26.6200	28.9600	29.9600

Tropical Storm Events

Grid Pts	Point X	Point Y	Zone	6 Hr. PMP	12 Hr. PMP	24 Hr. PMP	Controlling 6 Hr. Storm	Controlling 12 Hr. Storm	Controlling 24 Hr. Storm
1	-77.55	39.625	5	20.00	30.7	30.7	SPAS_1491_1	SPAS_1491_1	SPAS_1491_1
2	-77.525	39.625	5	20.7	31.7	31.7	SPAS_1491_1	SPAS_1491_1	SPAS_1491_1
3	-77.55	39.65	5	19.9	30.5	30.5	SPAS_1491_1	SPAS_1491_1	SPAS_1491_1
4	-77.525	39.65	5	20.7	31.7	31.7	SPAS_1491_1	SPAS_1491_1	SPAS_1491_1
5	-77.55	39.675	5	19.5	29.9	29.9	SPAS_1491_1	SPAS_1491_1	SPAS_1491_1

Average PMP Values:	20.1600	30.9000	30.9000

Governing PMP Values from Storm Events

	6 Hr. PMP	12 Hr. PMP	24 Hr. PMP
Governing PMP Values for Watershed	**26.6200**	**30.9000**	**30.9000**

Calculation Section D - Comparison Calculations - Original HMR 51/52 Values vs. New 2015 PMP Values

Information for these calculations obtained from data provided in this spreadsheet. Section provides comparison between HMR 51/52 rainfall values and new 2015 PMP rainfall values. Please review options presented below and DCR Dam Safety PMP Guidance Documentation to determine if SDF calculations are required (next section).

Storm Duration, hrs.	HMR 51/52 Value, in/hr	Governing 2015 PMP Value, in/hr	Comparison	Percent Difference, %
6	27.068	26.6	**-0.45**	-1.66%
12	31.307	30.9	**-0.41**	-1.30%
24	34.791	30.9	**-3.89**	-11.18%

Section Completion Options

Option A - The Dam in question has no previously completed (or approved) Inundation Study and will only be utilizing the Governing 2015 PMP values for the new Dam Failure Analysis. Calculation Section E and Calculation Section F are not required as the SDF for the Dam in question will be calculated from the new Dam Failure Analysis. This option only applies to Dams with no previously completed (or approved) Inundation Study on file with DCR Dam Safety.

Option B - All three of the new Governing 2015 PMP values decreased when compared to the previously completed HMR 51/52 values (negative values for all three storm durations in the comparison column above). At this time, revisions to the existing Inundation Maps / EAPs for the Dam in question are optional and not generally required [Please refer to the *Guidance Document on New Probable Maximum Precipitation (PMP) Implementation* for further details, restrictions, and exceptions]. Please fill out information below in Calculation Section E Only. Calculation Section F is not required for this option.

Option C - One or two of the new Governing 2015 PMP values increased when compared to the previously completed HMR 51/52 values (positive values for one or two storm durations in the comparison column above). At this time, revisions to the existing Inundation Maps / EAPs for the Dam in question may be required depending on further analysis of the Dam in question [Please refer to the *Guidance Document on New Probable Maximum Precipitation (PMP) Implementation* for further details, restrictions, and exceptions]. Please fill out information below in Calculation Section E and Calculation Section F as both are required. It must be determined if either of these new increased PMP values have become the controlling storm for the basin in question.

Option D - All of the new Governing 2015 PMP values increased when compared to the previously completed HMR 51/52 values (positive values for all three storm durations in the comparison column above). At this time revisions to the existing Inundation Maps / EAP's for the Dam in question will be required for the Dam in question [Please refer to the *Guidance Document on New Probable Maximum Precipitation (PMP) Implementation* for further details, restrictions, and exceptions]. Please fill out information below in Calculation Section E and Calculation Section F as both are required.

Calculation Section E - Current Flow and SDF for Dam in Question

Information for this calculation section obtained from previously completed Dam Failure Analysis hydrology calculations (HEC-1 or HEC-HMS). Section provides existing controlling storm for Dam in question, existing controlling flow (flow to Dam) from controlling storm for Dam in question, flow existing Dam in question can pass without overtopping, storm event (SDF) existing Dam in question can pass without overtopping, and storm event (SDF) existing Dam in question must pass per Regulations.

Current controlling storm duration for Dam (6, 12, or 24):	TBD	hour
PMF Flow TO existing Dam during controlling storm duration	TBD	cfs
Flow existing Dam can pass without overtopping	TBD	cfs
Storm event (SDF) existing Dam can pass without overtopping (calc)	TBD	PMF storm
Storm event (SDF) existing Dam must pass per State DS Regulations	1.00 PMP	storm

Calculation Section F - Revised Flow and SDF Calculations for Dam in Question

Information for this calculation section obtained from Calculation Section E and revised Dam Failure Analysis hydrology calculations (HEC-1 or HEC-HMS) (Please see DCR Dam Safety PMP Guidance Document). Section provides information on the revised controlling 6-hr, 12-hr, or 24-hr storm duration (if revisions needed), revised controlling storm for Dam in question (or previous controlling storm if no changes found), revised controlling flow (flow to Dam) from controlling storm for Dam in question, flow existing Dam in question can pass without overtopping (information from Calculation Section E), revised storm event (SDF) existing Dam in question can pass without overtopping, and storm event (SDF) existing Dam in question must pass per Regulations (information from Calculation Section E).

Did controlling storm duration for the Dam change based on revised flow / SDF data?	TBD	yes or no
Controlling storm duration for Dam based on Revised Data (6, 12, or 24):	TBD	hour
Revised PMF Flow TO existing Dam during revised controlling storm duration	TBD	cfs
Flow existing Dam can pass without overtopping (From Calculation Section E)	TBD	cfs
Revised Storm event (SDF) existing Dam can pass without overtopping (calc)	TBD	PMF storm
Storm event (SDF) existing Dam must pass per State DS Regulations	1.00 PMP	storm
Based on the revised flow / SDF values, can the Dam in question now pass the required SDF per State DS Regulations without overtopping?	TBD	yes or no

Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Mgmt.

600 East Main Street, 24th Floor
Richmond, VA 23219
Main Number: (804) 371-6095

This sheet should be used in consultation with VA PMP Temporal Distribution Training Document, Guidance Doc. on Dam Break Inundation Zone Modeling & Mapping Procedures (current version), 2018 VA PMP Temporal Distribution Analysis (Effective June 28, 2018), and VA 2015 PMP Watershed Calculations Worksheet (current version) in conjunction with the PMP Evaluation Tool.

VA 2018 PMP Temporal Distribution Calculation Worksheet (Aug. 2018 Ver.)

Date:	04/23/19
Dam:	Edgemont Reservoir Dam (NID MD00006)
Dam Location:	Washington County, MD
Company:	Hazen and Sawyer
Engineer:	Ann Nunnelley, EIT

Cells Requiring User Input / Selection are Highlighted in Blue
Example Cell

Calculation Section A - PMP Values from VA 2015 PMP Watershed Calculation Worksheet

Data for this section should be obtained from Section C of the VA 2015 PMP Watershed Calculations Worksheet (current version)

Average PMP Values by Storm Duration as Calculated through Virginia PMP Worksheet

		6-Hour PMP	12-Hour PMP	24-Hour PMP
GENERAL STORM EVENTS:	Average PMP Values	16.0	18.6	20.1
LOCAL STORM EVENTS:	Average PMP Values	26.6	29.0	30.0
TROPICAL STORM EVENTS:	Average PMP Values	20.2	30.9	30.9

Governing PMP Values as Calculated through Virginia PMP Worksheet

	Governing 6 Hr. PMP	Governing 12 Hr. PMP	Governing 24 Hr. PMP
Governing PMP Values for Watershed	**26.6**	**30.9**	**30.9**
Governing Storm Type (General, Local, or Tropical)	Local	Tropical	Tropical

Calculation Section B - Required PMP Input for Temporal Distribution Curve Calculations

This section is for internal calculation purposes only & will be auto-filled with information from Calculation Section A of this worksheet.

Duration (hr.)	General PMP (in)	Local PMP (in)	Tropical PMP (in)
6	**15.98**	**26.62**	**20.16**
12	**18.56**	**28.96**	**30.90**
24	**20.12**	**29.96**	**30.90**

Calculation Section C - Required OUTPUT Information for Temporal Distribution Curve

Data for this section should be obtained from Dam's physical location (East / West of drainage divide per Map Tab) & curve tabs located within worksheet. User shall evaluate PMP values to determine which value is controlling in order to choose correct temporal distribution curve. User shall provide controlling curves utilized in dropdown cells below. Not all temporal distribution curves provided in this worksheet will be utilized. It is up to the user to determine which curves are applicable for their Dam.

Dam Location (State Drainage Perspective):	**East**
6-Hour Temporal Distribution Curve Utilized:	**6-Hour EAST Local Curve**
12-Hour Temporal Distribution Curve Utilized:	**12-Hour EAST Tropical Curve**
24-Hour Temporal Distribution Curve Utilized:	**24-Hour EAST Tropical Curve (B Distribution)**

Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Mgmt.

600 East Main Street, 24th Floor
Richmond, VA 23219
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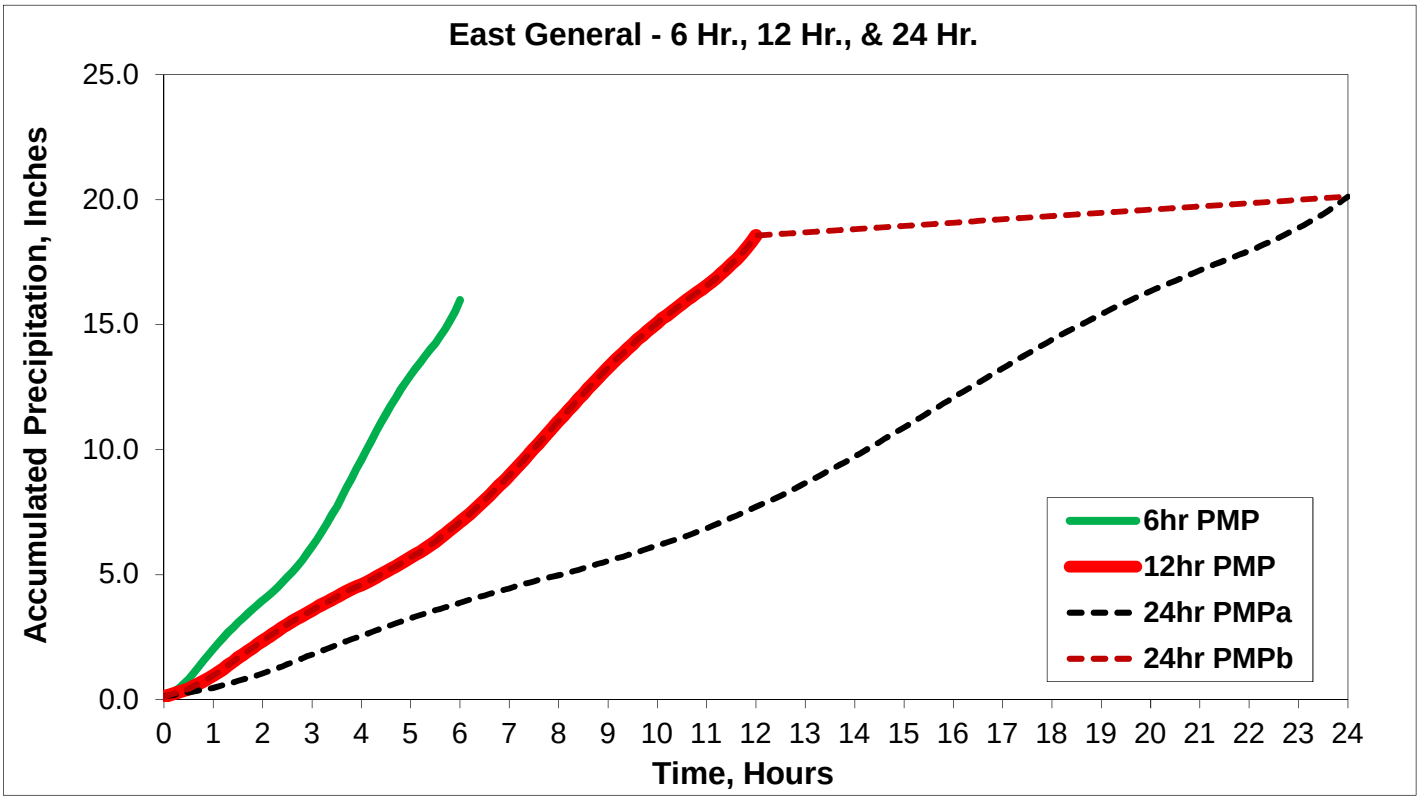
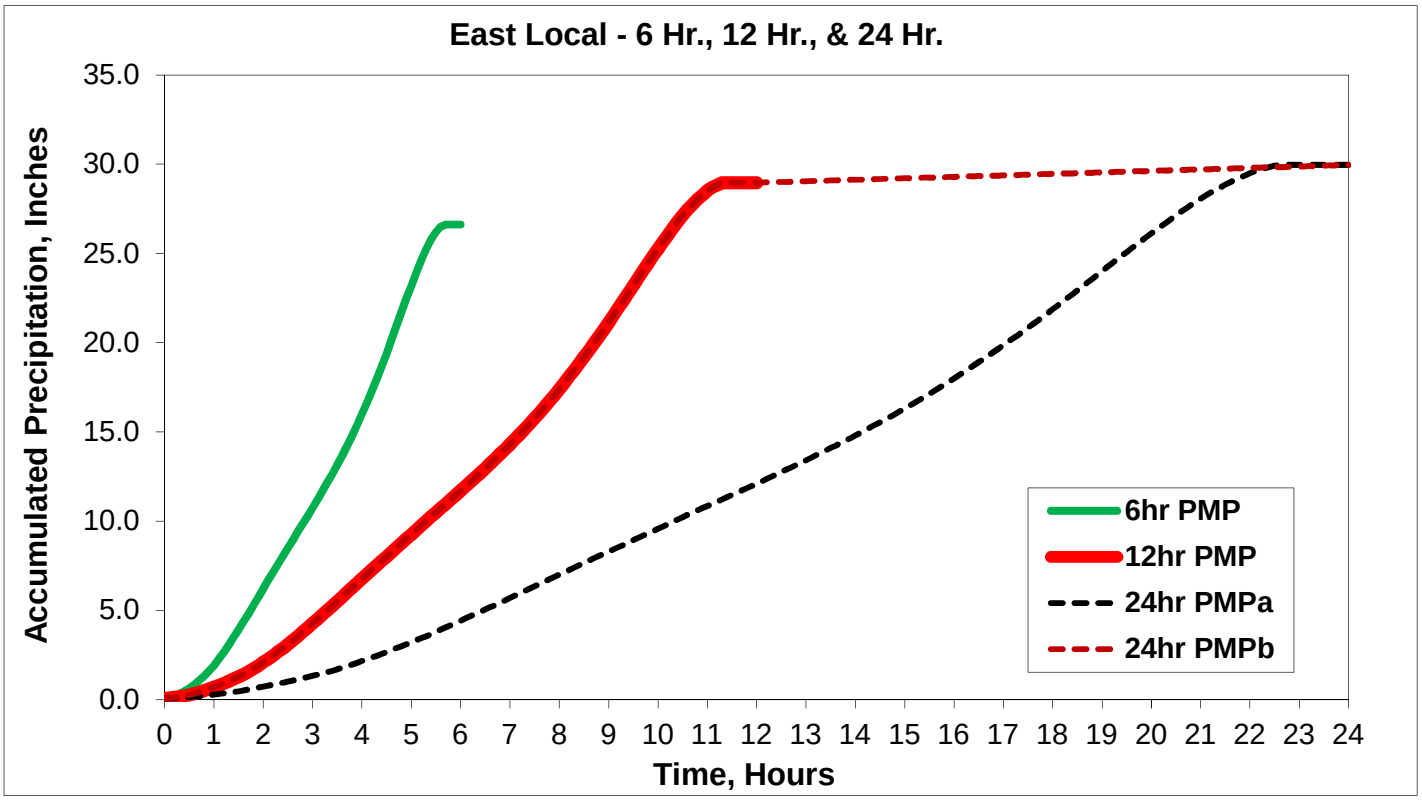
Calculation Section D - OUTPUT Information for Temporal Distribution Curve





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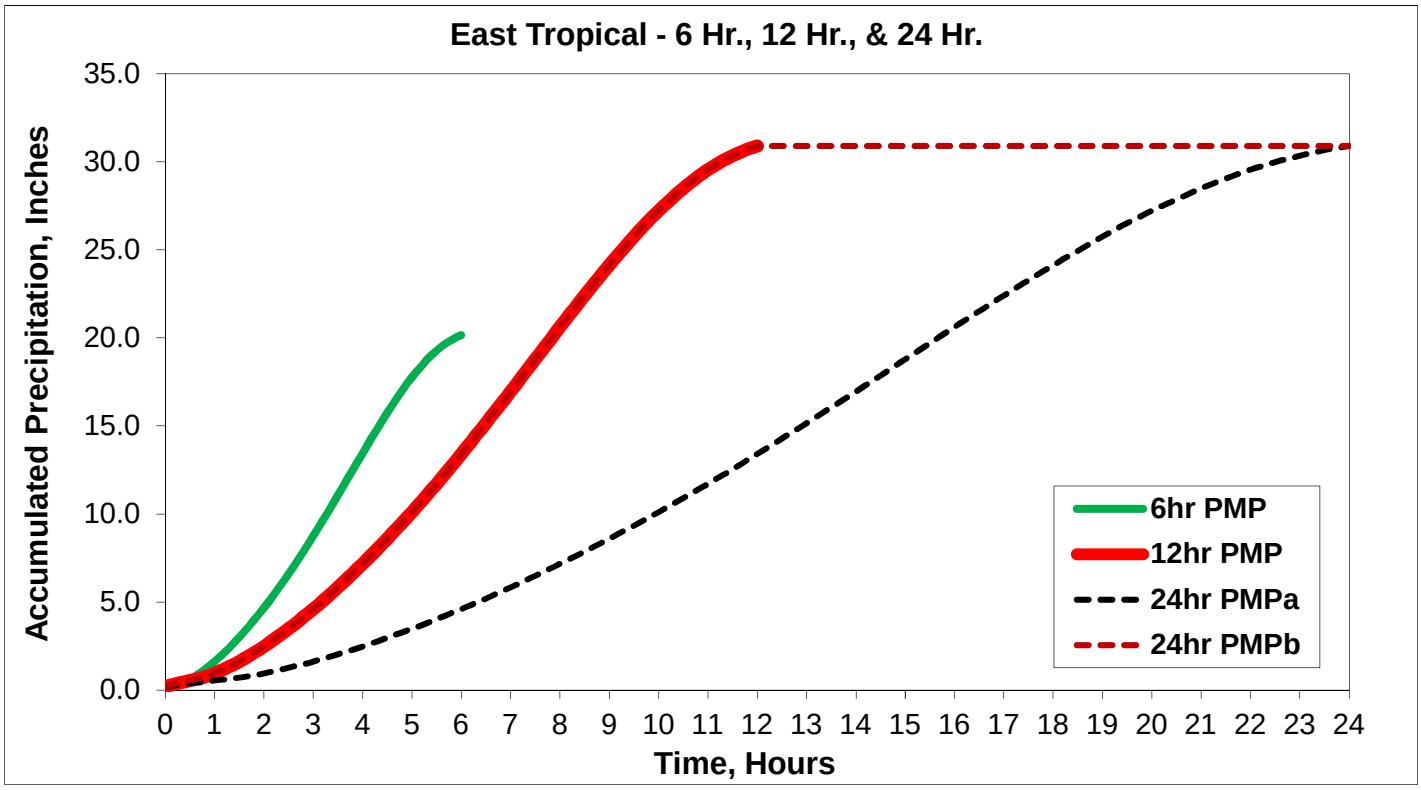
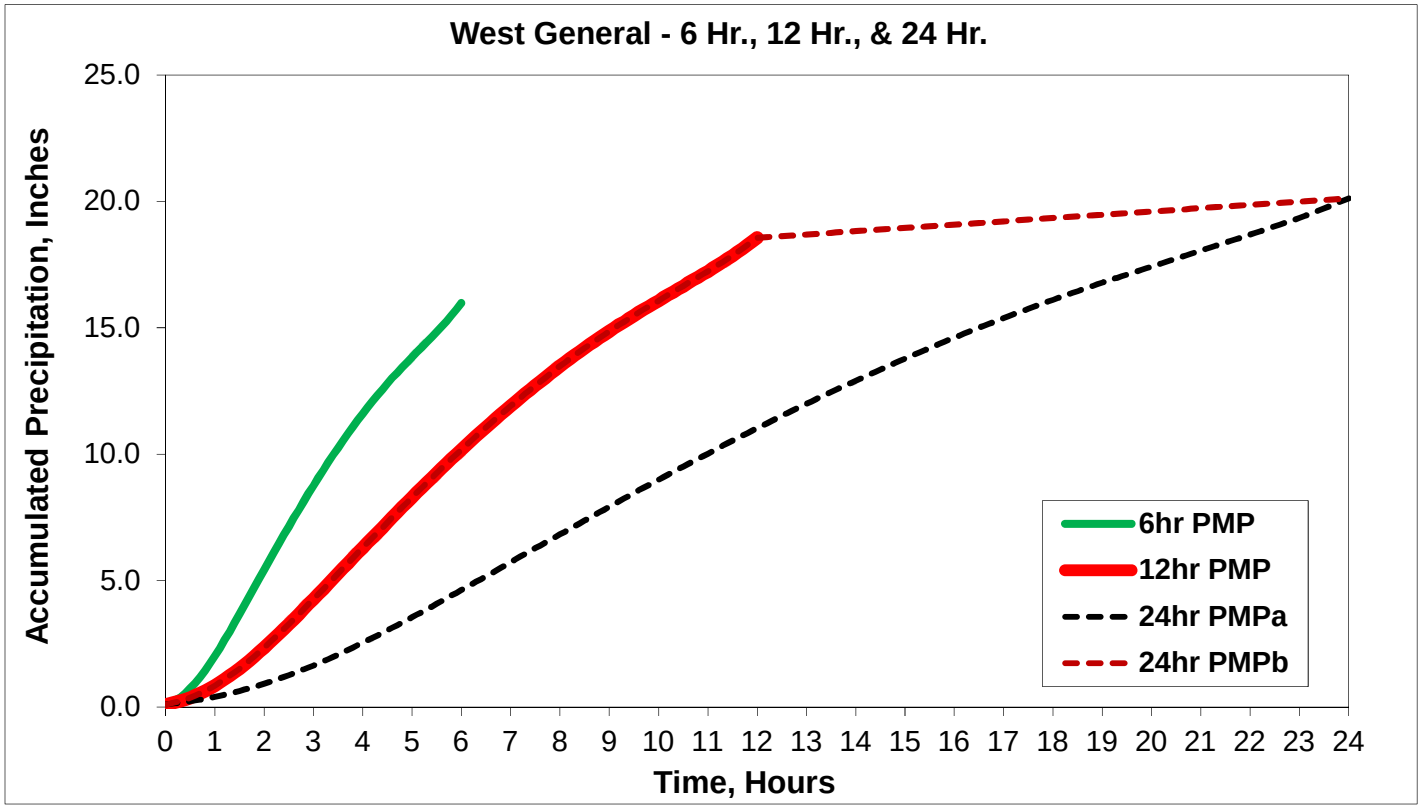
Calculation Section C - OUTPUT Information for Temporal Distribution Curve

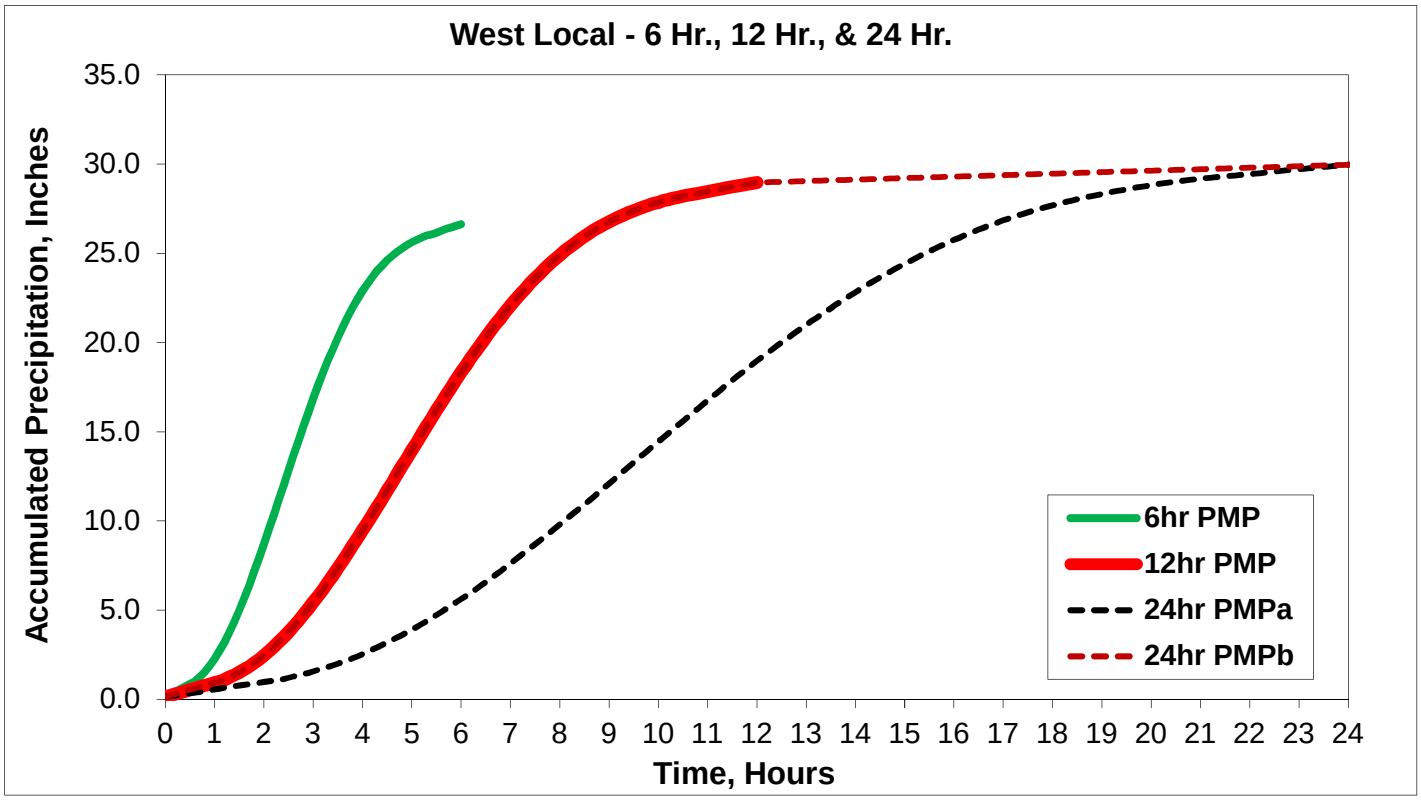


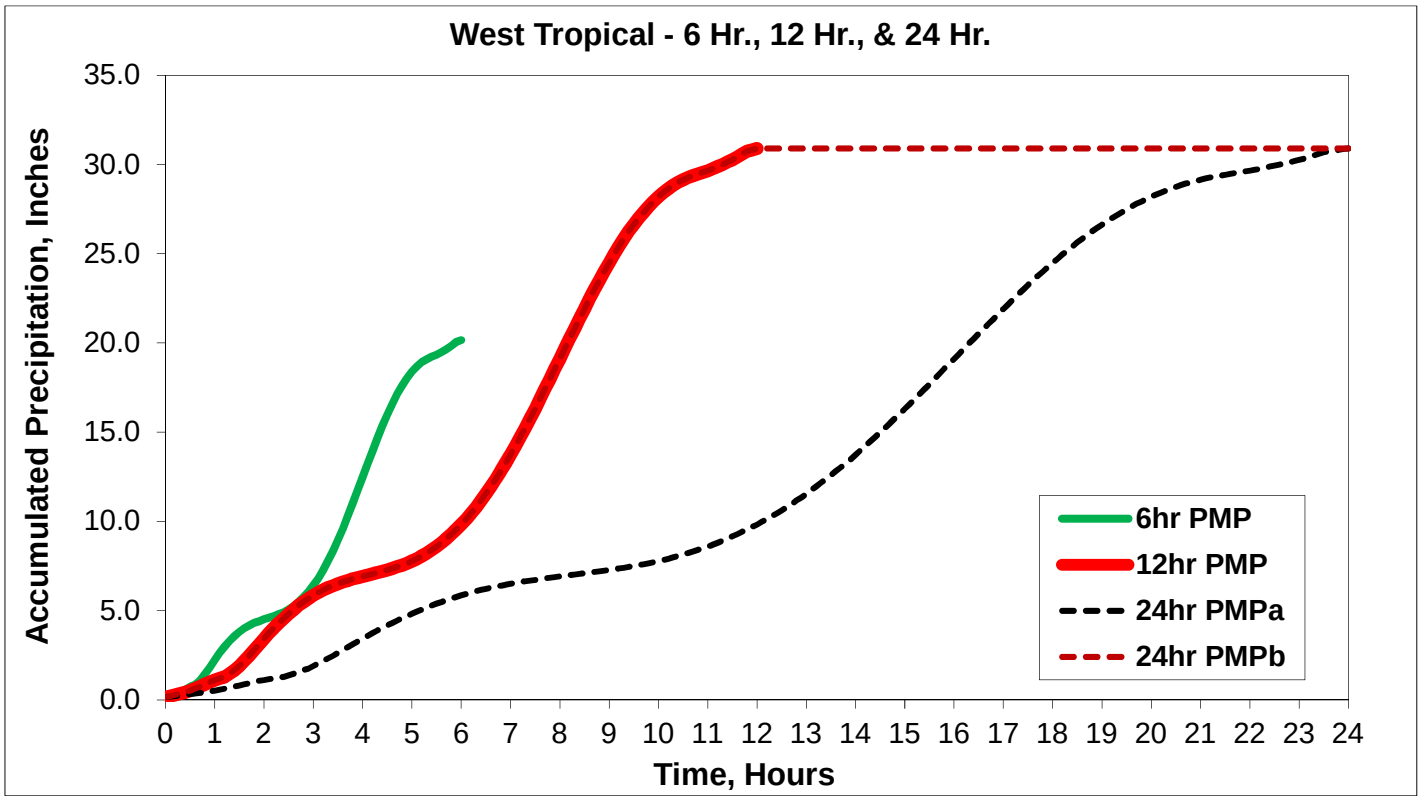


Virginia Department of Conservation and Recreation, Division of Dam Safety and Floodplain Mgmt.

600 East Main Street, 24th Floor
Richmond, VA 23219
Main Number: (804) 371-6095

Calculation Section C - OUTPUT Information for Temporal Distribution Curve





Probable Maximum Precipitation Study for Pennsylvania

Prepared for

Pennsylvania Department of Environmental Protection
400 Market Street, Harrisburg, PA 17105-8460
(717) 787-8568
https://www.dep.pa.gov/Business/Water/Waterways/DamSafety/Pages/default.aspx

Prepared by

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March 2019

Executive Summary

This study produced gridded PMP values for the project domain at a spatial resolution of approximately 2.3-square miles. Variations in topography, climate and storm types across the state were explicitly taken into account. A large set of storm data were analyzed for use in developing the PMP values. These values replace those provided in Hydrometeorological Reports (HMRs) 33, 40, 51, and 52. The full PMP values are valid from May through October when no significant contribution from melting snow would occur. Results of this analysis reflects the most current practices used for defining PMP, including comprehensive storm analyses procedures, extensive use of geographical information systems (GIS), explicit quantification of orographic effects, updated maximum dew point climatologies for storm adjustments, and improved understanding of the weather and climate related to extreme rainfall throughout the state.

The approach used in this study followed the same philosophy used in the numerous site-specific, statewide, and regional PMP studies that AWA has completed. This was the storm-based approach and it follows the same general procedures used by the National Weather Service (NWS) in the development of the HMRs. The World Meteorological Organization (WMO) Manual on Estimation of PMP recommends this same approach. The storm-based approach identified extreme rainfall events that have occurred in regions considered transpositionable to Pennsylvania. These are storms that had meteorological and topographical characteristics similar to extreme rainfall storms that could occur over any location within the project domain and were deemed to be PMP-type storm events. Detailed storm analyses were completed for the largest of these rainfall events.

Data, assumptions, and analysis techniques used in this study have been reviewed and accepted by the review board and the Pennsylvania Department of Environmental Protection with significant input provided by other study participants including the Federal Energy Regulatory Commission, the Natural Resource Conservation Service, Pennsylvania American Water, and various private consultants.

Although this study produced deterministic values, it must be recognized that there is some subjectivity associated with the PMP development procedures. Examples of decisions where scientific judgment was involved included determining which storms are used for PMP, determination of storm adjustment factors, and storm transposition limits. For areas where uncertainties in data were recognized, conservative assumptions were applied unless sufficient data existed to make a more informed decision. All data and information supporting decisions in the PMP development process have been documented so that results can be reproduced and verified.

Ninety-eight rainfall events were identified as having similar characteristics to rainfall that could potentially control PMP values at various locations within the state. Several storm events had multiple Depth-Area-Duration (DAD) zones that were used in the PMP determination process. This includes 32 tropical storm rainfall centers, 34 general storm rainfall centers, and 28 local storm rainfall centers. Note, four storms exhibited characteristics of both local and general storm types and were therefore evaluated as both the general and local storm PMP determination process.

Each storm center was analyzed using the Storm Precipitation Analysis System (SPAS), which produced several standard products including DAD values, storm center mass curves, and total storm isohyetal patterns. National Weather Service (NWS) Next Generation Weather Radar (NEXRAD) data were used in storm analyses when available (generally for storms which occurred after the mid-1990's).

Standard procedures were applied for in-place maximization adjustments (e.g. HMR 51 Section 2.3). New techniques and new datasets were used in other procedures to increase accuracy and reliability when justified by utilizing advancements in technology and meteorological understanding, while adhering to the basic approach used in the HMRs and in the WMO Manual. Updated precipitation frequency analyses data available from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 were used for this study. These were used to calculate the Geographic Transposition Factors (GTFs) for each storm. The GTF procedure provided explicit evaluations of the effects of terrain on rainfall and corrected for the lack of analysis in the "stippled' region of HMR 51. The GTF procedure, through its correlation process, provided quantifiable and reproducible analyses of the effects of terrain on rainfall. Results of these factors (in-place maximization and geographic transposition) were applied for each storm at each grid point for each of the area sizes and durations used in this study to define the PMP values.

Maximization factors were computed for each of the analyzed storm events using updated dew point and sea surface temperature (SST) climatologies representing the maximum moisture equivalent to the 100-year recurrence interval for dew points or +2 sigma for SST that could have been associated with each rainfall event. The dew point climatology included the maximum average 3-, 6-, 12-, and 24-hour 100-year return frequency values, while the SST climatology provided the +2 sigma values. The most appropriate duration consistent with the duration of the storm rainfall was used. HYSPLIT model output, which represent model reanalysis fields of air flow in the atmosphere, and NWS synoptic weather maps were used as guidance in identifying the storm representative moisture source regions.

To store, analyze, and produce results from the large datasets developed in the study, the PMP calculation information was stored and analyzed in individual Excel spreadsheets and a GIS database. This combination of Excel and GIS was used to query, calculate, and derive PMP values for each grid point for each duration for each storm type. The database allowed PMP to be calculated at any area size and/or duration available in the underlying SPAS data.

When compared to previous PMP depths provided in HMR 51 the updated values from this study resulted in a wide range of reductions at most area sizes and durations, with some regions resulting in minor increases. PMP depths are highest near the coast and along the ridges of the Appalachians. These regions have exhibited past extreme rainfall accumulations that are the result of both moisture availability and topographic enhancement. Regions along and near the coast are also affected by coastal convergence processes and direct access to low-level moisture which act to enhance lift and provide an additional mechanism for enhanced rainfall production versus other locations in the study domain. Minimum values are seen in the most protected interior valleys. This is expected because of the decrease in sustained moisture availability and reduced or negative orographic effects relative to other regions.

The contributing watersheds to the majority of dams in Pennsylvania are relatively small in area size, less than 10-square miles. Therefore, a significant amount of emphasis was placed on developing PMP and temporal patterns most relevant for smaller area sizes and quick response basins. This included extensive analysis of short duration, high intensity rainfall accumulation patterns (local storms) and development of PMP depths for area sizes and durations that are important for these types of basins. Providing PMP depths down to area sizes at 1/3rd-square miles and temporal accumulation patterns at 5-minute increments was a significant improvement for dam safety evaluations in Pennsylvania over what was previously available in the HMRs

Statewide it was found that on average, PMP values for local storms resulted in a 25% reduction at 6-hour 10-square miles and a 26% reduction at 12-hour 10-square miles. In general, the largest reductions were within the Appalachians, with smaller reductions in the eastern lower elevations. For the longer durations, larger area sizes, statewide reductions were 32% at 24-hours, 29% at 72-hours for 200-square miles, 28% at 24-hour, and 24% at 72-hours for 1,000-square miles. Tables E.1-E.3 provide the average percent difference (negative is a reduction) from HMR 51 across each of the transposition region analyzed.

Table E.1 Local storm PMP percent difference from HMR 51 PMP at 6-hour and 12-hour 10-square miles. Grayed out rows represent regions where either tropical or general storm PMP values were controlling.

Local Storm 10 mi² Average PMP						
Transposition Zone	**HMR 51 6hr**	**PMP 6hr**	**Change 6hr**	**HMR 51 12hr**	**PMP 12hr**	**Change 12hr**
1 - Coastal Plain	27.3	24.5	-10.1%	31.9	27.6	-13.5%
2 - Piedmont	27.0	23.2	-14.1%	31.3	26.1	-16.8%
3 - Ridge	26.6	19.8	-25.5%	30.7	22.0	-28.1%
4 - Valley	26.6	20.7	-22.3%	30.8	22.5	-26.9%
5 - Appalachian Plateau East	25.4	17.8	-29.9%	29.0	19.8	-31.6%
6 - Appalachian Plateau West	26.0	20.1	-22.7%	29.7	25.7	-13.6%
7 - Western Lowland	26.3	18.6	-29.0%	30.0	19.5	-34.9%
Statewide Domain	**26.2**	**19.7**	**-24.7%**	**30.0**	**22.4**	**-25.5%**

Table E.2 Tropical storm PMP percent difference from HMR 51 PMP at 24-hour and 72-hour 200- and 1000-square miles. Grayed out rows represent regions where general storm PMP values were controlling.

Tropical Storm 200 mi² Average PMP						
Transposition Zone	**HMR 51 24hr**	**PMP 24hr**	**Change 24hr**	**HMR 51 72hr**	**PMP 72hr**	**Change 72hr**
1 - Coastal Plain	26.8	18.0	-32.8%	31.6	27.6	-12.7%
2 - Piedmont	25.9	16.7	-35.5%	30.6	25.6	-16.3%
3 - Ridge	24.8	19.2	-22.7%	29.3	21.0	-28.1%
4 - Valley	25.0	19.8	-20.6%	29.5	21.8	-26.1%
5 - Appalachian Plateau East	22.9	17.5	-23.7%	27.0	19.2	-29.1%
6 - Appalachian Plateau West	23.6	13.8	-41.3%	27.9	18.6	-33.0%
7 - Western Lowland	23.9	12.9	-46.0%	28.2	17.4	-38.2%
Statewide Domain	**24.1**	**16.4**	**-32.1%**	**28.5**	**20.2**	**-29.1%**
Tropical Storm 1,000 mi² Average PMP						
Transposition Zone	**HMR 51 24hr**	**PMP 24hr**	**Change 24hr**	**HMR 51 72hr**	**PMP 72hr**	**Change 72hr**
1 - Coastal Plain	21.6	16.0	-25.9%	25.4	25.5	0.3%
2 - Piedmont	20.7	14.8	-28.4%	24.5	23.7	-3.1%
3 - Ridge	19.6	14.5	-25.6%	23.4	17.8	-23.9%
4 - Valley	19.8	15.1	-23.9%	23.6	18.4	-21.9%
5 - Appalachian Plateau East	18.0	13.3	-26.1%	21.8	16.2	-25.8%
6 - Appalachian Plateau West	18.3	13.3	-27.5%	22.3	15.8	-28.8%
7 - Western Lowland	18.5	12.4	-32.9%	22.6	14.8	-34.2%
Statewide Domain	**18.9**	**13.7**	**-27.5%**	**22.8**	**17.4**	**-23.9%**

Table E.3 General storm PMP percent difference from HMR 51 PMP at 24-hour and 72-hour 200- and 1000-square miles. Grayed out rows represent regions where tropical storm PMP values were controlling.

General Storm 200 mi² Average PMP						
Transposition Zone	**HMR 51 24hr**	**PMP 24hr**	**Change 24hr**	**HMR 51 72hr**	**PMP 72hr**	**Change 72hr**
1 - Coastal Plain	26.8	16.6	-38.2%	31.6	20.5	-35.0%
2 - Piedmont	25.9	16.1	-37.8%	30.6	18.9	-38.3%
3 - Ridge	24.8	14.1	-43.2%	29.3	16.3	-44.2%
4 - Valley	25.0	14.6	-41.4%	29.5	16.9	-42.7%
5 - Appalachian Plateau East	22.9	12.9	-43.8%	27.0	14.9	-44.9%
6 - Appalachian Plateau West	23.6	15.5	-34.3%	27.9	16.0	-42.6%
7 - Western Lowland	23.9	15.0	-37.0%	28.2	15.2	-46.3%
Statewide Domain	**24.1**	**14.6**	**-39.7%**	**28.5**	**16.2**	**-43.3%**

General Storm 1,000 mi² Average PMP						
Transposition Zone	**HMR 51 24hr**	**PMP 24hr**	**Change 24hr**	**HMR 51 72hr**	**PMP 72hr**	**Change 72hr**
1 - Coastal Plain	21.6	15.0	-30.6%	25.4	17.5	-31.0%
2 - Piedmont	20.7	14.5	-29.8%	24.5	16.4	-33.1%
3 - Ridge	19.6	12.6	-35.3%	23.4	14.2	-39.2%
4 - Valley	19.8	13.2	-33.5%	23.6	14.7	-37.6%
5 - Appalachian Plateau East	18.0	11.6	-35.6%	21.8	13.0	-40.6%
6 - Appalachian Plateau West	18.3	12.1	-33.7%	22.3	15.1	-32.2%
7 - Western Lowland	18.5	11.8	-36.4%	22.6	14.1	-37.4%
Statewide Domain	**18.9**	**12.4**	**-34.4%**	**22.8**	**14.4**	**-36.8%**

Input the rainfall data for the Local, Tropical, and General Storm directly from the PMP tool.
This data is available on the PMP_Basin_Average.csv file
which is located in the CSV_ folder for the analyzed watershed.

	1 HR	2 HR	3 HR	4 HR	5 HR	6 HR	12 HR	24 HR
Local	12.13	13.93	15.79	17.24	18.65	25.02	27.32	28.28
Tropical	3.71	6.07	10.16	10.16	10.16	14.42	16.68	16.99
General	10.08	10.08	11.98	12.99	15.15	17.65	27.12	27.12

The green highlighted values in the table above are the controlling PMP values for the specified durations.
The Yellow highlighted Storm type below is the controlling storm for the specific duration.
- Use GIS program to view PMP_Points for your watershed to determine the controlling storm at each duration.
- If Local controls at all durations, only the Local_PMP_Points will need to be used.
- If other storms (General, Tropical) control at certain durations, make sure to use the correct PMP_Points file.
- If multiple storms control at a specific duration, i.e. more than one Local storm, try all distributions and choose the most conservative answer.
Select the appropriate storm from the red highlighted dropdown for each duration.

3 HR	
Local	1547_1

6 HR	
Local	1406_1

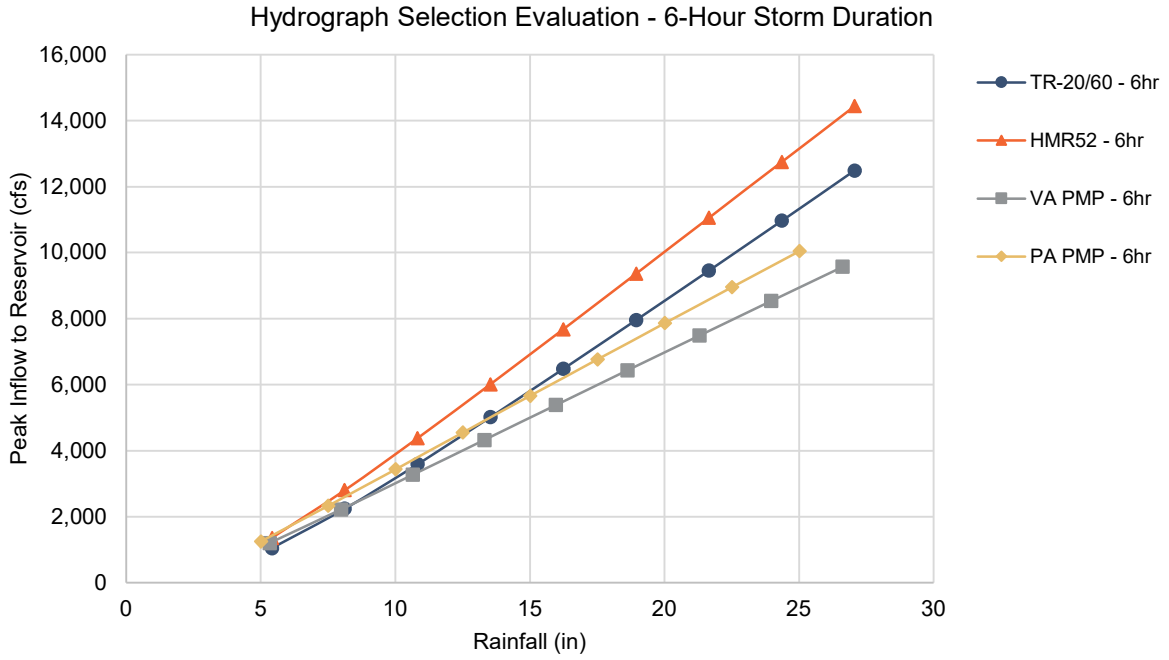
12 HR	
Local	1406_1

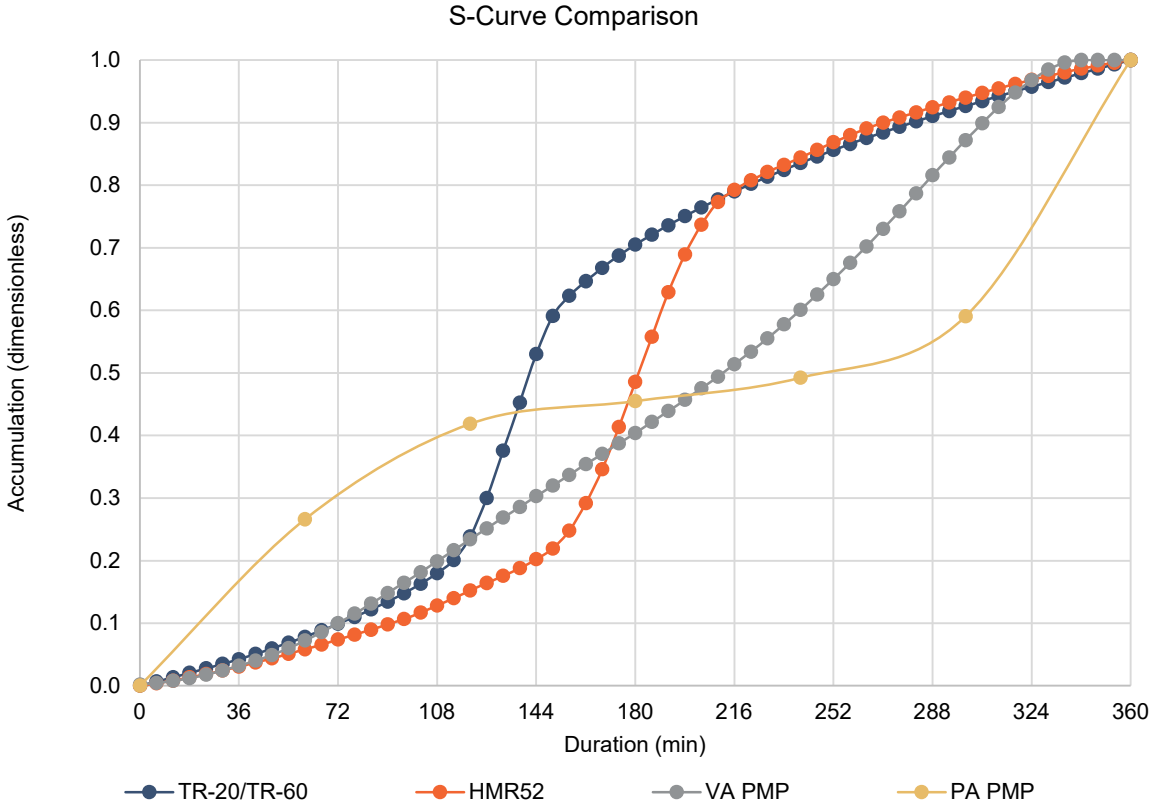
24 HR	
Local	1406_1

The storm specific distributions for use in HEC-HMS or other
hydraulic routing programs will be available to the right.
The rainfall distributions are given in 1-hour increments.
A 5-minute timestep should be used in the hydraulic routing program to capture the peak of the storm.

STORM SPECIFIC DISTRIBUTION								2 HR Synth	
3 HR		6 HR		12 HR		24 HR			
1547_1		1406_1		1406_1		1406_1			
MIN	INC	MIN	INC	MIN	INC	MIN	INC	MIN	INC
0	0.000	0	0.000	0	0.000	0	0.000	*0*	0.000
60	1.817	60	6.654	60	0.310	60	0.027	*5*	0.150
120	12.113	120	3.819	120	0.296	120	0.330	*10*	0.150
180	1.860	180	0.911	180	0.232	180	0.364	*15*	0.150
240	0.000	240	0.936	240	0.385	240	0.044	*20*	0.150
300	0.000	300	2.453	300	6.603	300	0.060	*25*	0.150
360	0.000	360	10.248	360	3.790	360	0.077	*30*	0.150
420	0.000	420	0.000	420	0.904	420	0.310	*35*	0.748
480	0.000	480	0.000	480	0.929	480	0.296	*40*	0.808
540	0.000	540	0.000	540	2.434	540	0.232	*45*	0.885
600	0.000	600	0.000	600	10.170	600	0.385	*50*	1.094
660	0.000	660	0.000	660	1.089	660	6.603	*55*	1.544
720	0.000	720	0.000	720	0.179	720	3.790	*60*	1.893
780	0.000	780	0.000	780	0.000	780	0.904	*65*	1.281
840	0.000	840	0.000	840	0.000	840	0.928	*70*	0.966
900	0.000	900	0.000	900	0.000	900	2.434	*75*	0.838
960	0.000	960	0.000	960	0.000	960	10.170	*80*	0.784
1020	0.000	1020	0.000	1020	0.000	1020	1.089	*85*	0.690
1080	0.000	1080	0.000	1080	0.000	1080	0.179	*90*	0.596
1140	0.000	1140	0.000	1140	0.000	1140	0.031	*95*	0.150
1200	0.000	1200	0.000	1200	0.000	1200	0.007	*100*	0.150
1260	0.000	1260	0.000	1260	0.000	1260	0.000	*105*	0.150
1320	0.000	1320	0.000	1320	0.000	1320	0.000	*110*	0.150
1380	0.000	1380	0.000	1380	0.000	1380	0.019	*115*	0.150
1440	0.000	1440	0.000	1440	0.000	1440	0.001	*120*	0.150

Edgemont Reservoir
Design Storm Evaluation - Storm Hydrograph Distribution Analysis
Project Manager: JGP
Project Number: 30065-014
Designer: AGN
Date: 12/30/2019





Edgemont Reservoir
Design Storm Evaluation - Storm Hydrograph Distribution Analysis
Project Manager: JGP
Project Number: 30065-014
Designer: AGN
Date: 12/30/2019

TR-20/TR-60/SITES Distribution - HEC-1 Summary of Results

	6-Hour Storm		
Ratio of PMP	Rainfall (in)	Peak Inflow (CFS)	Max Elevation
20%	5.41	1,043	930.47
30%	8.12	2,241	931.37
40%	10.83	3,590	932.18
50%	13.53	5,016	932.90
60%	16.24	6,478	933.57
70%	18.95	7,959	934.17
80%	21.65	9,453	934.69
90%	24.36	10,968	935.04
100%	27.07	12,486	935.35

HMR52 Distribution - HEC-1 Summary of Results

	6-Hour Storm		
Ratio of PMP	Rainfall (in)	Peak Inflow (CFS)	Max Elevation
20%	5.41	1,356	930.73
30%	8.12	2,805	931.72
40%	10.83	4,379	932.60
50%	13.53	6,009	933.36
60%	16.24	7,682	934.06
70%	18.95	9,367	934.66
80%	21.65	11,057	935.06
90%	24.36	12,749	935.40
100%	27.07	14,441	935.71

VA PMP Distribution - HEC-1 Summary of Results

	6-Hour Storm		
Ratio of PMP	Rainfall (in)	Peak Inflow (CFS)	Max Elevation
20%	5.32	1,199	930.64
30%	7.99	2,218	931.43
40%	10.65	3,269	932.09
50%	13.31	4,326	932.67
60%	15.97	5,383	933.21
70%	18.63	6,436	933.74
80%	21.30	7,484	934.27
90%	23.96	8,530	934.73
100%	26.62	9,571	935.02

PA PMP Distribution - HEC-1 Summary of Results

	6-Hour Storm		
Ratio of PMP	Rainfall (in)	Peak Inflow (CFS)	Max Elevation
20%	5.00	1,252	930.67
30%	7.51	2,328	931.50
40%	10.01	3,436	932.17
50%	12.51	4,550	932.77
60%	15.01	5,660	933.34
70%	17.51	6,764	933.89
80%	20.02	7,863	934.43
90%	22.52	8,957	934.84
100%	25.02	10,046	935.13

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*            VERSION 4.1                *
*                                       *
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*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
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X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID  EDGEMONT RESERVOIR DAM
   2          ID  PREPARED FOR HAGERSTOWN, MD
   3          ID  PREPARED BY HAZEN
   4          ID  PMP ANALYSIS
   5          ID  EXISTING LAND USE
   6          ID  6 HOUR STORM EVENT - HMR52 DISTRIBUTION
   7          ID  JOB No.:  30065-014
   8          ID  FILE:  EDGEMONT_HMR52DIST_6HR_EX.ih1
   9          ID  DATE:  2019-04-23
  10          ID  HYDROLOGIST:  AGN
  11          IT       2 01JAN18     900    1500
  12          IO       4
              * 20-100% PMP
  13          JR    PREC     0.2     0.3     0.4     0.5     0.6     0.7     0.8     0.9       1

  14          KK      B5
  15          KM  RUNNOFF HYDROGRAPH TO BASIN 5
  16          KO                                    21
  17          BA    2.35
  18          PB  27.068
  19          IN       5
  20          PI   0.087   0.097   0.106   0.115   0.123   0.131   0.138   0.145   0.151   0.157
  21          PI   0.162   0.167   0.171   0.175   0.178   0.181   0.183   0.185   0.194   0.222
  22          PI   0.244    0.26   0.271   0.276    0.27   0.257   0.264   0.291   0.338   0.405
  23          PI   0.579   0.928   1.115   1.337    1.61   1.633   1.627   1.616   1.575   1.148
  24          PI   1.042   0.774   0.445   0.369   0.312   0.275   0.258   0.261   0.277   0.275
  25          PI   0.267   0.253   0.234   0.209   0.186   0.184   0.182    0.18   0.177   0.173
  26          PI   0.169   0.165    0.16   0.154   0.148   0.142   0.135   0.127   0.119   0.111
  27          PI   0.101   0.092
  28          LS       0      67
  29          UD   1.045

  30          KK      R5
  31          KM  ROUTING BASIN 5 THROUGH RESERVOIR
  32          KM  OUTLET: EX OVER OGEE WEIR AND SPILLWAY
  33          KO                                    21
  34          RS       1    ELEV     929
  35          SV       0    1.11    5.56   13.87   26.81   44.12   65.38   89.85  117.57  149.27
  36          SV  185.14  224.84  246.14  257.05  268.25  279.62  288.23  303.13  311.88  321.39
  37          SE     884     886     890     894     898     902     906     910     914     918
  38          SE     922     926     928     929     930     931     932     933     934   934.5
  39          SQ       0    15.7    44.9   181.8   539.4  1025.5  1614.3  2305.7  3096.1  3983.6
  40          SQ  4967.4  5959.6  6920.7  7871.6
  41          SE     929   929.1   929.2   929.5     930   930.5     931   931.5     932   932.5
  42          SE     933   933.5     934   934.5
  43          ST   934.5     700     2.6     1.5
  44          ZZ
```

```
*****************************************                    *****************************************
*                                       *                    *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS       *
*               JUN   1998              *                    *    HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.1                *                    *          609 SECOND STREET            *
*                                       *                    *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE   23APR19  TIME  17:17:06   *                    *           (916) 756-1104              *
*                                       *                    *                                       *
*****************************************                    *****************************************
```

EDGEMONT RESERVOIR DAM
PREPARED FOR HAGERSTOWN, MD
PREPARED BY HAZEN
PMP ANALYSIS
EXISTING LAND USE
6 HOUR STORM EVENT - HMR52 DISTRIBUTION
JOB No.: 30065-014
FILE: EDGEMONT_HMR52DIST_6HR_EX.ih1
DATE: 2019-04-23
HYDROLOGIST: AGN

```
  12 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN18  STARTING DATE
                      ITIME        0900  STARTING TIME
                         NQ        1500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     3JAN18  ENDING DATE
                      NDTIME        1058  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE   49.97 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .20       .30       .40       .50       .60       .70       .80       .90      1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  14 KK     *        B5  *
            *            *
            **************
                        RUNNOFF HYDROGRAPH TO BASIN 5

  16 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        1500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


  19 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN           5  TIME INTERVAL IN MINUTES
                      JXDATE      1JAN18  STARTING DATE
                      JXTIME         900  STARTING TIME

               SUBBASIN RUNOFF DATA

  17 BA          SUBBASIN CHARACTERISTICS
                      TAREA        2.35  SUBBASIN AREA

               PRECIPITATION DATA

  18 PB               STORM       27.07  BASIN TOTAL PRECIPITATION

  20 PI            INCREMENTAL PRECIPITATION PATTERN
                     .03       .03       .04       .04       .04       .04       .04       .05       .05
                     .05       .05       .05       .05       .05       .06       .06       .06       .06       .06
                     .06       .06       .06       .06       .06       .06       .06       .07       .07       .07
                     .07       .07       .07       .07       .07       .07       .07       .07       .07       .07
                     .07       .07       .07       .07       .07       .08       .08       .08       .09       .09
                     .10       .10       .10       .10       .10       .11       .11       .11       .11       .11
                     .11       .11       .11       .10       .10       .11       .11       .11       .12       .12
                     .14       .14       .15       .16       .16       .23       .23       .30       .37       .37
```

```
                  .45       .45       .49       .53       .53       .64       .64       .65       .65       .65
                  .65       .65       .65       .65       .65       .63       .63       .54       .46       .46
                  .42       .42       .36       .31       .31       .18       .18       .16       .15       .15
                  .12       .12       .12       .11       .11       .10       .10       .10       .10       .10
                  .11       .11       .11       .11       .11       .11       .11       .10       .10       .10
                  .09       .09       .09       .08       .08       .07       .07       .07       .07       .07
                  .07       .07       .07       .07       .07       .07       .07       .07       .07       .07
                  .07       .07       .07       .07       .07       .06       .06       .06       .06       .06
                  .06       .06       .06       .06       .06       .05       .05       .05       .05       .05
                  .05       .05       .05       .04       .04       .04       .04       .04       .04       .04

 28 LS         SCS LOSS RATE
                     STRTL         .99  INITIAL ABSTRACTION
                    CRVNBR       67.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

 29 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG        1.04  LAG

                                                            ***

                                                      UNIT HYDROGRAPH
                                                159 END-OF-PERIOD ORDINATES
            10.        20.        30.        51.        75.        98.       126.       156.       186.       221.
           261.       302.       345.       399.       453.       507.       571.       635.       699.       754.
           807.       861.       903.       940.       977.      1005.      1025.      1045.      1060.      1063.
          1066.      1069.      1065.      1062.      1059.      1039.      1019.       999.       976.       953.
           929.       904.       877.       850.       820.       787.       753.       718.       678.       637.
           597.       564.       530.       497.       472.       448.       425.       404.       383.       363.
           345.       328.       311.       296.       283.       271.       259.       247.       234.       222.
           212.       202.       192.       182.       172.       162.       153.       147.       140.       133.
           127.       120.       113.       108.       103.        98.        93.        88.        83.        79.
            76.        72.        68.        65.        61.        58.        55.        53.        50.        48.
            45.        43.        41.        39.        37.        35.        33.        32.        30.        29.
            27.        26.        25.        23.        22.        21.        20.        19.        18.        17.
            16.        15.        15.        14.        13.        13.        12.        12.        11.        11.
            10.        10.        10.         9.         9.         8.         8.         7.         7.         7.
             6.         6.         5.         5.         5.         4.         4.         4.         3.         3.
             3.         2.         2.         2.         1.         1.         1.         0.         0.


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 30 KK    *      R5    *
          *            *
          **************
                        ROUTING BASIN 5 THROUGH RESERVOIR
                        OUTLET: EX OVER OGEE WEIR AND SPILLWAY

 33 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           4  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2        1500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT        .033  TIME INTERVAL IN HOURS


            HYDROGRAPH ROUTING DATA

 34 RS         STORAGE ROUTING
                     NSTPS           1  NUMBER OF SUBREACHES
                      ITYP        ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC      929.00  INITIAL CONDITION
                         X         .00 WORKING R AND D COEFFICIENT

 35 SV           STORAGE           .0       1.1       5.6      13.9      26.8      44.1      65.4      89.8     117.6     149.3
                                185.1     224.8     246.1     257.0     268.3     279.6     288.2     303.1     311.9     321.4

 37 SE         ELEVATION       884.00    886.00    890.00    894.00    898.00    902.00    906.00    910.00    914.00    918.00
                               922.00    926.00    928.00    929.00    930.00    931.00    932.00    933.00    934.00    934.50

 39 SQ         DISCHARGE           0.       16.       45.      182.      539.     1026.     1614.     2306.     3096.     3984.
                                4967.     5960.     6921.     7872.

 41 SE         ELEVATION       929.00    929.10    929.20    929.50    930.00    930.50    931.00    931.50    932.00    932.50
                               933.00    933.50    934.00    934.50

 43 ST         TOP OF DAM
                     TOPEL      934.50  ELEVATION AT TOP OF DAM
                    DAMWID      700.00  DAM WIDTH
                      COQD        2.60  WEIR COEFFICIENT
                      EXPD        1.50  EXPONENT OF HEAD

                                                            ***

                                             COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                                   (INCLUDING FLOW OVER DAM)

          STORAGE        .00      1.11      5.56     13.87     26.81     44.12     65.38     89.85    117.57    149.27
          OUTFLOW        .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
        ELEVATION     884.00    886.00    890.00    894.00    898.00    902.00    906.00    910.00    914.00    918.00

          STORAGE     185.14    224.84    246.14    257.05    258.17    259.29    262.65    268.25    273.93    279.62
          OUTFLOW        .00       .00       .00       .00     15.70     44.90    181.80    539.40   1025.50   1614.30
        ELEVATION     922.00    926.00    928.00    929.00    929.10    929.20    929.50    930.00    930.50    931.00
```

STORAGE	283.92	288.23	295.68	303.13	307.51	311.88	321.39
OUTFLOW	2305.70	3096.10	3983.60	4967.40	5959.60	6920.70	7871.60
ELEVATION	931.50	932.00	932.50	933.00	933.50	934.00	934.50

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION								
OPERATION	STATION	AREA	PLAN		RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	B5	2.35	1	FLOW	1386.	2847.	4443.	6102.	7788.	9489.	11198.	12909.	14618.
				TIME	4.30	4.27	4.23	4.20	4.20	4.17	4.17	4.17	4.17
ROUTED TO	R5	2.35	1	FLOW	1367.	2827.	4409.	6079.	7677.	9441.	11162.	12873.	14587.
				TIME	4.43	4.33	4.30	4.27	4.30	4.23	4.23	4.20	4.20
			** PEAK STAGES IN FEET **										
			1	STAGE	930.79	931.83	932.72	933.56	934.40	934.99	935.41	935.77	936.10
				TIME	4.43	4.33	4.30	4.27	4.30	4.23	4.23	4.20	4.20

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION R5
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	929.00	934.50	934.50
STORAGE	257.	321.	321.
OUTFLOW	0.	7872.	7872.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	930.79	.00	277.	1367.	.00	4.43	.00
.30	931.83	.00	287.	2827.	.00	4.33	.00
.40	932.72	.00	299.	4409.	.00	4.30	.00
.50	933.56	.00	308.	6079.	.00	4.27	.00
.60	934.40	.00	319.	7677.	.00	4.30	.00
.70	934.99	.49	331.	9441.	.80	4.23	.00
.80	935.41	.91	339.	11162.	1.17	4.23	.00
.90	935.77	1.27	345.	12873.	1.43	4.20	.00
1.00	936.10	1.60	352.	14587.	1.70	4.20	.00

*** NORMAL END OF HEC-1 ***

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   24APR19  TIME  09:53:40   *
*                                       *
*****************************************
```


```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1         ID  EDGEMONT RESERVOIR DAM
    2         ID  PREPARED FOR HAGERSTOWN, MD
    3         ID  PREPARED BY HAZEN
    4         ID  PMP ANALYSIS
    5         ID  EXISTING LAND USE
    6         ID  6 HOUR STORM EVENT - TR-20/TR-60/SITES DISTRIBUTION
    7         ID  JOB No.:  30065-014
    8         ID  FILE:  EDGEMONT_TR-60DIST_6HR_EX.ih1
    9         ID  DATE:  2019-04-24
   10         ID  HYDROLOGIST:  AGN
   11         IT       2 01JAN18     900    1500
   12         IO       4
              * 20-100% PMP
   13         JR    PREC     0.2     0.3     0.4     0.5     0.6     0.7     0.8     0.9       1

   14         KK      B5
   15         KM  RUNNOFF HYDROGRAPH TO BASIN 5
   16         KO                                    21
   17         BA    2.35
   18         PB  27.068
   19         IN       6
   20         PC       0  0.0067  0.0135  0.0204  0.0275  0.0348  0.0425  0.0508  0.0595  0.0687
   21         PC  0.0783  0.0884   0.099  0.1102  0.1218  0.1343  0.1478  0.1629    0.18  0.2008
   22         PC  0.2383     0.3  0.3757  0.4525    0.53  0.5908   0.623  0.6465   0.668  0.6875
   23         PC   0.705  0.7208   0.736  0.7505  0.7643  0.7775    0.79  0.8019  0.8134  0.8246
   24         PC  0.8354  0.8459  0.8561  0.8659  0.8753  0.8844  0.8933  0.9019  0.9103  0.9185
   25         PC  0.9265  0.9344  0.9422  0.9498  0.9573  0.9646  0.9718   0.979   0.986   0.993
   26         PC       1
   27         LS       0      67
   28         UD   1.045

   29         KK      R5
   30         KM  ROUTING BASIN 5 THROUGH RESERVOIR
   31         KM  OUTLET: EX OVER OGEE WEIR AND SPILLWAY
   32         KO                                    21
   33         RS       1    ELEV     929
   34         SV       0    1.11    5.56   13.87   26.81   44.12   65.38   89.85  117.57  149.27
   35         SV  185.14  224.84  246.14  257.05  268.25  279.62  288.23  303.13  311.88  321.39
   36         SE     884     886     890     894     898     902     906     910     914     918
   37         SE     922     926     928     929     930     931     932     933     934   934.5
   38         SQ       0    15.7    44.9   181.8   539.4  1025.5  1614.3  2305.7  3096.1  3983.6
   39         SQ  4967.4  5959.6  6920.7  7871.6
   40         SE     929   929.1   929.2   929.5     930   930.5     931   931.5     932   932.5
   41         SE     933   933.5     934   934.5
   42         ST   934.5     700     2.6     1.5
   43         ZZ
```

```
*****************************************                    *****************************************
*                                       *                    *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS       *
*               JUN   1998              *                    *    HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.1                *                    *          609 SECOND STREET            *
*                                       *                    *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE   24APR19  TIME  09:53:40   *                    *           (916) 756-1104              *
*                                       *                    *                                       *
*****************************************                    *****************************************
```

EDGEMONT RESERVOIR DAM
PREPARED FOR HAGERSTOWN, MD
PREPARED BY HAZEN
PMP ANALYSIS
EXISTING LAND USE
6 HOUR STORM EVENT - TR-20/TR-60/SITES DISTRIBUTION
JOB No.: 30065-014
FILE: EDGEMONT_TR-60DIST_6HR_EX.ih1
DATE: 2019-04-24
HYDROLOGIST: AGN

```
  12 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN18  STARTING DATE
                      ITIME        0900  STARTING TIME
                         NQ        1500  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      3JAN18  ENDING DATE
                      NDTIME        1058  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE   49.97 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .20       .30       .40       .50       .60       .70       .80       .90      1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  14 KK     *        B5  *
            *            *
            **************
                        RUNNOFF HYDROGRAPH TO BASIN 5

  16 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        1500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


  19 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN           6  TIME INTERVAL IN MINUTES
                      JXDATE      1JAN18  STARTING DATE
                      JXTIME         900  STARTING TIME

               SUBBASIN RUNOFF DATA

  17 BA          SUBBASIN CHARACTERISTICS
                      TAREA        2.35  SUBBASIN AREA

               PRECIPITATION DATA

  18 PB               STORM       27.07  BASIN TOTAL PRECIPITATION

  20 PI            INCREMENTAL PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .02       .02       .02       .03       .03       .03       .03       .03       .03       .03
                     .03       .03       .02       .02       .02       .01       .01       .01       .01       .01
```

```
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00

 27 LS        SCS LOSS RATE
                    STRTL         .99  INITIAL ABSTRACTION
                   CRVNBR       67.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

 28 UD        SCS DIMENSIONLESS UNITGRAPH
                     TLAG        1.04  LAG

                                                     ***

                                                UNIT HYDROGRAPH
                                          159 END-OF-PERIOD ORDINATES
           10.        20.        30.        51.        75.        98.       126.       156.       186.       221.
          261.       302.       345.       399.       453.       507.       571.       635.       699.       754.
          807.       861.       903.       940.       977.      1005.      1025.      1045.      1060.      1063.
         1066.      1069.      1065.      1062.      1059.      1039.      1019.       999.       976.       953.
          929.       904.       877.       850.       820.       787.       753.       718.       678.       637.
          597.       564.       530.       497.       472.       448.       425.       404.       383.       363.
          345.       328.       311.       296.       283.       271.       259.       247.       234.       222.
          212.       202.       192.       182.       172.       162.       153.       147.       140.       133.
          127.       120.       113.       108.       103.        98.        93.        88.        83.        79.
           76.        72.        68.        65.        61.        58.        55.        53.        50.        48.
           45.        43.        41.        39.        37.        35.        33.        32.        30.        29.
           27.        26.        25.        23.        22.        21.        20.        19.        18.        17.
           16.        15.        15.        14.        13.        13.        12.        12.        11.        11.
           10.        10.        10.         9.         9.         8.         8.         7.         7.         7.
            6.         6.         5.         5.         5.         4.         4.         4.         3.         3.
            3.         2.         2.         2.         1.         1.         1.         0.         0.


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
 29 KK     *      R5    *
           *            *
           **************
                       ROUTING BASIN 5 THROUGH RESERVOIR
                       OUTLET: EX OVER OGEE WEIR AND SPILLWAY

 32 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           4  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2        1500  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT        .033  TIME INTERVAL IN HOURS


            HYDROGRAPH ROUTING DATA

 33 RS        STORAGE ROUTING
                    NSTPS           1  NUMBER OF SUBREACHES
                     ITYP        ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      929.00  INITIAL CONDITION
                        X         .00 WORKING R AND D COEFFICIENT

 34 SV          STORAGE          .0        1.1        5.6       13.9       26.8       44.1       65.4       89.8      117.6      149.3
                              185.1      224.8      246.1      257.0      268.3      279.6      288.2      303.1      311.9      321.4

 36 SE        ELEVATION      884.00     886.00     890.00     894.00     898.00     902.00     906.00     910.00     914.00     918.00
                             922.00     926.00     928.00     929.00     930.00     931.00     932.00     933.00     934.00     934.50

 38 SQ        DISCHARGE          0.        16.        45.       182.       539.      1026.      1614.      2306.      3096.      3984.
                              4967.      5960.      6921.      7872.

 40 SE        ELEVATION      929.00     929.10     929.20     929.50     930.00     930.50     931.00     931.50     932.00     932.50
                             933.00     933.50     934.00     934.50

 42 ST        TOP OF DAM
                    TOPEL      934.50  ELEVATION AT TOP OF DAM
                   DAMWID      700.00  DAM WIDTH
                     COQD        2.60  WEIR COEFFICIENT
                     EXPD        1.50  EXPONENT OF HEAD

                                                     ***

                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                             (INCLUDING FLOW OVER DAM)

            STORAGE        .00       1.11       5.56      13.87      26.81      44.12      65.38      89.85     117.57     149.27
            OUTFLOW        .00        .00        .00        .00        .00        .00        .00        .00        .00        .00
          ELEVATION     884.00     886.00     890.00     894.00     898.00     902.00     906.00     910.00     914.00     918.00

            STORAGE     185.14     224.84     246.14     257.05     258.17     259.29     262.65     268.25     273.93     279.62
            OUTFLOW        .00        .00        .00        .00      15.70      44.90     181.80     539.40    1025.50    1614.30
          ELEVATION     922.00     926.00     928.00     929.00     929.10     929.20     929.50     930.00     930.50     931.00
```

STORAGE	283.92	288.23	295.68	303.13	307.51	311.88	321.39
OUTFLOW	2305.70	3096.10	3983.60	4967.40	5959.60	6920.70	7871.60
ELEVATION	931.50	932.00	932.50	933.00	933.50	934.00	934.50

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION								
OPERATION	STATION	AREA	PLAN		RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	B5	2.35	1	FLOW	1062.	2284.	3658.	5110.	6602.	8117.	9648.	11186.	12727.
				TIME	3.67	3.57	3.53	3.50	3.47	3.47	3.43	3.43	3.43
ROUTED TO	R5	2.35	1	FLOW	1044.	2271.	3624.	5088.	6568.	8022.	9609.	11154.	12698.
				TIME	3.80	3.63	3.63	3.57	3.53	3.57	3.50	3.50	3.47
			** PEAK STAGES IN FEET **										
			1	STAGE	930.52	931.48	932.30	933.06	933.82	934.56	935.04	935.40	935.73
				TIME	3.80	3.63	3.63	3.57	3.53	3.57	3.50	3.50	3.47

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION R5
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	929.00	934.50	934.50
STORAGE	257.	321.	321.
OUTFLOW	0.	7872.	7872.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	930.52	.00	274.	1044.	.00	3.80	.00
.30	931.48	.00	284.	2271.	.00	3.63	.00
.40	932.30	.00	293.	3624.	.00	3.63	.00
.50	933.06	.00	304.	5088.	.00	3.57	.00
.60	933.82	.00	310.	6568.	.00	3.53	.00
.70	934.56	.06	323.	8022.	.27	3.57	.00
.80	935.04	.54	332.	9609.	.90	3.50	.00
.90	935.40	.90	339.	11154.	1.27	3.50	.00
1.00	935.73	1.23	345.	12698.	1.57	3.47	.00

*** NORMAL END OF HEC-1 ***

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   23APR19  TIME  17:07:49   *
*                                       *
*****************************************
```


```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

    1         ID  EDGEMONT RESERVOIR DAM
    2         ID  PREPARED FOR HAGERSTOWN, MD
    3         ID  PREPARED BY HAZEN
    4         ID  PMP ANALYSIS
    5         ID  EXISTING LAND USE
    6         ID  6 HOUR STORM EVENT - VA PMP DISTRIBUTION
    7         ID  JOB No.:  30065-014
    8         ID  FILE:  EDGEMONT_VAPMPDIST_6HR_EX.ih1
    9         ID  DATE:  2019-04-23
   10         ID  HYDROLOGIST:  AGN
   11         IT       2 01JAN18     900    1000
   12         IO       4
              * 20-100% PMP
   13         JR    PREC     0.2     0.3     0.4     0.5     0.6     0.7     0.8     0.9       1

   14         KK      B5
   15         KM  RUNNOFF HYDROGRAPH TO BASIN 5
   16         KO                                    21
   17         BA    2.35
   18         PB   26.62
   19         IN       6
   20         PC   0.002  0.0045  0.0077   0.012  0.0177  0.0245   0.032  0.0403  0.0493    0.06
   21         PC  0.0723  0.0858     0.1   0.115  0.1313   0.148  0.1647  0.1815   0.199  0.2165
   22         PC   0.234  0.2515  0.2687  0.2855   0.303  0.3197   0.337   0.354  0.3707  0.3873
   23         PC   0.404  0.4215   0.439   0.457  0.4753   0.494   0.514   0.534  0.5553  0.5775
   24         PC  0.6007   0.625    0.65  0.6758  0.7023    0.73  0.7583  0.7868   0.816  0.8443
   25         PC   0.872   0.899  0.9247   0.948   0.968  0.9847   0.996       1       1       1
   26         PC       1
   27         LS       0      67
   28         UD   1.045

   29         KK      R5
   30         KM  ROUTING BASIN 5 THROUGH RESERVOIR
   31         KM  OUTLET: EX OVER OGEE WEIR AND SPILLWAY
   32         KO                                    21
   33         RS       1    ELEV     929
   34         SV       0    1.11    5.56   13.87   26.81   44.12   65.38   89.85  117.57  149.27
   35         SV  185.14  224.84  246.14  257.05  268.25  279.62  288.23  303.13  311.88  321.39
   36         SE     884     886     890     894     898     902     906     910     914     918
   37         SE     922     926     928     929     930     931     932     933     934   934.5
   38         SQ       0    15.7    44.9   181.8   539.4  1025.5  1614.3  2305.7  3096.1  3983.6
   39         SQ  4967.4  5959.6  6920.7  7871.6
   40         SE     929   929.1   929.2   929.5     930   930.5     931   931.5     932   932.5
   41         SE     933   933.5     934   934.5
   42         ST   934.5     700     2.6     1.5
   43         ZZ
```

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*****************************************                                                       ***************************************
*                                       *                                                       *                                     *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                       *   U.S. ARMY CORPS OF ENGINEERS      *
*             JUN   1998                *                                                       *   HYDROLOGIC ENGINEERING CENTER     *
*          VERSION 4.1                  *                                                       *         609 SECOND STREET           *
*                                       *                                                       *      DAVIS, CALIFORNIA 95616        *
*  RUN DATE   23APR19  TIME  17:07:49   *                                                       *          (916) 756-1104             *
*                                       *                                                       *                                     *
*****************************************                                                       ***************************************




                          EDGEMONT RESERVOIR DAM
                          PREPARED FOR HAGERSTOWN, MD
                          PREPARED BY HAZEN
                          PMP ANALYSIS
                          EXISTING LAND USE
                          6 HOUR STORM EVENT - VA PMP DISTRIBUTION
                          JOB No.:  30065-014
                          FILE:  EDGEMONT_VAPMPDIST_6HR_EX.ih1
                          DATE:  2019-04-23
                          HYDROLOGIST:  AGN

  12 IO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                       NMIN           2  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1JAN18  STARTING DATE
                      ITIME        0900  STARTING TIME
                         NQ        1000  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2JAN18  ENDING DATE
                     NDTIME        1818  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .03 HOURS
                       TOTAL TIME BASE   33.30 HOURS

         ENGLISH UNITS
              DRAINAGE AREA         SQUARE MILES
              PRECIPITATION DEPTH   INCHES
              LENGTH, ELEVATION     FEET
              FLOW                  CUBIC FEET PER SECOND
              STORAGE VOLUME        ACRE-FEET
              SURFACE AREA          ACRES
              TEMPERATURE           DEGREES FAHRENHEIT

     JP         MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .20       .30       .40       .50       .60       .70       .80       .90      1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
  14 KK    *       B5   *
           *            *
           **************
                          RUNNOFF HYDROGRAPH TO BASIN 5

  16 KO         OUTPUT CONTROL VARIABLES
                      IPRNT           4  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2        1000  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT        .033  TIME INTERVAL IN HOURS


  19 IN         TIME DATA FOR INPUT TIME SERIES
                      JXMIN           6  TIME INTERVAL IN MINUTES
                     JXDATE      1JAN18  STARTING DATE
                     JXTIME         900  STARTING TIME

              SUBBASIN RUNOFF DATA

  17 BA         SUBBASIN CHARACTERISTICS
                      TAREA        2.35  SUBBASIN AREA

                PRECIPITATION DATA

  18 PB               STORM       26.62  BASIN TOTAL PRECIPITATION

  20 PI           INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .01       .00       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
```

```
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .01      .01      .01      .01      .01
                .01      .01      .01      .01      .01      .00      .00      .00      .00      .00
                .00

27 LS       SCS LOSS RATE
                STRTL       .99  INITIAL ABSTRACTION
               CRVNBR     67.00  CURVE NUMBER
                RTIMP       .00  PERCENT IMPERVIOUS AREA

28 UD       SCS DIMENSIONLESS UNITGRAPH
                TLAG      1.04  LAG

                                                ***

                                          UNIT HYDROGRAPH
                                      159 END-OF-PERIOD ORDINATES
          10.      20.      30.      51.      75.      98.     126.     156.     186.     221.
         261.     302.     345.     399.     453.     507.     571.     635.     699.     754.
         807.     861.     903.     940.     977.    1005.    1025.    1045.    1060.    1063.
        1066.    1069.    1065.    1062.    1059.    1039.    1019.     999.     976.     953.
         929.     904.     877.     850.     820.     787.     753.     718.     678.     637.
         597.     564.     530.     497.     472.     448.     425.     404.     383.     363.
         345.     328.     311.     296.     283.     271.     259.     247.     234.     222.
         212.     202.     192.     182.     172.     162.     153.     147.     140.     133.
         127.     120.     113.     108.     103.      98.      93.      88.      83.      79.
          76.      72.      68.      65.      61.      58.      55.      53.      50.      48.
          45.      43.      41.      39.      37.      35.      33.      32.      30.      29.
          27.      26.      25.      23.      22.      21.      20.      19.      18.      17.
          16.      15.      15.      14.      13.      13.      12.      12.      11.      11.
          10.      10.      10.       9.       9.       8.       8.       7.       7.       7.
           6.       6.       5.       5.       5.       4.       4.       4.       3.       3.
           3.       2.       2.       2.       1.       1.       1.       0.       0.

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
29 KK     *        R5  *
          *            *
          **************
                      ROUTING BASIN 5 THROUGH RESERVOIR
                      OUTLET: EX OVER OGEE WEIR AND SPILLWAY

32 KO       OUTPUT CONTROL VARIABLES
              IPRNT          4  PRINT CONTROL
              IPLOT          0  PLOT CONTROL
              QSCAL         0.  HYDROGRAPH PLOT SCALE
              IPNCH          0  PUNCH COMPUTED HYDROGRAPH
               IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
              ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
              ISAV2       1000  LAST ORDINATE PUNCHED OR SAVED
             TIMINT       .033  TIME INTERVAL IN HOURS


          HYDROGRAPH ROUTING DATA

33 RS       STORAGE ROUTING
              NSTPS          1  NUMBER OF SUBREACHES
               ITYP       ELEV  TYPE OF INITIAL CONDITION
             RSVRIC     929.00  INITIAL CONDITION
                  X        .00 WORKING R AND D COEFFICIENT

34 SV         STORAGE         .0      1.1      5.6     13.9     26.8     44.1     65.4     89.8    117.6    149.3
                           185.1    224.8    246.1    257.0    268.3    279.6    288.2    303.1    311.9    321.4

36 SE       ELEVATION     884.00   886.00   890.00   894.00   898.00   902.00   906.00   910.00   914.00   918.00
                          922.00   926.00   928.00   929.00   930.00   931.00   932.00   933.00   934.00   934.50

38 SQ       DISCHARGE        0.       16.      45.     182.     539.    1026.    1614.    2306.    3096.    3984.
                          4967.    5960.    6921.    7872.

40 SE       ELEVATION     929.00   929.10   929.20   929.50   930.00   930.50   931.00   931.50   932.00   932.50
                          933.00   933.50   934.00   934.50

42 ST       TOP OF DAM
              TOPEL      934.50  ELEVATION AT TOP OF DAM
             DAMWID      700.00  DAM WIDTH
               COQD        2.60  WEIR COEFFICIENT
               EXPD        1.50  EXPONENT OF HEAD

                                                ***

                                    COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                              (INCLUDING FLOW OVER DAM)

          STORAGE        .00     1.11     5.56    13.87    26.81    44.12    65.38    89.85   117.57   149.27
          OUTFLOW        .00      .00      .00      .00      .00      .00      .00      .00      .00      .00
        ELEVATION     884.00   886.00   890.00   894.00   898.00   902.00   906.00   910.00   914.00   918.00

          STORAGE     185.14   224.84   246.14   257.05   258.17   259.29   262.65   268.25   273.93   279.62
          OUTFLOW        .00      .00      .00      .00    15.70    44.90   181.80   539.40  1025.50  1614.30
        ELEVATION     922.00   926.00   928.00   929.00   929.10   929.20   929.50   930.00   930.50   931.00
```

STORAGE	283.92	288.23	295.68	303.13	307.51	311.88	321.39
OUTFLOW	2305.70	3096.10	3983.60	4967.40	5959.60	6920.70	7871.60
ELEVATION	931.50	932.00	932.50	933.00	933.50	934.00	934.50

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION								
OPERATION	STATION	AREA	PLAN		RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	B5	2.35	1	FLOW	1199.	2218.	3269.	4326.	5383.	6436.	7484.	8530.	9571.
				TIME	5.87	5.83	5.80	5.77	5.77	5.77	5.77	5.73	5.73
ROUTED TO	R5	2.35	1	FLOW	1190.	2210.	3252.	4312.	5375.	6417.	7438.	8505.	9554.
				TIME	5.97	5.90	5.90	5.87	5.83	5.83	5.87	5.83	5.80
			** PEAK STAGES IN FEET **										
			1	STAGE	930.64	931.43	932.09	932.67	933.21	933.74	934.27	934.73	935.02
				TIME	5.97	5.90	5.90	5.87	5.83	5.83	5.87	5.83	5.80

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION R5
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	929.00	934.50	934.50
STORAGE	257.	321.	321.
OUTFLOW	0.	7872.	7872.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	930.64	.00	276.	1190.	.00	5.97	.00
.30	931.43	.00	283.	2210.	.00	5.90	.00
.40	932.09	.00	290.	3252.	.00	5.90	.00
.50	932.67	.00	298.	4312.	.00	5.87	.00
.60	933.21	.00	305.	5375.	.00	5.83	.00
.70	933.74	.00	310.	6417.	.00	5.83	.00
.80	934.27	.00	317.	7438.	.00	5.87	.00
.90	934.73	.23	326.	8505.	.77	5.83	.00
1.00	935.02	.52	331.	9554.	1.33	5.80	.00

*** NORMAL END OF HEC-1 ***

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN   1998              *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   12NOV19  TIME  09:09:57   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1          ID  EDGEMONT RESERVOIR DAM
   2          ID  PREPARED FOR HAGERSTOWN, MD
   3          ID  PREPARED BY HAZEN
   4          ID  PMP ANALYSIS
   5          ID  EXISTING LAND USE
   6          ID  6 HOUR STORM EVENT - HMR52 DISTRIBUTION
   7          ID  JOB No.:  30065-014
   8          ID  FILE:  EDGEMONT PAPMPDIST 6HR EX.ih1
   9          ID  DATE:  2019-11-12
  10          ID  HYDROLOGIST:  AGN
  11          IT       2 01JAN19     900    1000
  12          IO       4
              * 20-100% PMP
  13          JR    PREC     0.2     0.3     0.4     0.5     0.6     0.7     0.8     0.9       1

  14          KK      B5
  15          KM  RUNNOFF HYDROGRAPH TO BASIN 5
  16          KO                                      21
  17          BA    2.35
  18          PB   25.02
  19          IN      60
  20          PC       0   0.266   0.419   0.455   0.492    0.59       1
  21          LS       0      67
  22          UD   1.045

  23          KK      R5
  24          KM  ROUTING BASIN 5 THROUGH RESERVOIR
  25          KM  OUTLET: EX OVER OGEE WEIR AND SPILLWAY
  26          KO                                      21
  27          RS       1    ELEV     929
  28          SV       0    1.11    5.56   13.87   26.81   44.12   65.38   89.85  117.57  149.27
  29          SV  185.14  224.84  246.14  257.05  268.25  279.62  288.23  303.13  311.88  321.39
  30          SE     884     886     890     894     898     902     906     910     914     918
  31          SE     922     926     928     929     930     931     932     933     934   934.5
  32          SQ       0    15.7    44.9   181.8   539.4  1025.5  1614.3  2305.7  3096.1  3983.6
  33          SQ  4967.4  5959.6  6920.7  7871.6
  34          SE     929   929.1   929.2   929.5     930   930.5     931   931.5     932   932.5
  35          SE     933   933.5     934   934.5
  36          ST   934.5     700     2.6     1.5
  37          ZZ
```

```
*****************************************                    *****************************************
*                                       *                    *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                    *    U.S. ARMY CORPS OF ENGINEERS       *
*              JUN  1998                *                    *    HYDROLOGIC ENGINEERING CENTER      *
*            VERSION 4.1                *                    *          609 SECOND STREET            *
*                                       *                    *       DAVIS, CALIFORNIA 95616         *
*  RUN DATE   12NOV19  TIME  09:09:57   *                    *           (916) 756-1104              *
*                                       *                    *                                       *
*****************************************                    *****************************************
```

EDGEMONT RESERVOIR DAM
PREPARED FOR HAGERSTOWN, MD
PREPARED BY HAZEN
PMP ANALYSIS
EXISTING LAND USE
6 HOUR STORM EVENT - HMR52 DISTRIBUTION
JOB No.: 30065-014
FILE: EDGEMONT PAPMPDIST 6HR EX.ih1
DATE: 2019-11-12
HYDROLOGIST: AGN

```
  12 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           2  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1JAN19  STARTING DATE
                       ITIME        0900  STARTING TIME
                          NQ        1000  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2JAN19  ENDING DATE
                      NDTIME        1818  ENDING TIME
                       ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL     .03 HOURS
                         TOTAL TIME BASE   33.30 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                     .20       .30       .40       .50       .60       .70       .80       .90      1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  14 KK     *        B5  *
            *            *
            **************
                          RUNNOFF HYDROGRAPH TO BASIN 5

  16 KO          OUTPUT CONTROL VARIABLES
                       IPRNT           4  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2        1000  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT        .033  TIME INTERVAL IN HOURS


  19 IN          TIME DATA FOR INPUT TIME SERIES
                        JXMIN          60  TIME INTERVAL IN MINUTES
                       JXDATE      1JAN19  STARTING DATE
                       JXTIME         900  STARTING TIME

               SUBBASIN RUNOFF DATA

  17 BA          SUBBASIN CHARACTERISTICS
                       TAREA        2.35  SUBBASIN AREA

                 PRECIPITATION DATA

  18 PB                STORM       25.02  BASIN TOTAL PRECIPITATION

  20 PI            INCREMENTAL PRECIPITATION PATTERN
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .01       .01       .01
                     .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00
```

```
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .01       .01       .01

 21 LS         SCS LOSS RATE
                  STRTL        .99  INITIAL ABSTRACTION
                 CRVNBR      67.00  CURVE NUMBER
                  RTIMP        .00  PERCENT IMPERVIOUS AREA

 22 UD         SCS DIMENSIONLESS UNITGRAPH
                   TLAG       1.04  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                159 END-OF-PERIOD ORDINATES
            10.       20.       30.       51.       75.       98.      126.      156.      186.      221.
           261.      302.      345.      399.      453.      507.      571.      635.      699.      754.
           807.      861.      903.      940.      977.     1005.     1025.     1045.     1060.     1063.
          1066.     1069.     1065.     1062.     1059.     1039.     1019.      999.      976.      953.
           929.      904.      877.      850.      820.      787.      753.      718.      678.      637.
           597.      564.      530.      497.      472.      448.      425.      404.      383.      363.
           345.      328.      311.      296.      283.      271.      259.      247.      234.      222.
           212.      202.      192.      182.      172.      162.      153.      147.      140.      133.
           127.      120.      113.      108.      103.       98.       93.       88.       83.       79.
            76.       72.       68.       65.       61.       58.       55.       53.       50.       48.
            45.       43.       41.       39.       37.       35.       33.       32.       30.       29.
            27.       26.       25.       23.       22.       21.       20.       19.       18.       17.
            16.       15.       15.       14.       13.       13.       12.       12.       11.       11.
            10.       10.       10.        9.        9.        8.        8.        7.        7.        7.
             6.        6.        5.        5.        5.        4.        4.        4.        3.        3.
             3.        2.        2.        2.        1.        1.        1.        0.        0.


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 23 KK    *       R5   *
          *            *
          **************
                     ROUTING BASIN 5 THROUGH RESERVOIR
                     OUTLET: EX OVER OGEE WEIR AND SPILLWAY

 26 KO         OUTPUT CONTROL VARIABLES
                  IPRNT          4  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE
                  IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                   IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2       1000  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT       .033  TIME INTERVAL IN HOURS


            HYDROGRAPH ROUTING DATA

 27 RS         STORAGE ROUTING
                  NSTPS          1  NUMBER OF SUBREACHES
                   ITYP       ELEV  TYPE OF INITIAL CONDITION
                 RSVRIC     929.00  INITIAL CONDITION
                      X        .00 WORKING R AND D COEFFICIENT

 28 SV           STORAGE        .0       1.1       5.6      13.9      26.8      44.1      65.4      89.8     117.6     149.3
                             185.1     224.8     246.1     257.0     268.3     279.6     288.2     303.1     311.9     321.4

 30 SE         ELEVATION    884.00    886.00    890.00    894.00    898.00    902.00    906.00    910.00    914.00    918.00
                            922.00    926.00    928.00    929.00    930.00    931.00    932.00    933.00    934.00    934.50

 32 SQ         DISCHARGE        0.       16.       45.      182.      539.     1026.     1614.     2306.     3096.     3984.
                             4967.     5960.     6921.     7872.

 34 SE         ELEVATION    929.00    929.10    929.20    929.50    930.00    930.50    931.00    931.50    932.00    932.50
                            933.00    933.50    934.00    934.50

 36 ST         TOP OF DAM
                  TOPEL     934.50  ELEVATION AT TOP OF DAM
                 DAMWID     700.00  DAM WIDTH
                   COQD       2.60  WEIR COEFFICIENT
                   EXPD       1.50  EXPONENT OF HEAD

                                                          ***

                                           COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                                 (INCLUDING FLOW OVER DAM)

          STORAGE       .00      1.11      5.56     13.87     26.81     44.12     65.38     89.85    117.57    149.27
          OUTFLOW       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
        ELEVATION    884.00    886.00    890.00    894.00    898.00    902.00    906.00    910.00    914.00    918.00

          STORAGE    185.14    224.84    246.14    257.05    258.17    259.29    262.65    268.25    273.93    279.62
          OUTFLOW       .00       .00       .00       .00     15.70     44.90    181.80    539.40   1025.50   1614.30
        ELEVATION    922.00    926.00    928.00    929.00    929.10    929.20    929.50    930.00    930.50    931.00
```

STORAGE	283.92	288.23	295.68	303.13	307.51	311.88	321.39
OUTFLOW	2305.70	3096.10	3983.60	4967.40	5959.60	6920.70	7871.60
ELEVATION	931.50	932.00	932.50	933.00	933.50	934.00	934.50

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION								
OPERATION	STATION	AREA	PLAN		RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
HYDROGRAPH AT	B5	2.35	1	FLOW	1252.	2328.	3436.	4550.	5660.	6764.	7863.	8957.	10046.
				TIME	6.60	6.60	6.57	6.57	6.57	6.57	6.57	6.57	6.57
ROUTED TO	R5	2.35	1	FLOW	1230.	2311.	3396.	4508.	5637.	6718.	7736.	8892.	9998.
				TIME	6.70	6.67	6.67	6.67	6.63	6.63	6.67	6.63	6.63
			** PEAK STAGES IN FEET **										
			1	STAGE	930.67	931.50	932.17	932.77	933.34	933.89	934.43	934.84	935.13
				TIME	6.70	6.67	6.67	6.67	6.63	6.63	6.67	6.63	6.63

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION R5
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	929.00	934.50	934.50
STORAGE	257.	321.	321.
OUTFLOW	0.	7872.	7872.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	930.67	.00	276.	1230.	.00	6.70	.00
.30	931.50	.00	284.	2311.	.00	6.67	.00
.40	932.17	.00	291.	3396.	.00	6.67	.00
.50	932.77	.00	300.	4508.	.00	6.67	.00
.60	933.34	.00	306.	5637.	.00	6.63	.00
.70	933.89	.00	311.	6718.	.00	6.63	.00
.80	934.43	.00	320.	7736.	.00	6.67	.00
.90	934.84	.34	328.	8892.	.60	6.63	.00
1.00	935.13	.63	333.	9998.	.87	6.63	.00

*** NORMAL END OF HEC-1 ***

CITY OF HAGERSTOWN

DEPARTMENT OF UTILITIES

425 East Baltimore Street
Hagerstown, MD 21740-6105

51 West Memorial Blvd
Hagerstown, MD 21740-6848

August 12, 2019

To: Scott Nicewarner, City Administrator

From: Nancy Hausrath, Director of Utilities
William Luhn, Water Operations Manager

Subject: Update on the Warner Hollow Dam/Edgemont Reservoir Project

Action: Discussion

Water Division Staff continues to work through the project challenges for the Edgemont Reservoir and the associated Water Appropriation Permit for Edgemont. I included the previous three project updates in this memorandum for reference.

In our April meeting with MDE, MDE requested the City update the Probable Maximum Precipitation (PMP) Analysis using the Virginia methodology. The justification for this request was based on the constructability issues and expected cost increase for the reconstruction of the Ogee and Emergency Spillway. MDE Dam Safety is generally in agreement with using the VA PMP Study, which would result in less rainfall intensity and a subsequent reduction in dam improvement sizing. However, MDE Dam Safety has not fully completed their review. MDE has requested additional input on the comparison of the Virginia temporal distribution to the Pennsylvania temporal distribution because of the overlap between the two data sets. MDE's wants to ascertain the two data sets are similar to one another near our project area. Additionally, MDE has requested from the author of the VA PMP Study a release of the data for use on this particular project.

Jeremy Hise (Hazen and Sawyer) and City Staff met with MDE on May 30, 2019 to discuss the recently updated PMP analysis for the Reservoir and to acquire direction from the Maryland Department of Natural Resources (M-DNR) for the additional requirements needed to determine safe yield and conservation flow (flow-by) that were discussed with City staff and MDE during a meeting on April 19, 2019.

It was our hope that this meeting would result in clear direction so that the Edgemont Rehab design could be completed – design remains at approximately 35%. To date, the approved City funding for the Evaluation and Design is $2,800,000 with the actual expenses to date totaling $917,000. However, the following direction was provided by MDE that will result in additional delays and increased expenses:

1. M-DNR expressed concern for cold water fisheries downstream in the Little Antietam Creek, including native Brook Trout and other potentially endangered species. Fisheries would prefer a flow by that varies with natural stream flow, such as 85% passing using the Maryland Flow-By Method. Important to note is that water has not been diverted from Raven Rock to Edgemont for many years. Fisheries would like to preserve the established aquatic habitat. Limiting flow in Raven Rock to 0.2 cfs for the entire year would not accomplish this goal. M-DNR would prefer to limit how much warm water overtops the dam – this has to be assessed via modeling to minimize spill and minimize use of Raven Rock. Action required is for Hazen to assess warm water overtopping with an updated modeling effort and will be presented to MDE and M-DNR at a follow up meeting to be scheduled.

2. MDE Water Supply will require use of the Maryland Flow-By Method with any new permit appropriation or increase in existing appropriation. MDE is requiring the combined watersheds of Warner Hollow and Raven Rock to calculate the required flow-by, as prior to the dam those two streams would have combined. There will not be a flow-by requirement for Warner Hollow – DNR noted there are no known fisheries that would be impacted by this warm water supply. However, the total flow-by will increase for Raven Rock unless the flow-by calculated by the combination of both watersheds is above the flow along Raven Rock. It was also noted that any seasonal flow-by at Raven Rock would require seasonal modification of the diversion at Raven Rock. This will be accounted for in the design (i.e. removable weir, adjustable weir, etc.).

3. M-DNR will require screening at Raven Rock, but not at Warner Hollow (Edgemont Reservoir/Warner Gap Hollow Dam).Screening requirements include 0.5 fps entrance velocity and 1 mm screen mesh sizing. Screens are required because trout will not spawn in the lake (warm water). Screening will only be necessary during spawning season (October 1st to April 30th). However, DNR is concerned with adult trout getting into the reservoir during other times of the year. Therefore, some amount of screening may be required throughout the year at Raven Rock to prevent adult trout from entering Edgemont Reservoir.

4. MDE and M-DNR is also requiring an evaluation of the current condition of the existing fish ladder and it is uncertain if repairs or modifications will be required.

Staff submitted an updated funding application to MDE in January 2019. The updated funding application reflected the most recent estimated construction project cost of approximately $12 million dollars. MDE completed their review of all projects submitted and the Edgemont Rehabilitation Project was not included on the State's Intended Use Plan (IUP) for funding. As you will recall, MDE included this project on the previous IUP.

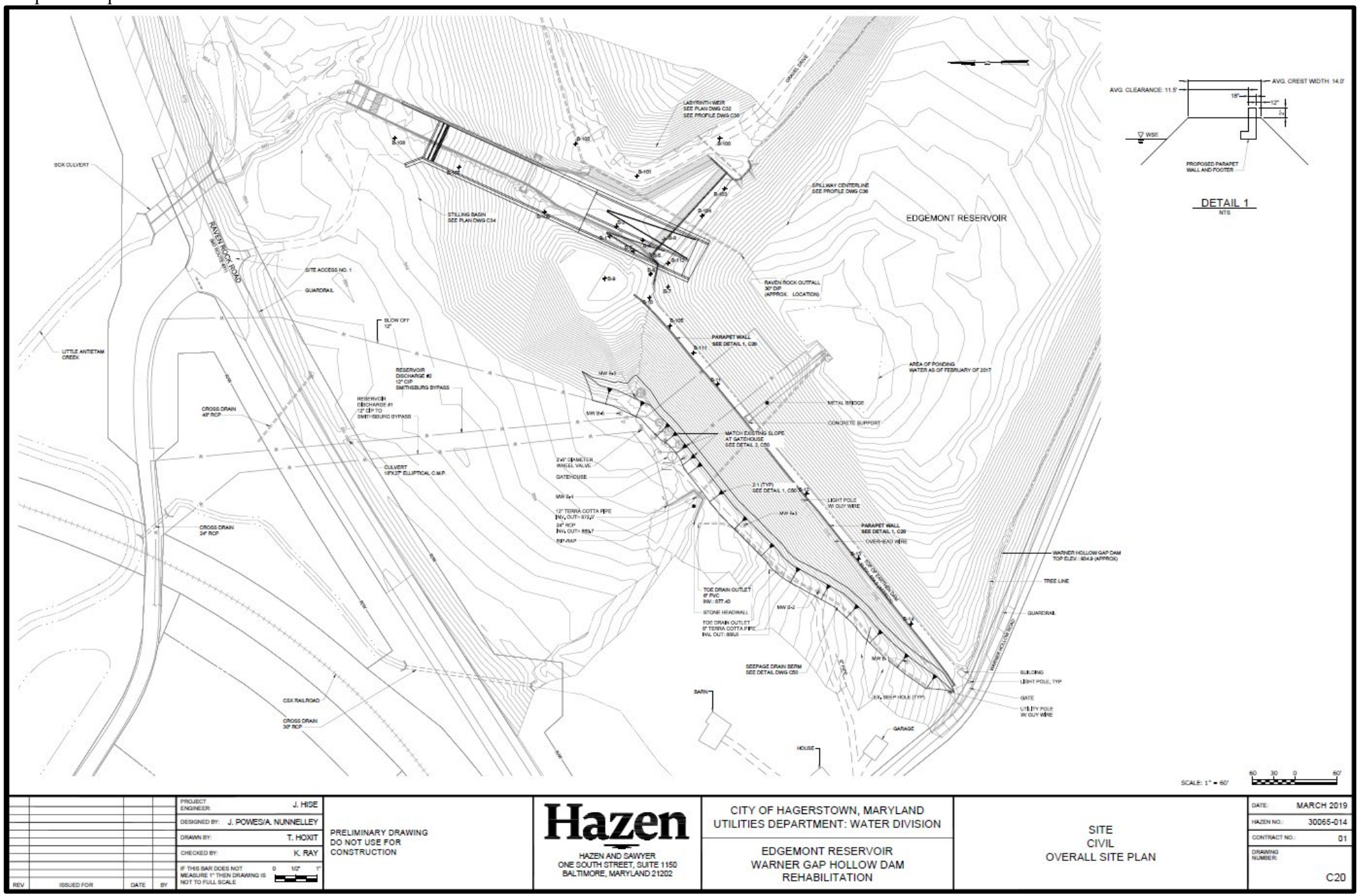
Appropriation permit renewal applications have been submitted for the Edgemont and Potomac sources. As previously indicated, MDE is now requiring, in addition to the Capacity Management Study, a Screening Study for both sources. The purpose of the screening studies is to determine the impact on fish that can enter intake pipes/structures. At this time we are not clear on the exact requirements should MDE and M-DNR require the design and installation of improvements to prevent fish from entering the intakes at each source.

Hazen and Sawyer is the Engineer of Record with MDE for Edgemont/Warner Hollow and for the RC Willson Appropriation permit applications and provided estimates for the additional requirements. The preliminary estimate to prepare the Screening Feasibility Study and Design at RC Willson is 200,000. The Edgemont Screening Feasibility Study and Design will also include a Diversion Pipe Evaluation is expected to cost $245,000. These estimates do not include construction phase engineering or actual construction costs. As you can see in the chart below, should MDE be amenable to permitting the City to utilize the Virginia Model for PMP, the cost to replace the ogee and spillway would decrease. Please note that the estimates below do not include the screening and diversion piping nor do they include any estimates for the Breichner Plant. If I were to provide a conservative estimate, I would plan for an $18M to $20M for the Edgemont/Breichner improvements. Because the RCW Plant intake is located on NPS land and extends into the Potomac, I would expect this to be a $3M to $5M dollar project.

Date	Basis	Construction Cost Estimate
03/03/2017	Ogee/Grout/Seepage	$4,727,500
1/23/2018	MD Hydrology Update Full Spillway/Grout/Seepage	$10,608,000
4/10/2019	MD Hydrology Update HMR 72-Hour Full Spillway/Grout/Seepage	$12,934,00
5/30/2019	VA PMP 6-Hour Full Spillway/Grout/Seepage	$9,678,750
5/30/2019	VA PMP 6-Hour 1-Foot Parapet Full Spillway/Grout/Seepage	$8,816,000
5/30/2019	VA PMP 6-Hour 2-Foot Parapet Full Spillway/Grout/Seepage	$7,605,250

Staff is available to answer and questions you may have or provide additional information.

Proposed Improvements – Site Plan



DETAIL 1
NTS

REV	ISSUED FOR	DATE	BY

PROJECT ENGINEER: J. HISE
DESIGNED BY: J. POWESIA. NUNNELLEY
DRAWN BY: T. HOXIT
CHECKED BY: K. RAY
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE 0 1/2" 1"

PRELIMINARY DRAWING
DO NOT USE FOR
CONSTRUCTION

Hazen
HAZEN AND SAWYER
ONE SOUTH STREET, SUITE 1150
BALTIMORE, MARYLAND 21202

CITY OF HAGERSTOWN, MARYLAND
UTILITIES DEPARTMENT: WATER DIVISION

EDGEMONT RESERVOIR
WARNER GAP HOLLOW DAM
REHABILITATION

SITE
CIVIL
OVERALL SITE PLAN

DATE: MARCH 2019
HAZEN NO.: 30065-014
CONTRACT NO.: 01
DRAWING NUMBER: C20

CITY OF HAGERSTOWN

425 East Baltimore Street
Hagerstown, MD 21740-6105

DEPARTMENT OF UTILITIES

51 West Memorial Blvd
Hagerstown, MD 21740-6848

March 5, 2018

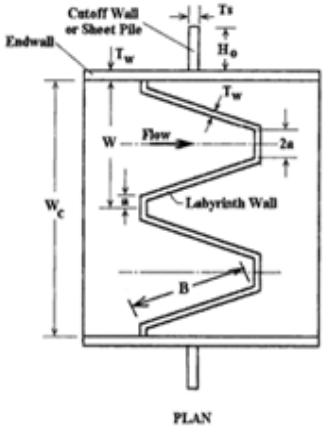
To: Valerie Means, City Administrator

From: Michael Spiker, Director of Utilities
Nancy Hausrath, Water Operations Manager

Subject: Warner Hollow Dam/Edgemont Reservoir Project

Action: Discussion

In accordance with direction provided by the Mayor and Council regarding the repair and restoration of the Edgemont Reservoir (Warner Hollow Dam), staff is reporting additional findings from the final Study/Evaluation of the Edgemont Reservoir to include additional work required and the revised cost estimate to complete this work.



PLAN

The end result of the Design Storm Evaluation (required by MDE) of the existing Ogee and Spillway is that it does not meet Dam Safety Standards. The existing ogee and spillway transition, and chute spillway cannot safely pass the Probable Maximum Precipitation (PMP Design Storm). Should the Mayor and Council decide to move forward with this work, the work will result in the removal and reconstruction of the existing concrete structures (ogee, transition spillway, and chute spillway). The new design will result in a labyrinth weir for the spillway entrance thus increasing the length of the weir from 160 feet to 400 feet. In addition to the labyrinth weir, a new spillway transition, and chute spillway will be constructed – this will be done in a manner that addresses the ongoing seepage under the existing structure.

The total estimated cost to repair the existing earthen dam and remove and replace the ogee and spillway structures to meet current Dam Safety requirements is $12,553,000. This will result in an estimated project increase amount of $6,745,500. Please note that the new estimate includes $1,945,000 for Engineering Services, $3,978,000 in Construction Contingency, and $6,630,000 in actual estimated construction expenses. The Contingency is higher than would be typical of most construction projects because of the ongoing seepage and higher potential for additional work once the concrete structures are removed. A detailed breakdown of the revised cost estimate can be found on page 2 of this memorandum.

The project schedule will be modified once staff has received additional direction from the Mayor and Council based on the information provided herein and once we receive the funding ranking/rating from MDE. Please see attached memorandum from March 2017 for previous funding needs and project schedule.

As a reminder and directly related to the Edgemont Reservoir restoration/rehabilitation project are the upgrades to the Breichner WTP. While an in-depth engineering evaluation has not been completed, a summary of needed improvements has been completed and the current estimate to upgrade the Breichner WTP is approximately $4.9 million.

Brief project update - staff continues to work on the Traveling Screen & Tank Mixing Project and will request Mayor and Council approval of the funding documents at the March 20th meeting. The EWIP project continues to move forward as well and is currently grant funded.

As always, staff is available to answer and questions you may have regarding the work completed to date and future planned work.

Edgemont Reservoir Dam Rehabilitation
Conceptual Budget Estimate

	Budget
Engineering Services	
Heavy Civil	$280,000
Structural Design	$340,000
Geotechnical Engineering	$100,000
Project Bidding	$50,000
Sub-Total	$770,000
Construction Services	
Construction Administration	$200,000
Dam Embankment Monitoring & Testing	$250,000
Grout Curtain Monitoring	$80,000
Spillway Monitoring & Testing	$500,000
Sub-Total	$1,030,000
Post Construction Services	
As-Built Surveys	$15,000
Monitoring Point Surveys	$25,000
Piezometer Readings	$50,000
Monitoring (12-Months)	$55,000
Sub-Total	$145,000
Construction	
Dam Rehabilitation	$500,000
Grout Curtain Enhancement	$900,000
Ogee Weir & Spillway Demolition	$700,000
Weir Structure Replacement	$760,000
Spillway Replacement	$2,900,000
Spillway Excavation	$710,000
Access Improvements	$160,000
Sub-Total	$6,630,000
Construction General Conditions & Division 1 (25%)	$1,657,500
Construction Contingency (35%)	$2,320,500
Construction Total	$10,608,000

	Budget
Engineering Services	$770,000
Construction Services	$1,030,000
Post Construction Services	$145,000
Construction	$10,608,000
Project Total	**$12,553,000**

CITY OF HAGERSTOWN

425 East Baltimore Street
Hagerstown, MD 21740-6105

DEPARTMENT OF UTILITIES

51 West Memorial Blvd
Hagerstown, MD 21740-6848

March 10, 2017

To: Valerie Means, City Administrator

From: Nancy Hausrath, Water Operations Manager
Michael Spiker, Director of Utilities

Subject: Edgemont Reservoir Improvements

Action: Discussion

Per previous discussions with the Mayor and Council, the following is supplied as a preliminary summary of findings resulting from the ongoing Edgemont Reservoir evaluation performed by Hazen and Sawyer Engineering. The evaluation of current conditions has been completed and preliminary recommendations are also complete. The primary focus of the evaluation was the repair and rehabilitation of the existing structures (earthen dam and the emergency spillway). To this end, the following improvements are being considered to address issues with both the earthen dam and emergency spillway:

1. Dam Rehabilitation which will require actual work to the earthen embankment at the toe to include toe drains, seepage drains, and modifications to the plunge pool. Work may also include the installation of a chimney drain and toe drain outlets. The cost for this work is estimated at $500,000.

2. Grout Curtain/Grout Enhancements which will include taking advantage of the work that was completed in the 1960's and 1990's upstream of the spillway and crossing the earthen embankment. Work will also include the installation of a new grout curtain that will essentially "weave together pre-existing grouting to new grouting" to create a grout mesh barrier. Testing and analysis will be ongoing throughout the installation to ensure the end effectiveness of the grout curtain. The cost for this work is estimated at $900,000.

3. Spillway Re-Construction which will require the removal of a section of the existing emergency spillway and the ogee wall. Once partial removal of the structure is completed, an evaluation of the existing underdrain will occur as will an evaluation of the 30" raw water conveyance line from Raven Rock. Repairs will be made as required to address subsurface seepage issues under this structure. The cost for this work is estimated at $1,500,000.

4. Access Improvements will be required to enable needed access of construction equipment. Where feasible, the access improvements will remain in-place. Because of the nature of the work and work-site, some of the construction access improvements will have to be removed to allow for use of the reservoir. The cost for this work is estimated at $150,000.

Because of the nature of this work, construction phase engineering and post construction services will be extensive and are estimated at $656,000. Construction phase engineering services will include general construction administration ($75,000), dam embankment monitoring and testing ($150,000), grout curtain monitoring ($60,000), and spillway monitoring and testing ($250,000). In August Mayor and Council reviewed and approved the Study,

Design and Bidding Engineering Proposal from Hazen and Sawyer with an estimated cost of $415,000. Total Design, Construction, and Post-Construction Engineering Services are estimated at $1,080,000.

At this juncture, staff is recommending that we acknowledge the potential for latent conditions that can potentially increase and/or modify the scope of work and as such is including a sizable construction contingency of $1,677,500. It is possible that this contingency amount will not be fully utilized and it is staff's hope that the contingency amount will not increase as a result of latent conditions discovered during construction.

With the aforementioned in mind, the total estimated cost to complete the MDE Dam Safety Division required improvements to allow the City to place the Edgemont Reservoir back in service is $5,807,500. The below chart provides the estimated costs in table format.

	Budget
Engineering Services	
Heavy Civil	$120,000
Structural Design	$230,000
Geotechnical Engineering	$30,000
Project Bidding	$35,000
Sub-Total	$415,000
Construction Services	
Construction Administration	$75,000
Dam Embankment Monitoring & Testing	$150,000
Grout Curtain Monitoring	$60,000
Spillway Monitoring & Testing	$250,000
Sub-Total	$535,000
Post Construction Services	
As-Built Surveys	$15,000
Monitoring Point Surveys	$15,000
Piezometer Readings	$50,000
Monitoring (12-Months)	$50,000
Sub-Total	$130,000
Construction	
Dam Rehabilitation	$500,000
Grout Curtain Enhancement	$900,000
Spillway Reconstruction	$1,500,000
Access Improvements	$150,000
Sub-Total	$3,050,000
Construction General Conditions & Division 1 (25%)	$762,500
Construction Contingency (30% - AACE Class 5 Estimate)	$915,000
Construction Total	$4,727,500

	Budget
Engineering Services	$415,000
Construction Services	$535,000
Post Construction Services	$130,000
Construction	$4,727,500
Project Total	**$5,807,500**

The project continues to be on schedule – below is the schedule that was provided in August 2016 to both Mayor and City Council and MDE-Dam Safety. Important to note: at this time MDE-Dam Safety is satisfied with the progress and direction of the project and a Consent Agreement has not been drafted. It is Staff's hope that we can continue in this manner and eliminate the need for a future Consent Agreement.

	Milestone:	Start Date	End Date	Duration	Cumulative Duration
1.	Supplemental Investigation/Design Evaluation	6/1/2016	1/31/2017	8	8
2.	Dam Recommendation Review by City and MDE	2/1/2017	3/31/2017	2	10
3.	Design Contracting	4/1/2017	5/31/2017	2	12
4.	Dam Repair/Rehabilitation Design (or Alternative Design)	6/1/2017	1/31/2018	8	20
5.	Construction Bidding	2/1/2018	5/31/2018	4	24
6.	Construction	6/1/2018	6/1/2019	12	36
7.	Post Construction Monitoring	6/1/2019	6/1/2020	12	48

In order for City Staff, Engineering Staff and Contractors to work safely through the project's completion, we recommend that hunting on Watershed Property be suspended. Additionally, staff continues to work with Aaron Cook of the MD Department of Natural Resources to utilize best management practices of our Watershed Management Plan. The Plan may include the thinning of select timber which will be presented to the Mayor and Council at a future work session.

Directly related to the Edgemont Reservoir restoration/rehabilitation project are the upgrades to the Breichner WTP. De-commissioning is ongoing and will be completed this summer. While an in-depth engineering evaluation has not been completed, a summary of needed improvements has been completed and the current estimate to upgrade the Breichner WTP is approximately $4.9 million as detailed in the chart on the following page.

It was requested that an estimated cost to decommission the Edgemont Reservoir and Breichner WTP be provided and that estimate is between $3 and $4 million. Should a decision be made to t to proceed with decommissioning these facilities, staff would need to work Hazen to develop a scope of services.

Attached to this memorandum are several schematics showing the areas that have been evaluated and the planned areas where the improvements will occur.

As always, staff is available to answer and questions you may have regarding the work completed to date and future planned work.

Costs to Renovate the Breichner WTP

	Budget
Engineering Services	
Civil	$50,000
Mechanical	$250,000
Discipline Engineering/Support	$150,000
Project Bidding	$20,000
Sub-Total	$470,000
Construction Services	
Construction Administration	$125,000
Monitoring & Testing	$75,000
Onsite Observation	$250,000
Sub-Total	$450,000
Post Construction Services	
As-Builts	$25,000
Miscellaneous	$30,000
Sub-Total	$55,000
Construction	
Ammonia Feed System	$250,000
SCADA System	$650,000
Clarifier Improvements	$750,000
Iron and Manganese Improvements	$250,000
Filter Renovations	$225,000
Analytical Equipment Replacement	$150,000
Raw and Finished Water Chemical Feed Improvements	$175,000
Miscellaneous Improvements	$75,000
Sub-Total	$2,525,000
Construction General Conditions & Division 1 (25%)	$631,250
Construction Contingency (30% - AACE Class 5 Estimate)	$757,500
Construction Total	$3,913,750

	Budget
Engineering Services	$470,000
Construction Services	$450,000
Post Construction Services	$55,000
Construction	$3,913,750
Project Total	**$4,888,750**

CITY OF HAGERSTOWN

425 East Baltimore Street
Hagerstown, MD 21740-6105

51 West Memorial Blvd
Hagerstown, MD 21740-6848

February 16, 2016

TO: Valerie Means, City Administrator

FROM: Michael S. Spiker, Director of Utilities
Nancy Hausrath, Water Operations Manager

SUBJECT: Edgemont Reservoir and W.M. Breichner Water Treatment Plant

ACTION: Discussion

Edgemont Background

The Edgemont Reservoir (Warner Gap Hollow Dam) constructed in 1902 is the raw water supply for the W.M. Breichner Water Treatment Plant (BWTP). In 1993, major reservoir work was completed which resulted in modification of the spillway capacity, construction of a new intake tower, re-lining of the existing 30" cast-iron drawdown pipe, construction of a new concrete emergency spillway, and removal of 20,000 cubic yards of silt.

Recent inspections (beginning in 2006) have revealed areas of concern near the left abutment of the downstream toe to include a wet area, missing and exposed toe-drain pipe, and tree root intrusions into the earthen embankment. As a result of the 2006 findings, the City contracted with Triad Engineering in 2007 to perform a geophysical investigation to determine the source and extent of the spillway channel seepage. This study included a microgravity survey, self-potential, and electrical imaging measurements which resulted in a schematic of subsurface moisture and seepage pattern.

As a result of the 2007 Study and as required by Maryland Department of the Environment – Dam Safety Division (MDE-DS) and to control the seepage traveling beneath the dam and possibly through the lower portion of the dam, the City contracted with Triad Engineering to prepare plans and specifications to construct a subsurface interceptor drain and remove root intrusions – this work was completed in 2009/2010 in an effort to ensure stability of the structure.

Current Status and Needs of Edgemont:

In December 2013, a new seep formed at the toe of the earthen embankment near the left downstream abutment. The flow from this seep is directly related and proportional to the pool elevation in the reservoir and as such, the reservoir has been maintained a minimum of six (6) feet below the emergency spillway elevation.

The City met with officials from MDE-DS in February 2014 to discuss this seepage and recommendations for remediation. Resulting from this meeting and subsequent site inspection(s), MDE-DS provided follow-up correspondence detailing the required work. This correspondence also provides notice that MDE-DS intends to draft a formal Consent Agreement to establish timeframes for permanent repair or removal of the Edgemont Reservoir/Warner Gap Hollow Dam (correspondence attached). This Agreement will be drafted following a second resistivity study to determine if the nature and magnitude of the seepage under the emergency spillway has changed significantly.

As required by MDE-DS, staff worked with Triad Engineering to complete the required engineering proposals for a Dam Breach Analysis, Geotechnical Evaluation of the Spillway Floor, and a Geotechnical Evaluation of the Toe Seepage. These proposals were presented to Mayor and City Council in November of 2014 for review and approval. A kick-off meeting was held on January 28, 2015 with Triad Engineering to complete this work. Triad Engineering completed the study and subsequent report (attached) which identifies needed work and preliminary engineering and construction estimates as follows:

ITEM		ESTIMATED COST
1.a.	Spillway Floor Evaluation	$18,000 to $25,000
1.b.	Construct Blanket/Toe Drain	$40,000 to $60,000
1.c.	Control Reservoir Elevation	$75,000 to $250,000
4.	Filling Voids Under Spillway Floor and Retaining Wall Foundation	$75,000 to $150,000
5.	Perform Extensive grouting Program	$2,000,000 to $2,500,000
6.	Complete Removal of the Embankment/Structures and Restoration	$3,000,000 to $4,000,000
Estimated costs should be considered approximate. Refined costs can be obtained at the completion of the study period		

Based on the most recent annual inspection performed by MDE on May 19, 2015, the current condition of the dam is considered unacceptable due to ongoing seepage problems at the right abutment and under the spillway. In summary, The Edgemont Reservoir is classified as a High Hazard Dam meaning that failure of the dam could lead to catastrophic damage and loss of life. Based on the current EAP and detailed breach analysis completed in October 2015, a total of 77 property owners would be affected if a failure of the embankment would occurred. In addition, 13 bridge/culvert type structures and up to 8 miles of roadway would be inundated during a breach. Any structural damage to the railroad bridge could result in a long-term delay of the railroad track use. The following sections of this report will evaluate and determine the most appropriate remedial action to restore the embankment to a condition acceptable to MDE. Please note that remediation may include a recommendation to breach the reservoir and restore the site to its original condition. Should this occur, staff will likely recommend a hydrologic study to determine the viability of a ground water supply (well system) for the BWTP.

To comply with Maryland Department of the Environment Dam Safety Division (MDE-DS) requirements, the City has retained the services of Triad Engineering. Triad Engineering, in conjunction with City staff, continue to collect monitoring well data (changes in ground water levels associated with reservoir pool elevation) and conduct routine dry and wet weather site inspections of the earth embankment.

Current Status and Needs of the W.M. Breichner Water Treatment Plant:

CIP C0405 contains requested funding of $4.3 million through FY19 for upgrades (engineering and construction costs) and CIP0820 contains requested funding for $600,000 for the required SCADA upgrades. These costs are based upon assumptions utilizing the current source of supply.

Per our discussions detailed above regarding the dam/reservoir, engineering and design parameters may change if the current source of supply is no longer a valid option. The preliminarily discussion of the option of utilizing ground water supply (well system) with MDE and our engineering consultant is forthcoming. In order to utilize a well system, studies must occur detailing the aquifer/hydrologic capabilities of the site, local and state requirements, and final permitting through the MDE.

The bulleted discussion points contain options related to the anticipated compliance, regulatory, public safety requirement and financial obligations of the Water Division. Any costs associated with the following are estimates derived through discussions between Staff and Triad Engineering;

- The repair of the existing Edgemont dam (grout injection and sub-soil stabilization at the toe and repair of the spillway) may well approach $3to $5million. If repairs of this nature were to be completed, the City still has associated liabilities and responsibility for the operation of a dam that is over 110 years old.
- If the cost benefit analysis of the Edgemont dam repairs exceeds a threshold of the costs associated with a change in water supply treatment, the breaching of the reservoir and restoration of the site is estimated at $3to $4 million. Total site restoration of the property may require the removal of the existing structures located at the reservoir.
- Estimated study costs of the initial ground water system to be located at the BWTP are approximately $100,000 – this estimate can be refined should the Mayor and Council wish to pursue this option.
- CIP CO405 will require further engineering studies to determine cost estimates required to attain the change in the source supply treatment parameters.
- If the Edgemont dam was breached and the property returned to a more natural state, the need for a watershed protection area is eliminated. The consideration of the sale of a portion of the approximately 1300 acres would greatly assist in the offset of any of the aforementioned costs associated with a change in water supply treatment. A major point of consideration would be retaining sufficient property utilized as a buffer for the Appalachian Trail per our 2006 agreement ($800,000 one-time payment).

Staff is available to further discuss requirements, options, schedules, funding, etc., should you have questions regarding future requirements regarding the long term viability of the Edgemont Reservoir and the Breichner WTP.

Little Antietam Creek
RAVEN ROCK HOLLOW ROAD
Raven Rock Hollow Run
MD. ROUTE 491
N
B.M.#73
24" Drain
N10,500
E19,750
12" Discharge #2 By-Pass Smithsburg Flume & Basin
12" Discharge #1 To Smithsburg
12" Blow-Off
Sta.1+10 Inv.861.46
6" P.V.C. Drain Perforated
Sta.0+05 Inv.862.06
Riprap Class II For Enlarged Scale, See C-4.
Sta.4+99± Sta.0+00 Inv.862.09
Remove existing Concrete Spillway and Footbridge For Enlarged Plan and Profile of New Spillway, See C-4
℄ Spillway
For Lined Waterway See C-10 & C-12
Pedestrian Access Spillway Bridge For Detail See S-14.
Ex. Dirt Service Road
30" R.W. Supply
Manhole No.1 For Detail See C-8
Transition Shoulder to Existing Shoulder
7+24.65
25'
E20,500
N10,000
Transition Typical Service Road Section to Existing Road
Traffic Barrier W Beam with End Section 28 Post @ 6.25' o/c = 175.00' For Detail See Maryland Department of Transportation SHA Standard No. MD-660.01 Bound in the Specification.
Limit of television inspection, cleaning, lining, and testing the 12" reservoir discharges. For Enlarged Plan, see C-9
Existing Footbridge
0+00 ℄ Spillway = 1+22 ℄ Ogee
℄ Ogee
Riprap Road Ditch For Detail See C-3
Typical Service Road Section
Limit of Clearing and Grubbing
Transition Existing Road to Typical Service Road Section.
Ex. Dirt Service Rd.
P.I. Curve No.7
P.I. Curve No.6
M2528
M2530
Riprap Class I Bank Protection For Detail See C-8
Remove & Relocate 30" R.W. Supply. For Profile & Detail See C-8.
30" R.W. Supply
12" Reservoir Discharge #2
12" Reservoir Discharge #1
30" Reservoir Drain
Top Dam Elev. 934.50
Pedestrian Access Control Tower Bridge See S-14
Area of Silt Removal For Construction of Control Tower and New Piping
CONTROL TOWER
For Enlarged Plan, Profiles and Stakeout See C-7. For Structural Details See S-2, S-3 & S-4
Remove accumulated debris in outlet structure down to original invert. Repair/improve outlet protection as directed by the Engineer if req'd.
Limits of television inspection, cleaning, lining, and testing the 30" reservoir drain. For enlarged plan, see C-9.
N10,000
E19,750
3" Pipe 2' Out Gr.
Light Pole P.K. Nail
H841 Rebar & Cap
Ex. Spillway
H842, H843, H844 & H845 R.R. Spike
12" Hick. P.K. Nail
10" Beech P.K. Nail
10" Maple P.K. Nail
To H845
H846 Rebar & Cap
15" Pine
12" Pine
To H842
To M2528
H847 Hub
Bench Mark #73
Square Cut on Top N.E. Corner Concrete Headwall of Culvert at Md Route 491 at Little Antietam Creek
P.O.L. 4+99 ℄ Spillway at End Baseline Spillway
0+00 ℄ Spillway = 1+22 ℄ Ogee
Baseline Ogee
P.O.T. 1+77.23
P.I. Curve No.8
℄ Access Road
P.O.T. 3+51.14 ℄ S
P.I. Curve No.7 42.26' Offset
P.O.L. Traverse 1+28.78
P.O.L. Traverse 2+47.20
P.I. Curve No.6 4.68' Offset
STAKEOUT
BASELINE SPILLWAY AND SERVICE ROAD
Existing Contours
Proposed Contours
Woods
P.I. Traverse
Boring
Test Pit
Existing Road
Proposed Road
Existing Supply
Existing Reservoir Drain
Proposed Raw Water
Traffic Barrier
Utility to be Removed
Exist Reservoir Discharge

℄ SERVICE ROAD

STATION	BEARING	DISTANCE
0+00 ℄ Ex. Rd.		
	N46°00'18"W	38.26'
0+38.26 P.C.		
CURVE No.6	Ch.N51°04'28"W	35.34'
0+73.65 P.T.		
	N56°08'38"W	215.71'
2+89.36 P.C.		
CURVE No.7	Ch.N43°06'12"W	67.69'
3+57.64 P.T.		
	N30°03'47"W	150.78'
5+08.43 P.C.		
CURVE No.8	Ch.N20°35'03"E	77.33'
5+96.82 P.T.		
	N71°13'53"E	127.83'
7+24.65 ℄ Ex. Rd.		

TRAVERSE

P. I.	BEARING	DISTANCE
H841		
	N61°32'16"E	278.80'
H842		
	N24°59'60"E	170.84'
H843		
	N25°59'34"E	173.87'
H844		
	N25°04'51"E	164.67'
H845		
	N21°48'47"E	147.95'
H846		
H842		
	N59°32'53"E	91.65'
H847		
	S28°12'00"E	99.49'
M2528		
	S52°14'37"E	150.29'
M2529		
	S45°35'06"E	348.12'
M2530		

BORINGS

No.	Elev.
E-1	938.2
E-2	933.0
E-3	929.4
E-4	939.7
E-5	925.6
E-6	896.2
E-7	879.6
E-8	872.7
E-9	868.8
B-10	Top Silt 932±
E-11	872.3
E-12	915.0
E-13A	957.0
E-13B	929.1
E-14	887.4
E-15	866.9

Curve No.8	Curve No.7	Curve No.6
Δ=101°17'39"	Δ=26°04'51"	Δ=10°08'20"
R=50'	R=150'	R=200'
T=60.97'	T=34.74'	T=17.74'
L=88.40'	L=68.28'	L=35.39'

STATE OF MARYLAND REGISTERED PROFESSIONAL ENGINEER

Edward A. Sesp III

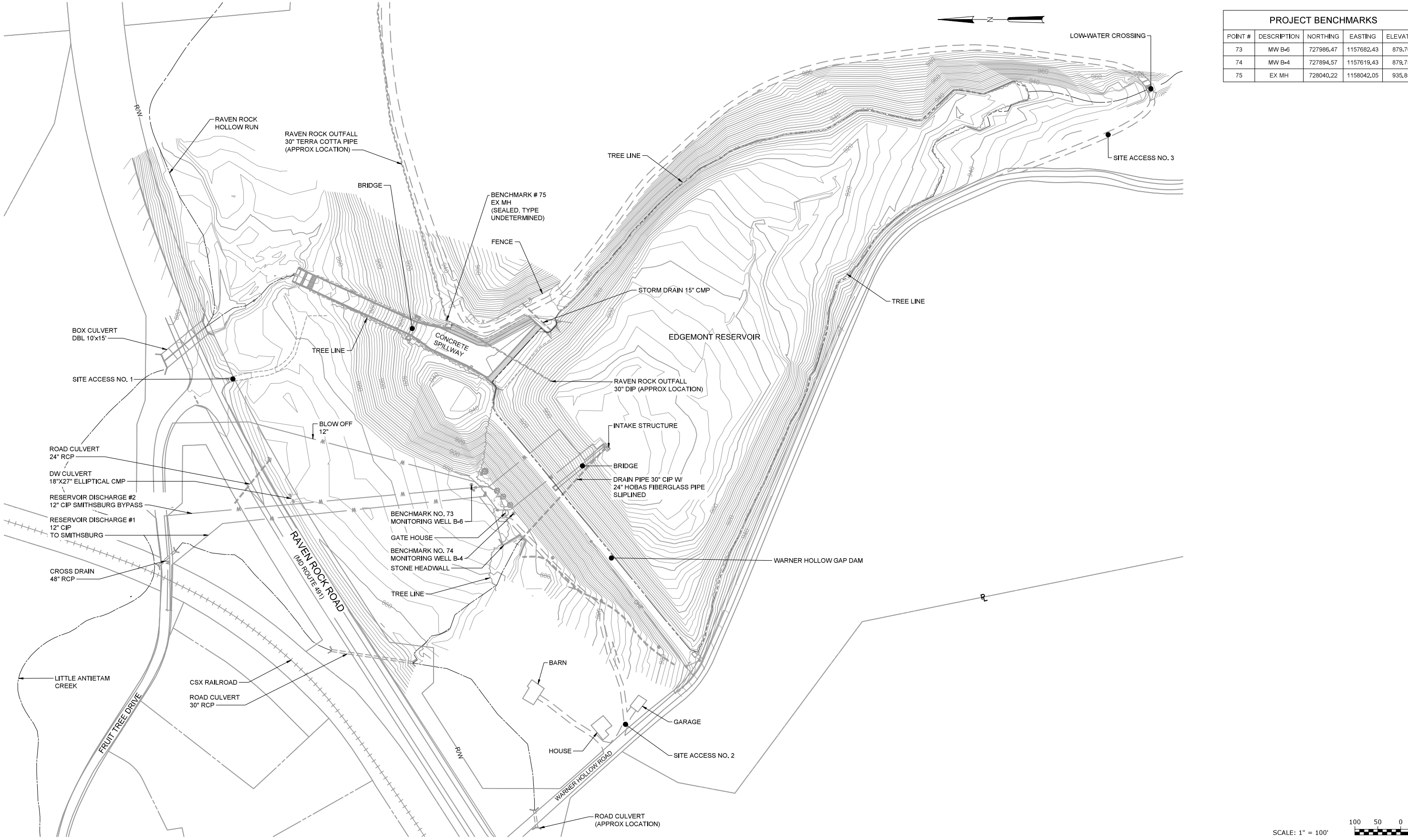
RECORD DRAWINGS

WHITMAN, REQUARDT AND ASSOCIATES ENGINEERS BALTIMORE, MARYLAND	DESIGNED R.B.C. DRAWN P.L.B. CHECKED R.B.C.	CITY OF HAGERSTOWN MARYLAND	EDGEMONT DAM	EXISTING SITE, GRADING AND STAKEOUT PLAN	GRAPHIC SCALE 1"=50'	DATE MAY, 1991	DRAWING NO. C-3	PROJECT NO. 03-804-168	SHEET NO. 3 OF 26

W.O. 50156

55-58-10-03

PROJECT BENCHMARKS				
POINT #	DESCRIPTION	NORTHING	EASTING	ELEVATION
73	MW B-6	727986.47	1157682.43	879.706
74	MW B-4	727894.57	1157619.43	879.755
75	EX MH	728040.22	1158042.05	935.858



REV	ISSUED FOR	DATE	BY

PROJECT ENGINEER:	J. HISE
DESIGNED BY:	J. POWERS/A. NUNNELLY
DRAWN BY:	T. HOXIT
CHECKED BY:	K. RAY

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE 0 1/2" 1"

PRELIMINARY DRAWING
DO NOT USE FOR
CONSTRUCTION

Hazen

HAZEN AND SAWYER
ONE SOUTH STREET, SUITE 1150
BALTIMORE, MARYLAND 21202

CITY OF HAGERSTOWN, MARYLAND
UTILITIES DEPARTMENT: WATER DIVISION

EDGEMONT RESERVOIR
WARNER GAP HOLLOW DAM
REHABILITATION

SITE
CIVIL
EXISTING CONDITIONS PLAN

DATE:	MARCH 2019
HAZEN NO.:	30065-014
CONTRACT NO.:	01
DRAWING NUMBER:	C01

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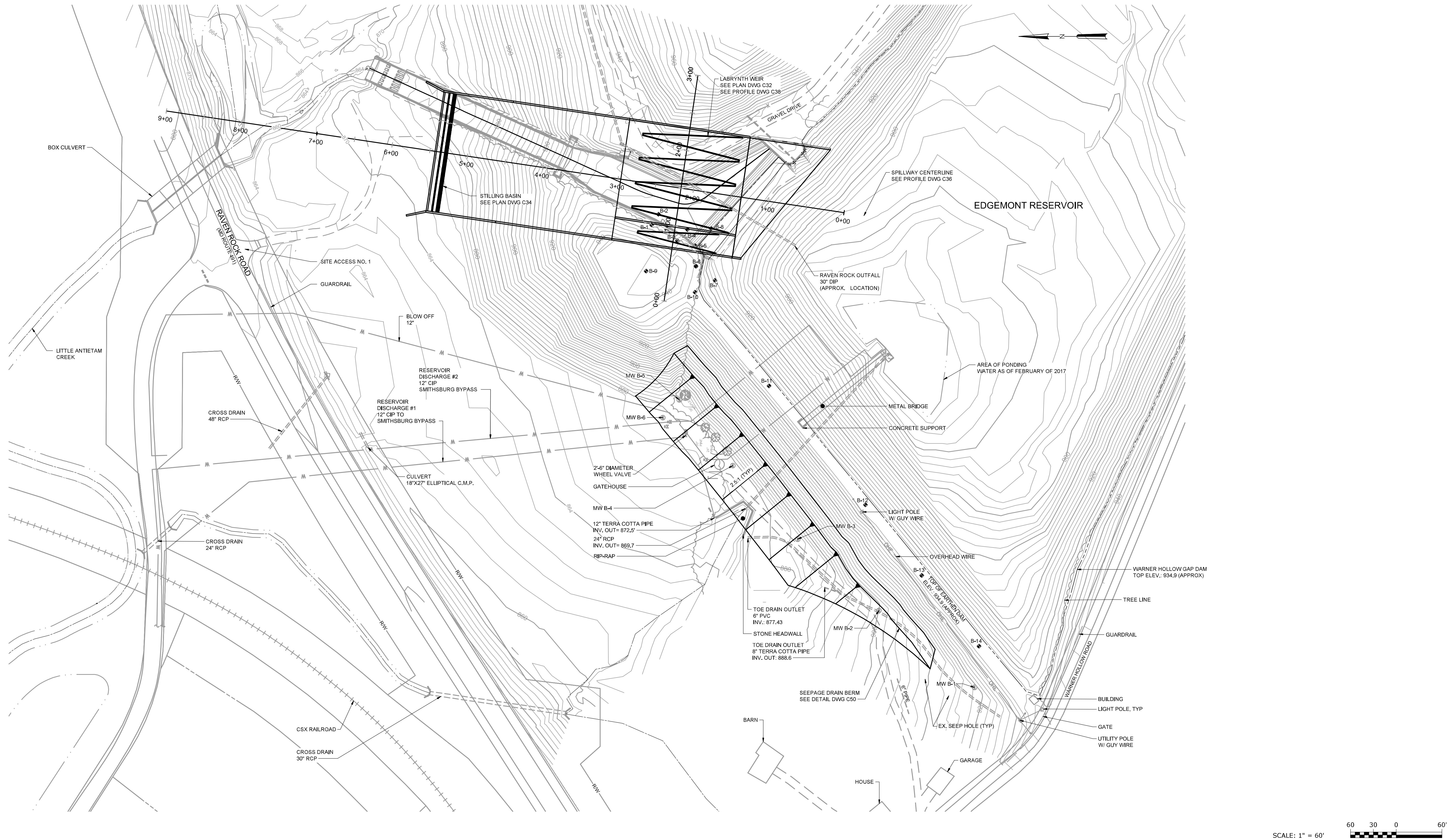

REV	ISSUED FOR	DATE	BY

PROJECT ENGINEER: J. HISE
DESIGNED BY: J. POWES/A. NUNNELLEY
DRAWN BY: T. HOXIT
CHECKED BY: K. RAY
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BALTIMORE, MARYLAND 21202

CITY OF HAGERSTOWN, MARYLAND
UTILITIES DEPARTMENT: WATER DIVISION

EDGEMONT RESERVOIR
WARNER GAP HOLLOW DAM
REHABILITATION

SITE
CIVIL
OVERALL SITE PLAN

DATE: MARCH 2019
HAZEN NO.: 30065-014
CONTRACT NO.: 01
DRAWING NUMBER: C20

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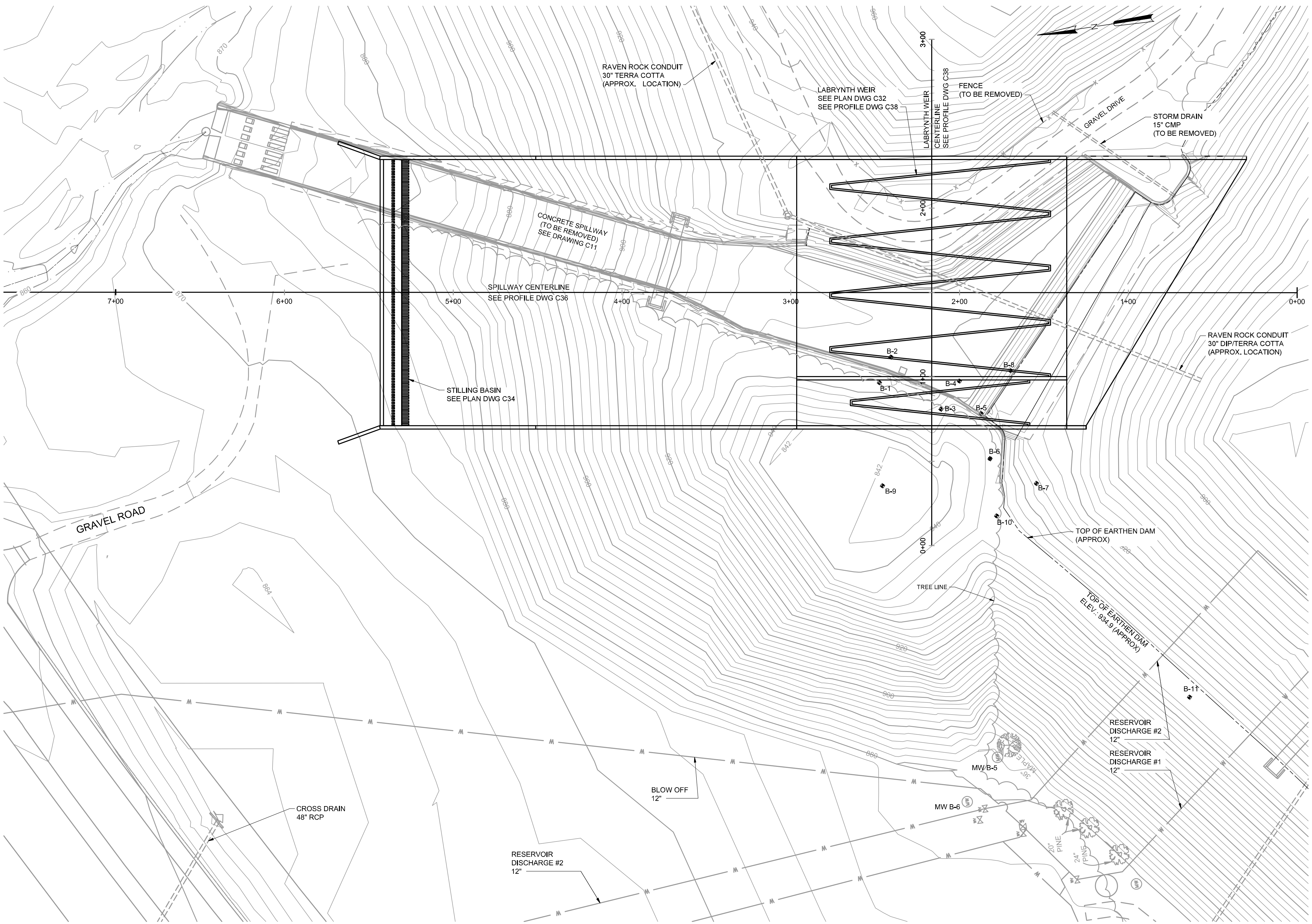

REV	ISSUED FOR	DATE	BY

PROJECT ENGINEER: J. HISE
DESIGNED BY: J. POWERS / A. NUNNELLEY
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PRELIMINARY DRAWING
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HAZEN AND SAWYER
ONE SOUTH STREET, SUITE 1150
BALTIMORE, MARYLAND 21202

CITY OF HAGERSTOWN, MARYLAND
UTILITIES DEPARTMENT: WATER DIVISION

EDGEMONT RESERVOIR
WARNER GAP HOLLOW DAM
REHABILITATION

SITE
CIVIL
OVERALL SPILLWAY PLAN

DATE: MARCH 2019
HAZEN NO.: 30065-014
CONTRACT NO.: 01
DRAWING NUMBER: C30

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
Water/Wastewater Rate Model Update - *Nancy Hausrath, Director of Utilities*

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
RATE_MODEL_DISCUSSION_FINAL_MEMO_02112025.pdf	Memo - Water and Wastewater Rates (with attachments)

CITY OF HAGERSTOWN, MARYLAND

Utilities Department
1 Clean Water Circle • Hagerstown, MD 21740
Telephone: 301-739-8577, ext. 650
Website: www.hagerstownmd.org

February 5, 2025

To: Scott Nicewarner, City Administrator

From: Nancy Hausrath, Director of Utilities
Ashley Newcomer, Financial Manager
Tyler Puffenberger, Deputy Director of Utilities

Action: Discussion - Water/Wastewater Rate Model Update

As requested by the Mayor and City Council, please find attached a proposal from NewGen Strategies to reevaluate the Water and Wastewater Rate Model and to prepare multiple recommendations for consideration.

As detailed in the proposal, the water and wastewater rate study update will evaluate various rate and policy alternatives and their impacts on the City's expenses, revenues, and cash balances, as well as customer bills. The following rate and policy alternatives will be evaluated.

1. Replacing current tiered rates with unit rates
2. Removing class differentials (between residential and non-residential)
3. Evaluating the billing of fixed fees and fireline fees for customers with fireline
4. Developing an "Inside Joint" wastewater fee (due to new City development with a pump station flowing to the County)
5. Moving all non-residential customers to monthly (keeping rate code "R" as quarterly)
6. Sewer Billing Analysis for sewer deduct meters and/or irrigation meters

Attached also is the 2005 Memo to Mayor and Council from staff adopting the rate model that is currently used to determine required revenue and customer rates. Additionally the staff memo for the adoption of the first 5-year rate plan which became effective on November 1, 2009 for Fiscal Year 2010 through FY2014 is included for reference. Rates were adopted in January 2014 for FY15 through FY19. In Feb 2019 rates were adopted for FY20 through FY24.

As was discussed prior to the adoption of the FY25 and FY26 water and sewer rates, the Mayor and City Council can amend the existing rates via ordinance once the current rate model work is completed.

Staff will provide updated documents during the meeting.

NewGen Strategies & Solutions

900 Bestgate Road
Suite 402
Annapolis, MD 21401
Phone: (443) 951-0355

January 9, 2025

Ashley Newcomer
Utilities Financial Manager
City of Hagerstown
1 Clean Water Circle
Hagerstown, MD 21740

Subject: **Water and Wastewater Rate Study Update (FY 2026)**

Dear Ms. Newcomer:

Thank you for the opportunity to continue working with the City of Hagerstown. Based on our recent communication, I have prepared a brief scope of work and fee estimate to update the Water and Wastewater Rate Study for the City. The scope of work outlines the tasks necessary to complete an update to the comprehensive water and wastewater rate analysis.

We look forward to working with the City on the update. If you would like to discuss any aspect of this work, please contact me at (443) 951-0355 or by email at mmaker@newgenstrategies.net.

Very truly yours,

Michael Maker

Michael Maker
Partner
NewGen Strategies & Solutions, LLC

The following document presents our proposed scope of work and fee estimate for a water and wastewater rate study update for the City of Hagerstown.

Scope of Work

Below are ten tasks (and one optional task) proposed to complete the study update in a timely and comprehensive manner.

Task 1 – Data Review

We will submit a data request to the City and, once the data request has been submitted, have a call with the City to discuss the data needs as well as what has changed since the previous study was completed.

Task 2 – Revenue Requirements

The data provided by the City will be used to update the comprehensive water and wastewater financial model. The model will continue to be used to determine the full cost (revenue requirements) of separately operating and maintaining the City's water and wastewater systems. The water and wastewater system revenue requirements that will be updated in the model include:

- Assumptions
- Operating and maintenance expenses
- Miscellaneous revenues
- Debt payments
- Capital improvement projects and funding sources (e.g., cash, debt, etc.)
- Repair, replacement, and rehabilitation reserve
- Cash balances

The model will facilitate sensitivity analysis based on various input assumptions such as customer growth rates, interest rates, and inflation rates.

Task 3 – Customer and Usage Data

The City will be asked to provide the most current customer and usage data for the water and wastewater systems dating back to the most recent actual data within the current model. We will organize the updated data and base all future projections on the most recent full fiscal year of data. We will determine, based on the City's plans, the projected rate of customer and consumption growth for the new projection period.

Task 4 – Financial Plan

The update will include projecting the City's costs for water and wastewater for the next ten years, including updates to the current rate design for the next ten years using the updated revenue requirements and consumption data. A financial plan and rates will be recommended for the next five years. We will update any recommendations regarding fund balances. Sample bill impacts will be

developed for small, median, and large customers. The comparison to surrounding utilities will also be updated.

Task 5 – Benefit Charges

The City currently collects benefit charges from new customers joining the water and wastewater system. Benefit charges are growth-related fees intended to recover the capital costs of backbone capacity in the water and wastewater system (i.e., major mains, interceptors, pumping stations, and facilities) needed to provide service to new customers. We will update the benefit charges for the City's new water and wastewater customers and provide recommendations to fully recover the City's system capacity-related costs.

Task 6 – Fireline Fees

Fire protection service is a standby service that the City makes available on demand. While firelines are rarely used by the customer, the City must be ready to provide water (often very significant quantities) and pressure at all times throughout the distribution system for firefighting purposes. As a result, the City incurs an ongoing cost associated with providing these services. We will update the fireline fees and provide recommendations to fully recover the City's fire protection service costs.

Task 7 – Sewer Billing Analysis

The City would like to develop a consistent policy that addresses situations in which a non-residential customer sends less than 100% of its metered water to the sewage collection system. The analysis should take the following into consideration:

- Per the current City Code requirement, ensure that for any exemptions granted, there is no way for any portion of this water to enter the collection system. Some examples:
  - Water associated with a manufacturing process, blow down water on chillers, etc.
  - Water bottled in products sold by breweries, distilleries, etc.
- Having no jurisdiction beyond the meter, ensure as best possible that customers do not modify interior plumbing to decrease their wastewater usage bill
- Reflect, if appropriate, the addition of non-City supplied water into the premises, thereby generating additional quantities of sewage not reflected in total by the City water meter serving the customer

As part of the analysis, we will request that the City develop a list of non-residential customers for whom the basis for their sewer bill is something other than 100% of metered water (i.e., sewer only customers, customers who receive reductions to their billed quantities of water, etc.). To the extent possible, we will work with the City in developing this list and documenting how these customers are currently charged. Also, to the extent possible, we will work with the City's attorney to identify any legal requirements (federal, state and/or City) for policy development.

We will research and review sewer billing practices and policies (deduct, cooling tower, irrigation, sewer flow meters, etc.) of other utilities. Comparison will include researching those within the region (i.e., Maryland and Virginia) as well as industry best practices.

We will identify the policy and procedural options available. Options to be addressed may include deduction meters, sewer flow meters, irrigation meters, cooling tower credit programs, capped

consumption for summer sewer bills tied to winter water usage, and flat charges for residential sewer only customers.

The intention of the program developed will be the use of simplified business processes that result in essentially the same results as more complex technical and financial analyses – the use of averages, approximations, proxy data, etc. The objective is a program that is accurate technically while perceived as being fair and reasonable by customers and practical to administer.

In association with the policy development, we will estimate the amount of lost revenue based on the implementation of various levels of a sewer billing exemption program. Using specific data for large non-residential customers, we will develop rate and bill impacts. While the impact on customers receiving credits should result in their bills decreasing, the impact on customers not receiving credits should result in their bills increasing. These impacts will be reflected in the water and sewer rate model as part of the update.

We will assist in developing a concise policy statement that lays out the agreed upon sewer billing policies, eligibility for exemptions, how exemptions are calculated, and the process for applying for exemptions. We will provide any supporting documentation or research (e.g., information gathered from comparable municipalities, financial spreadsheets developed, etc.) that was used to inform the decisions made on the policy.

Task 8 – Rate and Policy Alternatives

As part of the water and wastewater rate study update, the City would like to evaluate various rate and policy alternatives and their impacts on the City's expenses, revenues, and cash balances, as well as customer bills. Below are the rate and policy alternatives the City is interested in evaluating.

- Replacing current tiered rates with unit rates
- Removing class differentials (between residential and non-residential)
- Evaluating the billing of fixed fees and fireline fees for customers with firelines
- Developing an "Inside Joint" wastewater fee (due to new City development with a pump station flowing to the County)
- Moving all non-residential customers to monthly (keeping rate code "R" as quarterly)

While some of the rate and policy alternatives may be implemented to be effective on July 1, 2025 (FY 2026), the City may desire to implement others (given the additional evaluation and preparation required before being adopted) on January 1, 2026 (FY 2026 mid-year) or July 1, 2026 (FY 2027).

Task 9 – Report Results

We will deliver a draft report to the City and will revise the report (appended with the spreadsheet model that supports the study) after receipt of comments from the City on the draft report. We will be available for periodic interactive online meetings (e.g., walkthroughs of the financial model). Based on these discussions, we will document all work performed in the analysis of the rate study in a short narrative report presenting our findings and recommendations, supported by the financial spreadsheet model that sets forth all calculations.

Task 10 – Presentation (Optional)

We will prepare and present in person (as many times as desired by the City) a PowerPoint presentation and discuss the findings and recommendations of the study to stakeholders at a date and time of the City's choosing.

Cost Estimate

We develop our cost proposals by estimating the number of hours of effort that will be required by key individual/classification of employee and multiplying this number by the standard hourly rate that has been established for each administrative classification of employee. For the optional on-site presentations, we add estimated out-of-pocket expenses (e.g., travel, parking, meals, etc.) at actual cost, with no profit or overhead added to out-of-pocket expenses.

We utilize conference call and online meeting services that allow for additional interactive meetings (e.g., walkthroughs of the financial model) with no cost for travel.

Our estimated not-to-exceed cost for the scope of work and deliverables outlined in this document is $45,050 (plus $2,750 or actual cost [whichever is less] for each on-site presentation desired) as set forth below:

Task		Partner $285	Senior Consultant $190	Consultant $175	Labor Hours	Prof. Fees	Expenses	Total
Task 1	Data Review	2	2	4	8	$ 1,650		$ 1,650
Task 2	Revenue Requirements	6	8	14	28	$ 5,680		$ 5,680
Task 3	Customer and Usage Data	4	6	10	20	$ 4,030		$ 4,030
Task 4	Financial Plan	2	4	6	12	$ 2,380		$ 2,380
Task 5	Benefit Charges	4	6	8	18	$ 3,680		$ 3,680
Task 6	Fireline Fees	4	6	8	18	$ 3,680		$ 3,680
Task 7	Sewer Billing Analysis	12	16	20	48	$ 9,960		$ 9,960
Task 8	Rate and Policy Alternatives	10	14	18	42	$ 8,660		$ 8,660
Task 9	Report Results	6	8	12	26	$ 5,330		$ 5,330
	Total	**50**	**70**	**100**	**220**	**$ 45,050**		**$ 45,050**
Task 10	Presentation (Optional)	4	4	2	10	$ 2,250	$ 500	$ 2,750

MEMORANDUM

TO: Bruce Zimmerman, City Administrator

FROM: Alfred E. Martin, Director of Finance
David A. Shindle, Water & Sewer Department Manager

DATE: February 5, 2025

SUBJECT: Water and Sewer Benefit Fees and Other Charges

Background

In accordance with direction given by Mayor and Council last Tuesday, we are preparing to hold a public hearing next Tuesday, June 21, 2005 at the regular Mayor and Council Meeting to accept public comment on our water and sewer rate consultant's recommended changes to our water and sewer benefit fees and other charges. We will also prepare the necessary ordinances for introduction later that evening after the public hearing to start the process to change these fees and charges. We would then propose to have the Mayor and Council approve the ordinances at a special meeting on July 12, 2005. The changes would then become effective 30 days later on August 11, 2005.

As discussed last Tuesday, the rates we will be changing now are not the regular monthly or quarterly water and sewer user or service charges. We plan to come back to Mayor and Council in July to further discuss and review these rates, the in City and outside City rate differentials and the consultant's recommendations in more detail. Staff will discuss the pros and cons of the consultant's recommended changes and will make our own recommendations at that time.

Changes Recommended Now

The fees and charges that we discussed moving forward with changing now include:

1. Water and Sewer Benefit Charge Fees
2. Annual Fireline Charges for businesses with separate unmetered fire lines (for sprinkler and other fire protection systems)
3. Industrial Surcharges for Sewer for industries discharging sewage with higher than domestic strength levels
4. Sewer Grinder Pump (Low Pressure) Service Charges- These are surcharges for users who do not have gravity fed sewer lines to the collection system. They are for the additional costs of maintaining small sewer pumps to discharge sewage into the collection system. We have about 300 accounts with this type of connection.
5. Water System Debt Surcharge for Conocoheague, Cedar Lawn & Martin's Crossroads - This is a surcharge on customers in certain areas outside the City where the County paid to extend water service lines to areas that were experiencing failing wells. The charge is designed to recover the cost of the principal and interest payments on the debt issued to extend City water lines to serve these areas.

The attached schedule summarizes these changes. It reflects the nature of the fee or charge, how it is calculated, what part of the City Code controls it, what the exiting rate is and what the proposed rate is.

Additional Information on Benefit Charges

Benefit charges are designed to cover the capital cost of providing water and sewer system capacity for new

customers. The benefit charge is calculated per gallon of capacity per day used. For residential development, a standard fee based on 200 gallons per day for each dwelling unit is used. Non-residential development is assessed initially based on an estimate of the average daily consumption. These fees are charged when the water or sewer service is applied for. Each account is then reviewed annually to determine if the average daily consumption is higher than the amounts the benefit charges to date have been based on. If so, additional benefit charges are assessed for the additional capacity used for non-residential accounts. Other than non-residential users that have underestimated their average daily use or that have expanded or increased their use, benefit charges are only assessed on new development or system users.

All new system users should pay benefit charges to avoid having current system users having to pay to provide or expand system capacity for the new users. Our consultants have based their recommended charges on this assumption. An area we would like to explore further with the Mayor and Council at a future date, is how we handle water benefit charge assessment and collection from new accounts from the three municipalities that purchase water from the City. We currently do not have a wholesale customer class for these accounts. We treat the three towns of Funkstown, Williamsport and Smithsburg as large non-residential accounts. They do not pay for additional capacity allocation use unless their total average daily use increases above prior year's levels as noted above. We may want to consider establishing a wholesale customer class and establishing special rates or a benefit charge pass through from the municipalities to the City when individual accounts are hooked up to the towns' individual systems.

Since our benefit charges have not been increased since the last cost of service studies were done 10 to 15 years ago, due to the detailed nature of their calculation, the recommended increases are significantly more than the user charges that we have been adjusting annually. The recommended benefit charges for a new residential account would increase from $900 to $2,500 for water both inside and outside the City. Sewer would increase from $1,200 to $4,400 inside the City. Outside the City per the terms of the City/County Flow Transfer Agreement the City benefit charge of $1,800, which is $600 higher than the inside charge, would increase to $5,000. In addition, the agreement stipulates that the City will collect a County Connection Charge of $1,800 and a Construction Reserve Charge of $300 for each customer based on 200 gallons per day equivalent usage. The total outside City cost for City and County sewer benefit or allocation fees will increase from the current $3,900 to $7,100 per equivalent domestic unit.

Action Requested

If the Mayor and Council are in agreement with the recommended water and sewer benefit and other charge rate changes proposed by the City's consultant and staff, we will advertise the required public hearing for the regular meeting on Tuesday June 21, 2005 at 7 PM and will proceed to prepare the necessary ordinances to change the rates for introduction that evening. If they were then approved by the Mayor and Council at a subsequent special meeting on July 12, 2005, they would take effect 30 days later on August 11, 2005.

We will then plan to come back later in July as noted above to further discuss the regular monthly and quarterly water and sewer user charges and the in City and outside City rate differentials. The 2005/06 budget anticipated that these rates would not increase until October 1, 2005.

cc. Ray Foltz
Chris Bordlemay
Nelia Tidler

Attachment

City of Hagerstown

Hagerstown Light Department

Department of Utilities

425 East Baltimore Street
Hagerstown, MD 21740-6105

1 Clean Water Circle
Hagerstown, MD 21740-6848

September 1, 2009

TO: Bruce Zimmerman, City Administrator

FROM: Michael S. Spiker, Director of Utilities MSSpiker
Alfred Martin, Director of Finance

SUBJECT: Water Rate/ Wastewater Rate Information

Per comments received during the August 18, 2009 work session, City Staff and Municipal Financial Service Staff have addressed the stated concerns of the Mayor and Council and have subsequently revised portions of the Cost of Service Study. Staff does request approval of the proposed five year rate structure where this year's ordinance will set rates until 2014. As a schedule for implementation, combined City Staff and Municipal Financial Systems Staff will present information to the M&C in a work session on September 1, conduct a public hearing and introduce the ordinance in a special session on September 8, observe a public comment period for two weeks until September 22, request approval of the ordinance on September 22, and implement the rates on November 1. The highlights of the Cost of Service Study are as follows:

- Institute an approved 5 year rate structure which will eliminate the need for annual approvals and will diminish our dependence of the use of benefit charges to fund outstanding debt and allow the utilities to continue to perform financially independent from the General Fund while maintaining the ability to meet the environmental requirements and regulations mandated by the regulatory agencies
- Adopt an inclining block rate structure to promote conservation for residential customers
- Increase the fixed charges to capture the true cost of the billing and revenue collection process
- Maintain a utility rate basis for setting Outside City rates
- Establish a Repair, Renewal, and Replacement (3R) Reserve Fund for aging infrastructure expenditures that are growth related
- Increase Fire Line charges by 15%
- Institute late fees to encourage timely payment

The factors considered in the requested rate increase are the same as the factors that plague all utilities. An aging and failing infrastructure requires constant vigilance and sometimes unexpected expenditures. Regulatory and Environmental requirements that are mandated by our governing agencies, i.e. wastewater treatment upgrades, the removal of Inflow and Infiltration from the collections system, the removal of uncovered finished water storage vessels, new water disinfected byproduct parameters, etc., are all capital intensive projects. The Capital Improvement Projects all require some sort of long term financial commitment, hence accumulated growth in our debt service will occur. All of these factors drive the request for the rate increase.

Current user rates for water and wastewater do not produce sufficient revenue to cover revenue requirements for FY 09/10, or the subsequent years included in the planning period. The proposed rate increases developed during the 2005 cost of service study have not kept pace with water and wastewater expenses due to significant increases in operating expenses. The most significant of those increases are those associated with energy and chemicals. Additionally, treatment expenses have increased in order to meet new environmental requirements and regulations for both the water and wastewater systems. The present use of benefit charges to fund existing non-growth debt service will allow the City to cover the cost of operating the systems in the short term, but will cause a long-term shortfall in resources available for investment in the water and wastewater systems in the future.

Council has requested breakdowns of these costs as they relate to growth and non-growth expenditures. Simply put, non-growth related projects are regulatory compliant driven or aging infrastructure repair/replacement driven. Other capital expenditures are growth related. Non-growth capital improvements are generally paid by the current users through debt service payments over the life of the bonds or by cash from user charge revenues. Growth related capital is paid through benefit charges from new or expanded users' cash or debt service payments for bonds. The following conveys this information, broken out by growth and non-growth, for bond financing and cash outlay through FY 19 as it relates to the attached "Schedule 4 Capital Improvement Projects".

CIP Water Division - $57,269,634 total –Non Growth MDE/City Bond - $25,285,359 – Cash- $4,578,775
Growth MDE/City Bond - $25,787,500 – Cash - $1,218,000
CIP WWater Division - $31,845,000 total - Non Growth MDE/City Bond- $16,959,400 – Cash- $3,554,500
Growth MDE/City Bond - $ 6,559,500 – Cash - $2,621,500

Council requested confirmation of the percentage of the increase that will go toward Capital Improvements. City customers will experience an approximate 30% increase, 40% of the increase is for operating costs and 60% is for capital or debt service related to capital improvement costs. City wastewater customers will see an approximate 35% increase. 30% of the increase is for operating costs and 70% is for capital costs.

In order to provide funds to pay for unexpected major repairs and planned replacement or rehabilitation of equipment or other major fixed assets, our rate model establishes a Repair, Replacement and Rehabilitation ("3R") reserve. These reserves, which are based on a percentage of the total system asset value, can be used to fund non-growth capital projects. In order to avoid or minimize the amount that would need to be recovered in the future through user fees and to assist in the effort to minimize any future spike in rates due to unexpected system issues, the institution of 3R reserve is paramount. Per the attached Schedule 8, there will be no 3R reserve fund for Wastewater until FY14. Water will have reserves for FY 10/13/14, a modest reserve of $85,000 in FY11 and none in FY12.

On the plus side, the changes in the two rate structures adopted by the City following the 2005 study have been effective in simplifying the rate structure, protecting the small user by removal of the 10,000 gallon minimum and encouraging water conservation since all customers pay for actual usage. The current benefit and allocation charges are set at the appropriate level based on the cost of providing water and wastewater capacity to new customers.

The Cost of Service Study, which has been developed over a two year period, will propose some minor changes in the structure of our rates. This included an increase in the fixed charge portion of the water/wastewater bill whereas we will collect 20% of required revenues, more closely matching the fixed costs of billing and revenue collection per account. Per Council request, we have softened the increase by spreading the increase over a two year period, thereby lessening the effect on the customers who use lesser amounts of water and wastewater services. Using our Inside City Rate, we will reduce the effect on a customer who uses 6000 gallons per quarter by $27.24 over the two year period. A customer using 6000 gallon per quarter will be charged $180.56 per year, $45.13 per quarter, calculated at $0.49 per day, for water and wastewater service. Our average 13,000 gallon user will pay $328.82 per year, $82.20 per quarter, calculated at $0.90 per day for the services. As reference, an Outside City customer using 6000 gallon per quarter will be charged $346.80 per year, $86.70 per quarter, calculated at $.95per day, for water and wastewater service. Our average 13,000 gallon user will pay $629.88 per year, $157.47 per quarter, calculated at $1.72 per day for the services.

Water conservation (all natural resource conservation) is a prevalent theme throughout the industry. The proposed rate structure included an inclining block rate for residential customers who use more than 18,000 gallons of water per quarter. This limit, which equates to a usage of 200 gallons per day (EDU), is consistent with the engineering standards of the City's Water System and with the Water and Sewer Element contained within the City's Comprehensive Plan. As you can see from the chart below, only 15% of residential Inside City water customers fall within this category. As reference, a customer who continues to use 22,000 gallons per quarter will experience an increase of only $4.15 which is calculated as the difference between the proposed inclining block rate and the current rate structure.

Gallons	FY08 Inside City Customers Residential	FY08 Outside City Customers Residential
0 – 4,000	12%	12%
4,001 – 10,000	38%	20%
10,001 – 13,000	17%	20%
13,001 – 18,000	18%	24%
Over 18,000	15%	24%

Taking into account the aforementioned information, the Water Division requests to continue with the current water rate structure using the utility basis approach for Outside City rate customers with a residual cash basis for Inside City rate customers and the inclining block rate for luxury users who consume over 18,000 gallons per quarter. This structure benefits Inside City customers for the risks that are associated with owning and operating the water system. In order to meet the financial requirements of the operation, a 5.5% increase in revenue for Inside City rates and a 6.5% increase in revenue in Outside City rates will be required each year for the next 5 years.

Per our earlier discussion, the Water Division had discovered that some of the customers are using water through fire lines for non-fire protection purposes. We have taken the necessary steps to discontinue this practice. The current fire line charges are not set at the appropriate level based on the cost of providing this service. We therefore recommend a 15% increase for the 237 customers (145 City and 93 County) who utilize this service.

Meter or Pipe Size	City Fire Line Service Charge		County Fire Line Service Charge	
	Current	Proposed	Current	Proposed
4"	$144	$166	$192	$221
6"	$323	$372	$ 431	$496
8"	$575	$662	$766	$882
10"	$898	$1,034	$1,197	$1,379
12"	$1,293	$1,489	$1,724	$1,986

The Wastewater Division rate structure will be similar to that which is currently in place and will utilize a unit cost flat rate and a fixed charge with a utility basis approach for Outside City rate customers and a residual cash basis for Inside City rate customers. Equal to the Water Division proposal, the fixed charge portion of the sewer bill will increase to better match the fixed costs of billing and revenue collection per account. In order to meet the financial requirements of the operation, a 7% increase in revenue in Inside City rates and a 3.2% increase in revenue in Outside City rates will be required each year for the next five years.

The City's Flow Transfer Agreement with Washington County provides a cost saving to the City's wastewater treatment system, although the Wastewater Division should not depend financially on this cost savings at this time. Analysis showed that 89% of expenses at the wastewater treatment plant are fixed costs, thereby leaving 11% as the variable component. The estimated variable cost savings due to the transfer of wastewater flows is $23,000, which has been deducted from the calculation for the costs incurred by our Outside City rate payers.

SCHEDULE 12 SEWER RATE ANALYSIS		FY 09 Est. Actual	FY 10 Forecast	FY 11 Forecast	FY 12 Forecast	FY 13 Forecast	FY 14 Forecast
SEWER							
Required Revenues vs. Current Revenues							
Cash Basis Net Revenue Requirement - Sewer			$ 9,482,948	$ 9,591,628	$ 10,208,353	$11,041,550	$ 11,193,965
Utility Basis Net Revenue Requirement - Sewer			$13,363,310	$ 13,090,132	$ 12,663,656	$13,409,656	$ 13,614,469
County Sewage Treatment Costs		$ 210,000	$ 280,000	$ 299,600	$ 308,588	$ 317,846	$ 327,381
Additional Cost per 1,000 to Outside City Customers	89%	$ 0.6150	$ 0.8119	$ 0.8559	$ 0.8686	$ 0.8814	$ 0.8945
Additional Cost per 1,000 to All City Customers	11%	$ 0.0209	$ 0.0276	$ 0.0291	$ 0.0295	$ 0.0299	$ 0.0304

Late fees for tardy payments are not currently collected by the City. In order to collect the necessary revenues on a timely basis, we would request an implementation of utility bill late fees to encourage timely payment. We suggest that a survey be performed with other local utilities to determine the locally charged fees before this policy change is implemented.

Even though the revenue requirements are spread equally over a five year period, the increase in fixed charges combined with the lowering of the unit rate, will affect the percentage increase (or decrease) differently for each customer in this fiscal year. The percentage increases then moderate in the out years. As a reference using our Inside Customer Rate, a customer using 6000 gallons per quarter will experience a 10.4% increase for the next 8 months while a customer using 13,000 gallons per quarter will experience a 5% increase in billing for the same time frame. An 18,000 gallon customer will see a 2.7% increase. The increases then moderate into the mid 5% range for the next four years. Included below is rate comparison data and attached for review are the five year projections/rate differential information for each rate class using typical usage data.

Combined Inside City Rate Quarterly Bill Water and Wastewater Services	Quarterly Usage (gallons)			
	4,000	18,000	30,000	60,000
City of Hagerstown - FY 2009	$ 28.84	$ 101.36	$ 163.52	$ 318.92
City of Hagerstown – FY 2010 (Current Structure)	**$ 32.03**	**$ 112.81**	**$ 182.04**	**$ 355.13**
City of Hagerstown – FY 2010 (Alternative Structure)	**$ 39.91**	**$ 108.18**	**$ 181.14**	**$ 363.54**
City of Frederick, MD	$ 46.46	$ 152.77	$ 255.25	$ 538.55
City of Winchester, VA	$ 44.80	$ 142.41	$ 227.13	$ 490.43
City of Frostburg, MD	$ 50.43	$ 171.09	$ 274.51	$ 533.07
City of Cumberland, MD	$ 47.50	$ 209.64	$ 340.43	$ 655.37
Town of Williamsport. MD	$ 62.20	$ 192.40	$ 304.00	$ 583.00
Mid-Atlantic Average	$ 77.00	$ 164.50	$ 239.50	$ 427.00

Combined Outside City Rate Quarterly Bill Water and Wastewater Services	Quarterly Usage (gallons)			
	4,000	18,000	30,000	60,000
City of Hagerstown - FY 2009	$ 53.72	$ 187.70	$ 302.54	$ 589.64
City of Hagerstown – FY 2010 (Current Structure)	**$ 58.81**	**$ 205.67**	**$ 331.55**	**$ 646.26**
City of Hagerstown – FY 2010 (Alternative Structure)	**$ 79.14**	**$ 208.79**	**$ 352.48**	**$ 711.72**
City of Frederick, MD	$ 46.46	$ 152.77	$ 255.25	$ 538.55
City of Winchester, VA	$ 123.25	$ 228.88	$ 328.96	$ 579.16
City of Frostburg, MD	$ 95.90	$ 250.90	$ 396.70	$ 812.70
City of Cumberland, MD	$ 89.90	$ 320.75	$ 518.62	$ 1,013.30
Town of Williamsport. MD	$ 73.34	$ 323.82	$ 522.95	$ 902.32
Mid-Atlantic Average	$ 95.30	$ 297.60	$ 471.00	$ 904.50

Our Wholesale Water Customers are the Towns of Smithsburg, Williamsport and Funkstown. They currently receive a 16% discounted rate due to the fact they distribute the water through their private systems, therefore we remove our distribution charges to arrive at the discounted rate. The fixed charges are scheduled to increase, as with the other user rates, and they will still utilize a declining block rate for water purchase. The final attachment shows historical usage for the past three months and the proposed rates for each of the Towns. Each Town will see a 6% increase for the remainder of this fiscal year, a 3% increase in FY11, and a 7% increase in the remaining three fiscal years.

City and MFS Staff will be present at the work session to discuss these issues and present the Executive Summary of the Cost of Service Study. Please feel free to contact us with any questions that you may have.

REQUIRED MOTION
MAYOR AND CITY COUNCIL
HAGERSTOWN, MARYLAND

Topic:
State Revolving Fund (SRF) for Maryland Department of the Environment (MDE)
Water/Wastewater – Nancy Hausrath, Director of Utilities

Mayor and City Council Action Required:

Discussion:

Financial Impact:

Recommendation:

Motion:

Action Dates:

ATTACHMENTS:

File Name	Description
MEMO_SRF_FUNDING_WITH_ATTACHMENTS_02112025.pdf	MEMO - SRF FUNDINGWITH ATTACHMENTS

CITY OF HAGERSTOWN, MARYLAND

Utilities Department
1 Clean Water Circle • Hagerstown, MD 21740
Telephone: 301-739-8577, ext. 650
Website: www.hagerstownmd.org

February 5, 2025

To: Scott Nicewarner, City Administrator

From: Nancy Hausrath, Director of Utilities
Ashley Newcomer, Financial Manager
Tyler Puffenberger, Deputy Director of Utilities

Action: Discussion – SRF Funding

Every year Maryland Department of the Environment accepts applications for funding requests through primarily the Safe Drinking Water Act Program and the Clean Water Act Program. Bay Restoration Funds can also be requested.

The Water and Wastewater Divisions submitted six(7) funding applications for loans and grants for the following projects:

Safe Drinking Water Act Program:

1. R.C. Willson Transmission Main Project - $15,000,000 (local share $2,250,000)
2. Lead and Copper Rule Service Line Material - $15,358,618.75 (local share $450,000)

Clean Water Act Program:

1. Edgemont Reservoir Repair and Rehab Project - $30,000,000 (local share $4,100,000)
2. Wastewater Pump Station 13 Reconstruction - $5,175,000 (local share $945,000)
3. Wastewater Treatment Plant Improvements Phase-1 $22,000,000 (local share $4,020,000)
4. Wastewater Treatment Plant Improvements Phase-2: $27,500,000 (local share $4,125,000)
5. Wastewater Treatment Plant Improvements Phase-2A: $11,000,000 (local share $1,650,000)

Copies of the applications to include the Project Summaries are attached for your review.

Staff will be at the February 11th meeting to discuss and answer questions.

APPLICATION TYPE

Review the Drinking Water Funding Eligibility Chart[1] and the Median Household Income/Disadvantaged Community Chart[2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **Water Supply Grant funding only**.	
Consider for **DWSRF BIL PFAS/Emerging Contaminants (EC)or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects).	
Consider the project for **DWSRF BIL for Lead Service Line Replacements funding, only.**	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name: RC Willson Transmission Main Replacement

Project Address (MUST incl. 9-digit zip code): Fenton Avenue, Williamsport, MD

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST in xx.xxxxxx format)[3]: 39.604340

Longitude (MUST in xx.xxxxxx format)[3]: -77.825160

County: Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*

2022 Congressional District[4]: 6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*

2022 Legislative District[5]: 02A *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*

Current Owner of project/infrastructure: City of Hagerstown

Future Owner of project/infrastructure:

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement): City of Hagerstown

Federal Tax Identification Number: 52-60000794

Applicant Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

County: Washington *(drop down)*

Email Address: nhausrath@hagerstownmd.org

Phone Number (incl. extension) 301-739-8577 x677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name: Nancy Hausrath

Contact Title: Director of Utillities

Contact Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

Contact Email Address: nhausrath@hagerstownmd.org

Contact Phone Number (incl. extension): 301-739-8577 x677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/DW%20Subsidy%20Chart-FFY24-FINAL.pdf

[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf

[3] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees

[4] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx

[5] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Planning *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	April-25	October-25	0.00%
Design	November-25	June-26	0.00%
Bidding	July-26	September-26	0.00%
Construction *	December-26	December-28	0.00%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm: To Be Determined
A/E Firm Contact:
A/E Firm Contact Email Address:
A/E Firm Contact Phone Number (incl. extension):

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount		
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 15,000,000.00		
Total $ of Green Components (identified in Section II)				
Additional Funding		**Amount**		
$ of Previous Grant from MWIFA*				
$ of Previous SRF from MWIFA*				
		Amount	**Funds Secured? (Yes/No) dropdown[1]**	
$ from Applicant*		$ 2,250,000	Yes	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*				*If "Yes"[1]*
$ from USDA Rural Development*				*If "Yes"[1]*
$ from DHCD Community Development Block Grant*				*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*				*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*				*If "Yes"[1]*
$ from Other*				*If "Yes"[1]*
Other:	(y)	$ 2,250,000		*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 17,250,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of Requested $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 150,000	No	*If "Yes"[2]*
$ for A/E Design*	$ 1,200,000	No	*If "Yes"[2]*
$ for A/E Construction Management*	$ 900,000	No	*If "Yes"[2]*
$ for Construction*	$ 15,000,000	Yes	*If "Yes"[2]*
$ for Land*			*If "Yes"[2]*
$ for Contingency*			*If "Yes"[2]*
$ for Administrative*			*If "Yes"[2]*
$ for Other*			*If "Yes"[2]*
Project Funding Uses Total	**$ 17,250,000.00**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

Project Purpose and Summary:
Applicant: City of Hagerstown Water Department
Transmission Mains Replacement

Section III (a-c): Project Purpose and Summary

a. What is the proposed project?

This project is Phase 2 of a multi-phased project. The first phase was completed in 2008 with the installation of 500 LF of 36" pipe just outside the water treatment facility. The proposed Phase 2 will replace an approximately 6,000 LF portion of the existing two parallel 24" water transmission mains and appurtenances that date back as early as the 1920s. The following phases of the project will continue to replace portions of the transmission main until the full length of these pipes have been replaced.

These transmission mains serve the entire City of Hagerstown water system which encompasses three neighboring towns and much of the developed area of Washington County around the City in addition to the entire City of Hagerstown. This project impacts approximately 29,600 water service connections serving over 90,000 customers. It will replace the existing parallel 24" transmission mains with two new ductile iron 36" transmission mains and appurtenances. With the increased pipe size, one of these new mains will have the hydraulic capacity to supply the current maximum daily demand for the City's water system.

b. What is the purpose of this project, why is the project needed, and what problem is being corrected?

The purpose of the proposed phase 2 project is to replace deteriorated 90+ year old transmission main piping. The proposed portion of the transmission mains to be replaced experiences the highest operating pressure within the Hagerstown Water system. The existing mains are the sole source of water for the entire Hagerstown Water System which makes their reliability critical. Their replacement is needed to ensure continuous, reliable water service to customers of the water system. Previous high discharge pressures from the water treatment facility in combination with the poor integrity of the existing 24-inch cast iron pipe have resulted in multiple main breaks over the years. Based on historical records, the majority of the main breaks have occurred along the older 24-inch cast iron transmission main, installed in the 1920s.

The problem being corrected is the deterioration of the primary transmission lines from the system's sole water source, which are both experiencing an increasing rate of failures and inadequate to meet anticipated future growth in demand without excessive water pressure. Replacement of these mains will allow the water treatment facility to increase the output volume of treated water in order to meet future water demand within the system without increasing system pressure which could negatively affect other aging water distribution infrastructure. In an attempt to limit breaks on the transmission mains, several years ago, the water treatment facility made operational changes to the discharge pumping to limit the operating pressure on these transmission mains. The City has developed operating schemes (i.e., modulating valves on the discharge side of the WTP pumps) to reduce the pressure entering the system, which has worked to reduce the frequency of main breaks. However, these operating schemes have not completely eliminated their occurrence.

Replacement of these transmission mains with larger pipe will provide the necessary capacity for the City's growing water demands and improve system reliability. The ability of these transmission mains to provide water continuously and reliably is critical as no current redundant treated water source exists within the water system.

c. Has the project been previously submitted to MWQFA for funding consideration?

Yes, this project was submitted in 2022.

APPLICATION TYPE

Review the Drinking Water Funding Eligibility Chart[1] and the Median Household Income/Disadvantaged Community Chart[2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **Water Supply Grant funding only**.	
Consider for **DWSRF BIL PFAS/Emerging Contaminants (EC)or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects).	
Consider the project for **DWSRF BIL for Lead Service Line Replacements funding, only.**	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name:	Service Line Material Identification
Project Address (MUST incl. 9-digit zip code):	1 E Franklin St, Hagerstown, MD, 21740-4859

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST in xx.xxxxxx format)[3]:	39.643280
Longitude (MUST in xx.xxxxxx format)[3]:	-77.718800
County:	Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*
2022 Congressional District[4]:	6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*
2022 Legislative District[5]:	Multiple *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*
Current Owner of project/infrastructure:	City of Hagerstown
Future Owner of project/infrastructure:	City of Hagerstown

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement):	City of Hagerstown
Federal Tax Identification Number:	52-60000794
Applicant Address (MUST incl. 9-digit zip code):	1 E Franklin St, Hagerstown, MD, 21740-4859
County:	Washington *(drop down)*
Email Address:	nhausrath@hagerstownmd.org
Phone Number (incl. extension)	301-739-8577, Ext. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name:	Nancy Hausrath
Contact Title:	Director of Utilities
Contact Address (MUST incl. 9-digit zip code):	1 Clean Water Circle, Hagerstown, MD, 21740-6848
Contact Email Address:	nhausrath@hagerstownmd.org
Contact Phone Number (incl. extension):	301-739-8577, Ext. 677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/DW%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[4] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[5] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Planning *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	September-24	March-25	75.00%
Design	March-25	October-25	
Bidding	November-25	February-26	
Construction *	March-26	December-30	

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm: Hazen and Sawyer
A/E Firm Contact: Jeremy Hise
A/E Firm Contact Email Address: jhise@hazenandsawyer.com
A/E Firm Contact Phone Number (incl. extension): (410) 539-7681

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount		
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 14,908,618.75		
Total $ of Green Components (identified in Section II)				
Additional Funding		**Amount**		
$ of Previous Grant from MWIFA*				
$ of Previous SRF from MWIFA*				
		Amount	**Funds Secured? (Yes/No) dropdown[1]**	
$ from Applicant*		$ 450,000	Yes	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*				*If "Yes"[1]*
$ from USDA Rural Development*				*If "Yes"[1]*
$ from DHCD Community Development Block Grant*				*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*				*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*				*If "Yes"[1]*
$ from Other*				*If "Yes"[1]*
Other:	(y)	$ 450,000		*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 15,358,619**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of Requested $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 729,534		*If "Yes"[2]*
$ for A/E Design*	$ 652,741		*If "Yes"[2]*
$ for A/E Construction Management*	$ 767,931		*If "Yes"[2]*
$ for Construction*	$ 11,826,136		*If "Yes"[2]*
$ for Land*			*If "Yes"[2]*
$ for Contingency*	$ 767,931		*If "Yes"[2]*
$ for Administrative*	$ 614,345		*If "Yes"[2]*
$ for Other*			*If "Yes"[2]*
Project Funding Uses Total	**$ 15,358,618.75**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

CITY OF Hagerstown *Supplemental Information*

From FFY25 application, "Instructions" tab:

Supplementary information and supporting documents are to be submitted with the application, but as separate documents in their native format. Each must be labeled with the project name, the applicant name, and the corresponding application section/subsection number and/or statement being supported.

General Info – Multiple Legislative Districts

Work will benefit Legislative Districts 01C, 02A, and 02B.

I. Threshold Criteria

A. Priority Funding Area

The proposed project is a part of The City of Hagerstown's (Hagerstown) effort to identify unknown service lines to maintain compliance with US EPA's Lead and Copper Rule Improvements (LCRI). A majority of Hagerstown's service area falls within Priority Funding Areas, shown in **Figure 1**

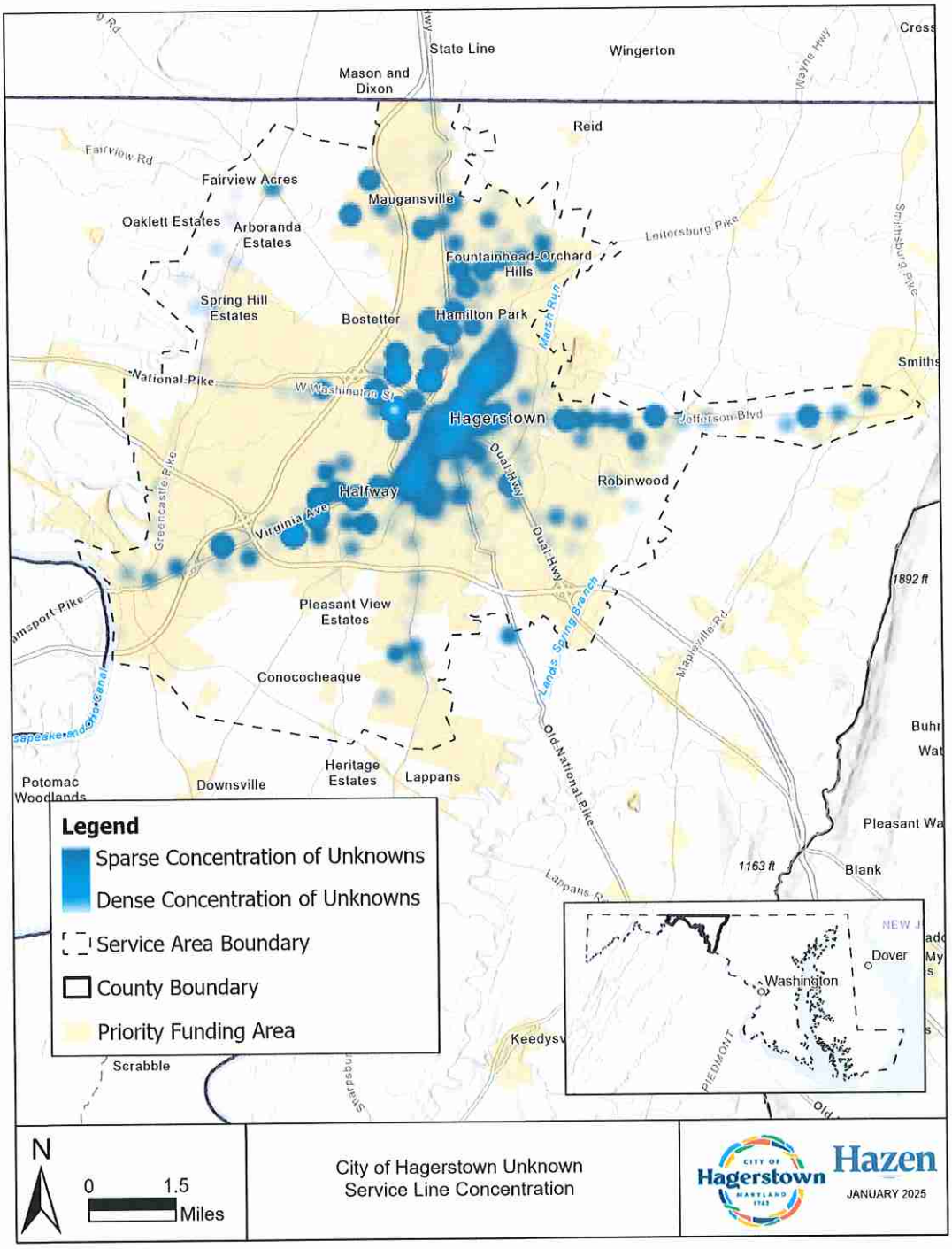

Figure 1. Concentration of Unknown service lines depicted by the shaded areas from high (light blue) to low (dark blue) density. Project work is planned for the blue shaded areas

B. Current MDE-approved County Water & Sewer Plan

Hagerstown has an approved water and sewer plan with MDE, published in 2008. The proposed project is within the current service area as is also consistent with the land use plan described in the water and sewer master plan.

III. Project Purpose and Summary

On a separate page titled "Project Purpose and Summary," provide a brief description of the project by answering the following question in the order shown (labeled IIIA, IIIB, and IIIC).

A. What is the proposed project?

Include the existing and proposed capacities, length and size of pipes, location of service area, etc.

The proposed project is focused on verifying the material of unknown service lines identified during development of Hagerstown's service line inventory (required for LCRR compliance and submitted to MDE on 10/16/2024). Work will take place in the central portion of Washinton County within Hagerstown's water service area (**Figure 2**).The project areas slated for identification are depicted by the blue shading in **Figure 1**, with priority given to higher density areas shaded light blue and areas within a DAC. The project aims to complete the following objectives using Hagerstown's initial LSL inventory submitted to MDE:

1. Material verification of unknown service lines in Hagerstown's water service area

To meet the objectives, the project will include the following tasks:

- Distribution of a material survey for customers and field staff to identify and report service line material.
- Verification of gathered information using field investigations, residents' self-reported data, meter box inspections, predictive statistical modeling, non-destructive technologies, potholing, and/or other MDE approved methods as applicable.
- Securing pitcher filters to issue to residents as required by regulations
- Preparing bid documents and completing subsequent competitive procurement activities for field verification

Hagerstown will continue to update the LSL inventory using existing records and with funding assistance already assigned in the MWIFA FFY 2023 IUP ("Lead and Copper Rule Revision Program – City of Hagerstown DW0089"). For this application, Hagerstown requests financial assistance to commence the material verification phase of the program.

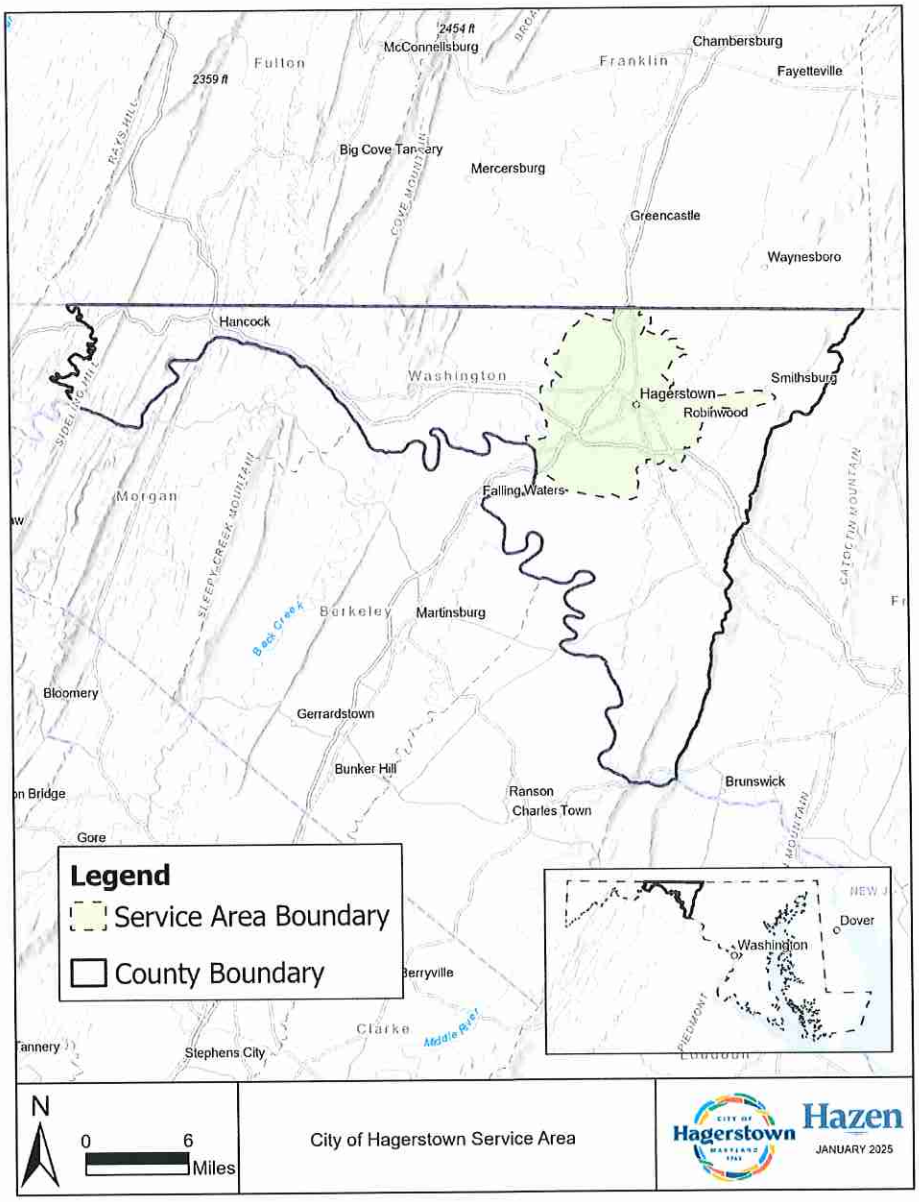

Figure 2. Hagerstown Service Area

B. What is the purpose of the project, why is the project needed, and what is the problem being corrected?

Include whether the project is to assist a non-compliance system to achieve compliance; assist a compliance system to maintain compliance; assist a compliant system to meet future requirements; or for other purposes not related to compliance.

In 2024 the Department engaged an engineering consultant to support efforts to maintain compliance with the Lead and Copper Rule Revisions (LCRR) by developing and submitting an initial LSL inventory for the October 16th, 2024, deadline. Based on the initial inventory, 54% (17,161 of 31,557) of total service lines are considered unknown. The Lead and Copper Rule Improvements (LCRI) require verification of all unknowns and eventual replacement of LSL and GRR where applicable by 2037. To prepare for the upcoming requirements, and maintain compliance with LCRI, Hagerstown is in the planning stages of proactive material verification. Field verification methods (e.g., field and customer survey, meter box inspections, non-destructive technologies, potholing) will be implemented for all unknowns.

Although Hagerstown currently has no known lead or GRR service lines and has no reported lead level exceedances, having unknown service lines within the distribution system is still considered a public health risk. Identifying service line material will allow Hagerstown to accurately assess the level of risk.

C. Has the project previously been submitted to MWIFA for funding consideration?

If so, by what project name, has the scope of work changed since that submittal (if so, explain how), and was the project selected to receive funding?

Previously an application for funding was submitted in FFY23 titled "Lead and Copper Rule Revision Program – City of Hagerstown DW0089". The application was for $450,000 total and covered just the initial program development work and inventory development/submission. The project was not noted in the FFY23 IUP.

IV. Project Supporting Documents Tab

A. Drinking Water Quality

Application Answer: Project is lead service line inventory or lead service line replacement

Summarize on a separate page and provide the following documentation:

- *Date(s) of when the water distribution system service lines at issue were installed.*
- *Confirmation that the lines being replaced are known LSLs, if applicable (e.g., based on tap cards, records, etc.).*
- *Confirmation that the lines being replaced specifically serve children under 6 years of age and/or pregnant women (if applicable).*
- *Lead action level exceedance(s), if applicable.*
- *Estimate the number of Lead Service Lines to be replaced on VIII. Project Numeric Benefits.*

The Department has no record of Lead Action Level exceedances, and no known LSL or GRR service lines based on records. Hagerstown provides water for 92,200 people. US Census data lists the percentage of children 5 and below at 7.9%, leading to an estimated 7,300 children. Census data also estimated a pregnancy population of 700. It can be assumed the work proposed for this project will benefit both of these sensitive populations.

The service lines considered "at issue" are those of unknown material. Between the Utility and Customer side service lines, there are a total of 17,161 unknowns.

VIII. Project Numeric Benefit / Cost-Effectiveness

For calculating the values for this section of the application, the following details were considered:

- **Diameter of main or service line (in)**. Service lines greater than 3 inches diameter are not considered to be at risk of containing lead and are not within the project scope.
- **Current water treatment flow (mgd)**. Average treatment production is 11.8 MGD.
- **Estimated no. of Lead Service Lines to be replaced**. Because there are no known LSL or GRR service line, a replacement estimate cannot be determined at this time.

APPLICATION TYPE

Review the Water Quality Funding Eligibility Chart[1] and the Median Household Income/Disadvantaged Community Chart[2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **BRF Wastewater Grant and/or Supplemental Assistance Grant, only**.	
Consider for **WQSRF BIL PFAS/Emerging Contaminants (EC) or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects)	
Consider for **CFMP Grant funding, only.**[3]	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name: Edgemont Reservoir Repair and Rehab Project

Project Address (MUST incl. 9-digit zip code): Warner Hollow Road, Smithsburg, MD

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST be in xx.xxxxxx format)[4]: 39.663447

Longitude (MUST be in xx.xxxxxx format)[4]: -77.549207

County: Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*

2022 Congressional District[5]: 6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*

2022 Legislative District[6]: 02B *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*

Watershed Name and 8-Digit Code[7]: Potomac River WA Cnty / 02-14-05-01 *(drop down)*

Select according to the project location (for WWTPs/WRFs, identify according to the permitted point of discharge) from the drop down list. If multiple, attach a list labeled General Info-Multiple Watersheds and 8-Digit Codes.

National Flood Insurance Program CID[8]: For CFMG projects, only.

Current Owner of project/infrastructure: City of Hagerstown

Future Owner of project/infrastructure:

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement): City of Hagerstown

Federal Tax Identification Number: 52-60000794

Applicant Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

County: Washington *(drop down)*

Email Address: nhausrath@gmail.com

Phone Number (incl. extension) 301-739-8577 x. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name: Nancy Hausrath

Contact Title: Director of Utilities

Contact Address (MUST incl. 9-digit zip code): nhausrath@gmail.com

Contact Email Address: 301-739-8577 x. 677

Contact Phone Number (incl. extension):

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/WQ%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx
[4] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[5] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[6] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx
[7] https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx
[8] https://www.fema.gov/cis/MD.html

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	January-15	March-17	100%
Design	May-17	March-26	35%
Bidding	April-26	June-26	0%
Construction	July-26	June-28	0%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm:	Hazen and Sawyer Environmental Engineers
A/E Firm Contact:	Jeremy Hise
A/E Firm Contact Email Address:	jhise@hazenandsawyer.com
A/E Firm Contact Phone Number (incl. extension):	443-948-7868

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount	
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 30,000,000	
Total $ of Green Components (identified in Section II)			
Additional Funding		**Amount**	
$ of Previous Grant from MWIFA*			
$ of Previous SRF from MWIFA*			
		Amount	**Funds Secured? (Yes/No) dropdown[1]**
$ from Applicant*		$ 4,100,000	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*			*If "Yes"[1]*
$ from USDA Rural Development*			*If "Yes"[1]*
$ from DHCD Community Development Block Grant*			*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*			*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*			*If "Yes"[1]*
$ from Other*			*If "Yes"[1]*
Specify:			
	(y)	$ 4,100,000	*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 34,100,000**	***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of MWIFA $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 100,000	No	*If "Yes"[2]*
$ for A/E Design*	$ 2,500,000	No	*If "Yes"[2]*
$ for A/E Construction Management*	$ 1,500,000	No	*If "Yes"[2]*
$ for Construction*	$ 27,000,000		*If "Yes"[2]*
$ for Land*			*If "Yes"[2]*
$ for Contingency*	$ 3,000,000	Yes	*If "Yes"[2]*
$ for Administrative*			*If "Yes"[2]*
$ for Other*			*If "Yes"[2]*
Project Funding Uses Total	**$ 34,100,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

Project Purpose and Summary:
Applicant: City of Hagerstown Water Department
Edgemont Reservoir Rehabilitation (Emergency Repair) Project – Dam Safety

Section III (a-c): Project Purpose and Summary

a. What is the proposed project?

The Edgemont Reservoir (Warner Gap Hollow Dam) was constructed in 1902 as a Municipal Water Supply. Based on recommendations detailed in the Phase I Inspection Report - National Dam Inspection Program dated 1979, improvements were made to the spillway to pass the probable maximum flood and deficiencies with 30-inch Reservoir drain were addressed. In 1995 a Geophysical Survey was conducted by Whitman, Requardt and Associates to determine subsurface seepage paths under the ogee structure. Since 1995, several studies have been completed which identify deficiencies.

MDE Dam Safety Division has performed numerous inspections, and as requested, a Study was completed to determine the severity of the seepage from the toe-drain on the earth fill embankment and under the emergency spillway (ogee weir structure). Also required was the removal of trees from the earth fill embankments at the Edgemont Reservoir. Improvements will include repair to the toe-drain, emergency spillway, intake piping, and, Reservoir drain piping and valves. Additionally, significant repairs/reconstruction is required to ensure the structure and pass 100% of the Design Storm.

Hazen and Sawyer Environmental Engineers completed the Design Storm Evaluation Study (as directed by MDE Dam Safety) to determine whether or not the existing structure is capable of passing the Design Storm Flows. The existing ogee weir, spillway transition, and chute spillway were originally designed for approximately 8,000 cfs and do not have the hydraulic capacity required to pass the updated Design Storm Flows. In order to evaluate the existing chute spillway, Hazen and Sawyer developed a rudimentary HEC-RAS hydraulic model using the record drawings from the spillway reconstruction. The existing chute spillway *will not safely pass flows* in the 10,000 to 15,000 cfs range due to excessive velocity and flow depths that exceed the side walls and gabions. The existing chute spillway width varies from 50 feet at the upper end to 30 feet from the mid-point to the lower end. Most design documentation recommends maximum flow rates per foot of chute spillway of approximately 200 cfs. Using 8,000 cfs with a 30-foot width, the flow per foot of width is over 266 cfs. It should also be noted that the existing chute spillway's vertical profile is not typical and may have to be modified to provide uniform flow depths.

As part of this Study, a preliminary labyrinth weir design for the spillway entrance was developed. Currently there are approximately 5.5 feet of hydraulic capacity above the crest of the existing ogee weir to safely pass the Design Storm before the dam embankment overtops. Using 5.5 feet, Hazen has approximated that 400 feet of weir length will be required. The current ogee weir is 160-feet wide. Based on typical labyrinth weir design standards, it is anticipated that the 400-foot weir length should be able to be folded and/or compressed into an overall structure width of approximately 145 feet. The 145-foot structure width will have to be narrowed through a transition section to the selected 75-foot chute spillway width. The analysis indicates that a 4-cycle structure will be required. Project will also address the flow-by use Maryland methodology into Raven Rock, Reservoir intake screening for protection of fish spawning, with consideration built into the model for climate change. Project will also require upgrade and/or replacement of the Reservoir aeration system to help address low dissolved oxygen and thermal pollution in Raven Rock and Little Beaver Creek.

Edgemont Reservoir/Breichner Water Plant currently provides emergency potable water supply during high demand time periods and during water distribution system breaks. Based on the ongoing work and evaluations both Triad Engineering and MDE Dam Safety Division, the Reservoir must be maintained a minimum of 6 feet below full pool elevation to minimize seepage from the toe of the earthen embankment. Seepage improvements are necessary to ensure public safety and adequate raw water supply. This work is also necessary to ensure public safety and protect downstream water quality. The Reservoir is currently being maintained in a dry condition to help ensure public safety and to the extent possible minimal impact to downstream water quality. To help ensure the treatability of the raw water modifications to the intake tower may be required as part of this project to include all piping, valving and automation. Upon completion of the Reservoir improvements, the Reservoir will be maintained as full pool elevation and the Breichner Plant will be operated daily to supply Zone 5. During emergency operations Breichner operations will be maximized to serve the Zone 1.

The results of ongoing studies could require a new hydrologic study to evaluate ground water supplies adjacent to the Breichner Plant. Should this occur, this project will entail breaching Reservoir and restoring the site to near original conditions and drilling wells as a source water supply for the Breichner Plant.

b. What is the purpose of this project, why is the project needed, and what problem is being corrected?

The project will repair the existing deficiencies identified in studies and field evaluation beginning 2006 to current. The repairs will address public safety issues to include protection of downstream water quality – remedial action is required by MDE Dam Safety Division (see attached correspondence). MDE Dam Safety Division is considering entering into a Consent Agreement with the City of Hagerstown to address the deficiencies at the Edgemont Reservoir.

Problems to be corrected:

1. Project will protect downstream water quality
2. Project will repair seepage at the toe of the Reservoir
3. Project will address identified significant seepage under the spillway and ogee
4. Project will result in the Ogee Weir, Spillway Transition and Chute Spillway being reconstructed to safely pass the Design Storm (PMP)
5. Project will address possible structural concerns associated with concrete failure at the emergency spillway and ogee interface
6. Project will address intake screening/raw water intake modifications and Reservoir aeration.
7. With the Reservoir being maintained in a dry condition and the subsequent vegetation that has established, dredging will be required to re-establish Reservoir storage capacity.
7. Project will ensure an adequate raw water supply to Breichner WTP
8. Project will address public safety concerns identified in the ongoing studies

c. Has the project been previously submitted to MWQFA for funding consideration?

Yes – this project was submitted in January 2015, 2017, 2018, 2019, 2020,2021, and 2022 and was entitled Edgemont Reservoir Emergency Repair. Based on the findings in the study to be completed in 2020 by Hazen and Sawyer, the scope of required improvements has significantly changed and the need for this project has increased. The City continues to work with Maryland Department of the Environment Dam Safety to refine the PMP to establish final design criteria.

APPLICATION TYPE

Review the Water Quality Funding Eligibility Chart [1] and the Median Household Income/Disadvantaged Community Chart [2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **BRF Wastewater Grant and/or Supplemental Assistance Grant, only**.	
Consider for **WQSRF BIL PFAS/Emerging Contaminants (EC) or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects)	
Consider for **CFMP Grant funding, only.** [3]	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name: Hagerstown Wastewater Pump Station 13 Reconstruction

Project Address (MUST incl. 9-digit zip code): 205 Western Maryland Parkway, Hagerstown, MD 21740-5148

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST be in xx.xxxxxx format)[4]: 39.640381

Longitude (MUST be in xx.xxxxxx format)[4]: -77.762321

County: Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*

2022 Congressional District[5]: 6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*

2022 Legislative District[6]: 02B *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*

Watershed Name and 8-Digit Code[7]: Antietam Creek / 02-14-05-02 *(drop down)*

Select according to the project location (for WWTPs/WRFs, identify according to the permitted point of discharge) from the drop down list.
If multiple, attach a list labeled General Info-Multiple Watersheds and 8-Digit Codes.

National Flood Insurance Program CID[8]: NA For CFMG projects, only.

Current Owner of project/infrastructure: City of Hagerstown

Future Owner of project/infrastructure: City of Hagerstown

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement): Nancy Hausrath

Federal Tax Identification Number: 5260000794

Applicant Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

County: Washington *(drop down)*

Email Address: NHausrath@Hagerstownmd.org

Phone Number (incl. extension) 301-739-8577, Ext. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name: Nancy Hausrath

Contact Title: Director

Contact Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

Contact Email Address: NHausrath@Hagerstownmd.org

Contact Phone Number (incl. extension): 301-739-8577, Ext. 677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/WQ%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx
[4] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[5] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[6] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx
[7] https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx
[8] https://www.fema.gov/cis/MD.html

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Design *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	December-23	November-24	100%
Design	March-25	October-25	0%
Bidding	November-25	December-25	0%
Construction	February-26	December-26	0%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm:	Buchart Horn, Inc.
A/E Firm Contact:	Scott Russell
A/E Firm Contact Email Address:	scottrussell@bucharthorn.com
A/E Firm Contact Phone Number (incl. extension):	717-852-1472

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount		
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 5,175,000		
Total $ of Green Components (identified in Section II)		$ -		

Additional Funding	Amount
$ of Previous Grant from MWIFA*	$ -
$ of Previous SRF from MWIFA*	$ -

		Amount	Funds Secured? (Yes/No) dropdown[1]	
$ from Applicant*		$ 945,000	Yes	*If "Yes"*[1]
$ from U.S. Army Corps of Engineers*				*If "Yes"*[1]
$ from USDA Rural Development*				*If "Yes"*[1]
$ from DHCD Community Development Block Grant*				*If "Yes"*[1]
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*				*If "Yes"*[1]
$ from Congressionally-Directed Spending (aka "Earmarks")*				*If "Yes"*[1]
$ from Other*				*If "Yes"*[1]
Specify:				
	(y)	$ 945,000		*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 6,120,000**		***Will autocalc***[3]

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of MWIFA $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 135,000	No	*If "Yes"*[2]
$ for A/E Design*	$ 360,000	No	*If "Yes"*[2]
$ for A/E Construction Management*	$ 450,000	No	*If "Yes"*[2]
$ for Construction*	$ 4,500,000	Yes	*If "Yes"*[2]
$ for Land*	$ -	No	*If "Yes"*[2]
$ for Contingency*	$ 675,000	Yes	*If "Yes"*[2]
$ for Administrative*	$ -	No	*If "Yes"*[2]
$ for Other*	$ -	No	*If "Yes"*[2]
Project Funding Uses Total	**$ 6,120,000**		***Will autocalc***[3]

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

MDE APPLICATION Questions

III. Project Purpose and Summary

A. What is the proposed Project? Include the existing and proposed capacities, length and size of sewer pipes, location of service area, etc.

The Pump Station No. 13 project is proposed to reconstruct the previously existing Pump Station No. 13. This pumping station was taken out of service in late 2003 as part of the Flow Transfer Agreement with Washington County. That Agreement facilitated the transfer of flows from customers in the City's service area to the County's service area. This enabled the County to serve outside City customers at no cost to those wastewater customers located inside the City boundaries.

The Hagerstown Mayor and City Council and the Washington County Commissioners revoked the Consolidated Joint Service Agreement and the Flow Transfer Agreement and enacted the Joint Sewer Service Area Agreement (JSSA) in January 2022. The Mayor and City Council and the Washington County Commissioners incorporated into the JSSA the reconstruction of City Pump Station 13 which will result in the transfer of flow from the County's sanitary sewer system back to the City's sanitary sewer system. The JSSA further required the construction of County owned infrastructure to transfer the sanitary sewer flows currently entering the City's sanitary sewer system in Maugansville area into the County sanitary sewer system for treatment at the County's wastewater treatment plant.

B. What is the purpose of the project, why is the project needed, and what is the problem being corrected?

This project is needed to enable the City to provide sanitary sewer service to customers located within Hagerstown Municipal boundaries. This project will also reduce volume of flow being treated at the Hagerstown Wastewater Treatment Plant (WWTP). The project will reduce inflow and infiltration entering the sanitary sewer system from the Maugansville service area. Additionally, this project will correct inflow and infiltration in the Pump Station 13 sanitary sewer service area thus reducing the total flow entering the WWTP.

C. Has the project previously been submitted to MWIFA for funding consideration? If so, by what project name, has the scope of work changed since that submittal (if so, explain how), and was the project selected to receive funding?

Project was previously submitted in January 2022 but was withdrawn by the City.

Additional Attachments to this Funding Application

1. **Application File:** Hagerstown Pump Station 13 FF25 SFY27 CW Application
2. **Project Purpose and Summary:** Hagerstown Project Summary Pump Station 13
3. **Project Information Street Map:** Pump Station 13 Current Street Map
4. **Color Copy of MDP PFA File:** MDP Priority Funding Map 1A Pump Station 13
5. **Current MDE-approved County Water & Sewer Plan File:** Hagerstown Pump Station 13Water Sewer Plan
6. **Water and Wastewater Rates File:** Hagerstown Pump Station 13 FY25 Rates

APPLICATION TYPE

Review the Water Quality Funding Eligibility Chart [1] and the Median Household Income/Disadvantaged Community Chart [2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **BRF Wastewater Grant and/or Supplemental Assistance Grant, only**.	
Consider for **WQSRF BIL PFAS/Emerging Contaminants (EC) or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects)	
Consider for **CFMP Grant funding, only.** [3]	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name: Hagerstown Wastewater Treatment Plant Improvements - Phase 1

Project Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST be in xx.xxxxxx format)[4]: 39.620097

Longitude (MUST be in xx.xxxxxx format)[4]: -77.707807

County: Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*

2022 Congressional District[5]: 6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*

2022 Legislative District[6]: 02B *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*

Watershed Name and 8-Digit Code[7]: Antietam Creek / 02-14-05-02 *(drop down)*

Select according to the project location (for WWTPs/WRFs, identify according to the permitted point of discharge) from the drop down list.
If multiple, attach a list labeled General Info-Multiple Watersheds and 8-Digit Codes.

National Flood Insurance Program CID[8]: NA For CFMG projects, only.

Current Owner of project/infrastructure: City of Hagerstown

Future Owner of project/infrastructure: City of Hagerstown

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement): Nancy Hausrath

Federal Tax Identification Number: 5260000794

Applicant Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

County: Washington *(drop down)*

Email Address: NHausrath@Hagerstownmd.org

Phone Number (incl. extension) 301-739-8577, Ext. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name: Nancy Hausrath

Contact Title: Director

Contact Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

Contact Email Address: NHausrath@Hagerstownmd.org

Contact Phone Number (incl. extension): 301-739-8577, Ext. 677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/WQ%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx
[4] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[5] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[6] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx
[7] https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx
[8] https://www.fema.gov/cis/MD.html

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Design *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	December-23	November-24	100%
Design	February-25	November-25	5%
Bidding	December-25	February-26	0%
Construction	February-26	August-28	0%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm: Black & Veatch
A/E Firm Contact: Betsy Baldwin
A/E Firm Contact Email Address: BaldwinB@bv.com
A/E Firm Contact Phone Number (incl. extension): 571-366-6953

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 2,000,000
Total $ of Green Components (identified in Section II)		$ -

Additional Funding	Amount
$ of Previous Grant from MWIFA*	$ -
$ of Previous SRF from MWIFA*	$ 20,000,000

	Amount	Funds Secured? (Yes/No) dropdown[1]	
$ from Applicant*	$ 4,020,000	Yes	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*			*If "Yes"[1]*
$ from USDA Rural Development*			*If "Yes"[1]*
$ from DHCD Community Development Block Grant*			*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*			*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*			*If "Yes"[1]*
$ from Other*			*If "Yes"[1]*
Specify:			
	(y) $ 24,020,000		*Will autocalc*
Project Funding Sources Total	(x + y) **$ 26,020,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of MWIFA $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 520,000	No	*If "Yes"[2]*
$ for A/E Design*	$ 2,000,000	No	*If "Yes"[2]*
$ for A/E Construction Management*	$ 1,000,000	No	*If "Yes"[2]*
$ for Construction*	$ 20,000,000	Yes	*If "Yes"[2]*
$ for Land*	$ -	No	*If "Yes"[2]*
$ for Contingency*	$ 2,000,000	Yes	*If "Yes"[2]*
$ for Administrative*	$ 500,000	No	*If "Yes"[2]*
$ for Other*	$ -	No	*If "Yes"[2]*
Project Funding Uses Total	**$ 26,020,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

MDE APPLICATION Questions

III. Project Purpose and Summary

A. What is the proposed Project? Include the existing and proposed capacities, length and size of sewer pipes, location of service area, etc.

The Hagerstown Wastewater Treatment Plant Improvements Project will address multiple plant process areas that all enhance the City of Hagerstown's (City's) ability to meet the effluent Total Phosphorus limit and improve plant reliability, safety, and operational efficiency. The project includes replacement of the existing influent bar screens, addition of a building enclosure covering influent channels and screens, replacement of in-plant pumps, improvements of biological nutrient removal process through nitrate based Internal Mixed Liquor Recycle (IMLR) control, new RAS and WAS pumps and replacement of electrical equipment at the plant. The equipment being replaced has exceeded its design life, resulting in high equipment maintenance requirements, and excessive chemical and power consumption throughout the plant. Proposed improvements will be planned and designed to improve operational efficiencies, reliability, redundancy, and reduce power and chemical demands. The preliminary engineering has been completed on this project and a Preliminary Engineering Report (PER) has been submitted and reviewed by MDE. Detailed design is due to start in February 2025, with bid phase planned for December 2025 pending loan funding availability, bids received, effects on rate structure, and affordability of the customer base. See attached approved water and wastewater rate structure for 2025.

This project will address aging infrastructure and facilitate meeting of nitrogen and phosphorous limits as well as all other quantified permit requirements. The City's existing wastewater treatment plant (WWTP) is currently rated for a capacity of 8.0 million gallons per day (mgd). The proposed improvements are not intended to modify the capacity rating of the plant. The WWTP services a population of 49,635 users (2024 population) in the City of Hagerstown and some surrounding areas. The proposed WWTP improvements will improve water quality of the receiving streams while maintaining the existing WWTP treatment capacity, facilitate plant reliability in meeting permit limits and does not address growth.

B. What is the purpose of the project, why is the project needed, and what is the problem being corrected?

The purpose of the project is to enhance Total Phosphorus removal through plant process improvements and maintain and improve treatment reliability through replacement of influent screens, in-plant pumps, RAS pumps, isolation gates, new chemical feed facility and protection of headworks equipment in an enclosed structure and electrical system upgrades.

Improved screening at the headworks will address the plant's inability to capture and remove debris from the influent wastewater. Currently, the uncaptured debris and rags have a cascading effect on liquid and solids stream processing efficiencies, impact operation of pumps, aeration, and mixing systems downstream, flow through the WWTP, and the quality of biosolids generated for beneficial use. Benefits of enclosure structure at the headworks include improved working environment during extreme temperatures, reduced heat tracing, and extended equipment life span. New in-plant pumps will ensure bypass of overflow to Oxygen Aeration Basin(s) during high flow events. New RAS pumps will provide redundancy to solids recirculation, preventing permit violations from solids passing through the clarifier, whereas the current Final Clarifier #1 RAS pump had zero standby pumps and remaining replacement parts were not available from the manufacturer. The absence of a WAS pump dedicated to wasting from Final Clarifier No. 1, impedes the control of nutrients and compound concentration in the wastewater treatment process. The new WAS pump will ensure the optimal functioning of wasting in the treatment process. New chemical feed facility will bring storage facility up to current standards and prevents injury and contamination from spills and offgas.

Overall, this project is needed to comply with the State and Federal discharge requirements as described in the plant permit.

C. Has the project previously been submitted to MWIFA for funding consideration? If so, by what project name, has the scope of work changed since that submittal (if so, explain how), and was the project selected to receive funding?

The project was submitted to MWIFA for FFY23 funding consideration, under the project name "Hagerstown Wastewater Treatment Plant Improvements" and City of Hagerstown received notification of FFY23 WQSRF Intended Use Plan Funding for $20,000,000 ($17,000,000 loan, $1,500,000 principal forgiveness loan - Base, and $1,500,000 principal forgiveness loan - Gen Supp) for $37,731,000 requested on October 16, 2023.

The project title has been amended to "Hagerstown Wastewater Treatment Plant Improvements Phase 1", to distinguish this application from two additional applications being submitted as Phase 2A – liquids improvements at the WWTP and Phase 2B – solids improvements at the WWTP.

As per the notification pertaining to the FFY23 WQSRF funding, the project has fulfilled the requisite PER and subsequently submitted it to MDE on November 8, 2024. The project scope was scaled down to match the loan funding amount of $20,000,000. The detailed design for the project is starting in February 2025 and expected to reach bid documents by December 2025. An additional $2,000,000 is being requested in this funding application to fund construction contingency, thereby resulting in a total construction budget of $22,000,000.

IV. Project Supporting Documents

A7. The Project can be presumed to mitigate public health and safety hazards posted by water quality problems, flooding, and climate change.
Does not need a paragraph

B6. The project can be credited toward meeting a completed TMDL for Total Nitrogen, Total Phosphorus, sediments, bacteria, or temperature as confirmed by a 4a category listing in the current final integrated Report of Surface Water Quality. *Include attachment.*
The proposed project can be credited toward meeting a completed TMDL for Total Phosphorus for the Antietam Creek sub watershed (02-14-05-02) as shown in the Attachment 07 IV.B. 4a. Influent wastewater screening, BNR improvements in the secondary process through Nitrate Based Internal Mixed Liquor Recycle (IMLR) control, and the chemical feed improvements will all enhance the plant's ability to meet the effluent Total Phosphorus limit. Nitrate based IMLR control will increase the amount of nitrate removal in the BNR anoxic zone by allowing recycle flow adjustment during various conditions. Overall, project improvements are expected to result in a nutrient removal of approximately 2% above existing effluent discharge conditions. Influent screening will improve equipment availability (less downtime due to ragging and debris buildup) and better biosolids quality (because of rag removal). The BNR system and chemical feed upgrades will not only address the City's challenges in meeting the Total Phosphorus limits during high flow events but also the improved denitrification process which will reduce the methanol dosing requirements by 10%-15% at the denitrification filters. A separate application has been submitted which includes biosolids processing facility improvements and are not included this application.

In the summer, the plant approaches compliance limits for NPDES thermal requirements, which will

possibly be a requirement in the next permit cycle. To assist in meeting the future thermal requirements, the headworks enclosure will reduce the exposure of the influent channels to warmer air during the summer.

C3. Project provides for energy reduction or alternate energy generation.

The proposed project aims to achieve energy reduction through the replacement of existing equipment with more energy-efficient units, along with the improvement of operating efficiencies of the current processes. Nitrate based IMLR control feedback system will facilitate the adjustment of pump speed as necessary, thereby reducing energy usage. The replacement of MCC will enable the proper management and monitoring of energy use through effective energy metering. New transformers will reduce the energy loss annually by approximately 413,000 KWh in comparison to the typical energy loss of 30 to 40 year old transformers currently installed at the plant. The planned project pump replacements will provide a forecasted savings of approximately 275,000 kWh per year due to more appropriately sized pumps and higher efficiency motors. See calculation summary in Table 1 and Table 2 on Appendix A. Additional energy use savings from VFDs are not included in the calculation.

C10. Project provides for a disaster resilience component

As part of the proposed project, the WWTP will be equipped with new substations and MCCs. As new process equipment is replaced the associated electrical conduits, electrical manholes, and panels will be updated and will address components that have typically become waterlogged during wet weather. The new systems will include energy metering capabilities, which will enable the effective monitoring and management of energy use across the plant. This feature will also prove to be useful during times of extreme weather conditions, as it will facilitate load curtailment if required. The additional standby pumps in the RAS and In-Plant pump stations will add redundancy to these important systems and the plant will be better equipped to handle higher flows. By incorporating such energy-efficient and disaster-resilient features, the WWTP will be better equipped to handle unforeseen circumstances and operate efficiently in a sustainable manner.

Additional Attachments to this Funding Application

1. **Application File:** 01 Hagerstown_Ph1_Nancy Hausrath_FFY25 SFY27 CW Application.xls

2. **III and IV. Project Summary File:** 02 Hagerstown_Ph1_Nancy Hausrath_III_IV._Project Summary.pdf

3. **General Info Street Map File:** 03 Hagerstown_Ph1_Nancy Hausrath_Info_Current Street Map.pdf

4. **I. Threshold Criteria, A. Color Copy of MDP PFA File:** 04 Hagerstown_ Ph1_Nancy Hausrath_I.A_PFA Map.pdf

5. **I. Threshold Criteria, B. Current MDE-approved County Water & Sewer Plan File:** 05 Hagerstown_Ph1_Nancy Hausrath_I.B_Water_Sewer Plan.pdf

6. **III. Project Purpose and Summary – Water and Wastewater Rates File:** 06 Hagerstown_Ph1_Nancy Hausrath_III.FY2025 Rates.pdf

7. **IV.B6. 4a Listing File:** 07 Hagerstown_Ph1_Nancy Hausrath_IV.B6_4aReport_SurfaceWQ.pdf

8. **Appendix A Energy Savings Calculation File:** 08 Hagerstown_Ph1_Nancy Hausrath_App A_Energy.pdf

APPLICATION TYPE

Review the Water Quality Funding Eligibility Chart [1] and the Median Household Income/Disadvantaged Community Chart [2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **BRF Wastewater Grant and/or Supplemental Assistance Grant, only**.	
Consider for **WQSRF BIL PFAS/Emerging Contaminants (EC) or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects)	
Consider for **CFMP Grant funding, only.** [3]	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name:	Hagerstown Wastewater Treatment Plant Improvements Phase 2
Project Address (MUST incl. 9-digit zip code):	1 Clean Water Circle, Hagerstown, MD 21740

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST be in xx.xxxxxx format)[4]:	39.620097
Longitude (MUST be in xx.xxxxxx format)[4]:	-77.707807
County:	Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*
2022 Congressional District[5]:	6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*
2022 Legislative District[6]:	02B *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*
Watershed Name and 8-Digit Code[7]:	Antietam Creek / 02-14-05-02 *(drop down)*

Select according to the project location (for WWTPs/WRFs, identify according to the permitted point of discharge) from the drop down list. If multiple, attach a list labeled General Info-Multiple Watersheds and 8-Digit Codes.

National Flood Insurance Program CID[8]:	NA For CFMG projects, only.
Current Owner of project/infrastructure:	City of Hagerstown
Future Owner of project/infrastructure:	City of Hagerstown

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement):	Nancy Hausrath
Federal Tax Identification Number:	5260000794
Applicant Address (MUST incl. 9-digit zip code):	1 Clean Water Circle, Hagerstown, MD 21740-6848
County:	Washington *(drop down)*
Email Address:	NHausrath@Hagerstownmd.org
Phone Number (incl. extension)	301-739-8577, Ext. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name:	Nancy Hausrath
Contact Title:	Director
Contact Address (MUST incl. 9-digit zip code):	1 Clean Water Circle, Hagerstown, MD 21740-6848
Contact Email Address:	NHausrath@Hagerstownmd.org
Contact Phone Number (incl. extension):	301-739-8577, Ext. 677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/WQ%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx
[4] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[5] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[6] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx
[7] https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx
[8] https://www.fema.gov/cis/MD.html

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Planning *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	January-26	November-26	5%
Design	December-26	October-27	0%
Bidding	December-27	February-28	0%
Construction	February-28	August-30	0%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm: Black & Veatch
A/E Firm Contact: Betsy Baldwin
A/E Firm Contact Email Address: BaldwinB@bv.com
A/E Firm Contact Phone Number (incl. extension): 571-366-6953

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 27,500,000
Total $ of Green Components (identified in Section II)		$ -

Additional Funding	Amount
$ of Previous Grant from MWIFA*	$ -
$ of Previous SRF from MWIFA*	$ -

		Amount	Funds Secured? (Yes/No) dropdown[1]	
$ from Applicant*		$ 4,125,000	Yes	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*				*If "Yes"[1]*
$ from USDA Rural Development*				*If "Yes"[1]*
$ from DHCD Community Development Block Grant*				*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*				*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*				*If "Yes"[1]*
$ from Other*				*If "Yes"[1]*
Specify:				
	(y)	$ 4,125,000		*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 31,625,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of MWIFA $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 500,000	No	*If "Yes"[2]*
$ for A/E Design*	$ 1,750,000	No	*If "Yes"[2]*
$ for A/E Construction Management*	$ 1,250,000	No	*If "Yes"[2]*
$ for Construction*	$ 25,000,000	Yes	*If "Yes"[2]*
$ for Land*	$ -	No	*If "Yes"[2]*
$ for Contingency*	$ 2,500,000	Yes	*If "Yes"[2]*
$ for Administrative*	$ 625,000	No	*If "Yes"[2]*
$ for Other*	$ -	No	*If "Yes"[2]*
Project Funding Uses Total	**$ 31,625,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

MDE APPLICATION Questions

III. Project Purpose and Summary

A. What is the proposed Project? Include the existing and proposed capacities, length and size of sewer pipes, location of service area, etc.

The Hagerstown Wastewater Treatment Plant Improvements Project Phase 2A aims to further enhance the City of Hagerstown's (City's) ability to meet the Total Phosphorous (TP) effluent limits while improving plant reliability and safety by incorporating upgrades and/or replacements across the plant. The project focuses on overall plant improvements and liquid process upgrades. The project includes expansion of the backup generator power system, replacement of the corroded primary and final clarifier mechanisms, nutrient removal improvements such as installation of Biological Nutrient Removal (BNR) mixer timers, Oxygen Aeration Basin (OAB) oxygen dosing improvements, denitrification filter compressors, grit system upgrade, improvements to enhance settling, re-establishment of drains in pump rooms, storm water pump replacement and replacement of electrical equipment.

Due to the equipment's age and outdated process technologies, the plant is struggling to meet regulatory requirements, particularly during wet weather flow, resulting in high equipment maintenance, excessive power consumption, and regulatory violations. The planned improvements will focus on enhancing operational efficiency, reliability, redundancy, and reducing power usage. Plant improvements will be multi-year projects (beginning design in 2026 and construction completion in 2030) based on funding availability, bids received, effects on rate structure, and affordability of the customer base. See Attachment 6 for approved water and wastewater rate structure.

The City's existing wastewater treatment plant (WWTP) is currently rated for a capacity of 8.0 million gallons per day (mgd).

The WWTP services a population of 49,635 users (2024 population) in the City of Hagerstown and some surrounding areas. The proposed WWTP improvements will secure a consistent high-quality plant effluent discharge into the receiving streams, provide added safety to the aging infrastructure, sustain the existing WWTP treatment capacity, and improve plant reliability in meeting permit limits.

B. What is the purpose of the project, why is the project needed, and what is the problem being corrected?

The purpose of the selected projects is to improve Total Phosphorus removal and treatment reliability.

The primary and older final clarifiers and scum system at the plant are not functioning properly and upgrading them will reduce maintenance and increase reliability. The project is also focused on improving nutrient removal, particularly for nitrogen and phosphorus through dedicated timers for BNR mixers and aeration basin improvements and enhancing settling to increase capacity during high flow events and improve climate resiliency. The additional backup generator will serve as an alternative energy source during outages and replacement of electrical equipment will increase overall treatment reliability and reduce power consumption. Replacement of utility power feed connection will increase reliability during severe weather. The new Storm Water pumps will protect the plant from being inundated during wet weather. Upgrades to the grit system will reduce maintenance on sludge handling pumps and reduce the amount of grit in the biosolids. The aging Operations Building drain system will be replaced to safely drain pump rooms after maintenance and

spills as current drains pipes are collapsed. Replacement blowers providing air to the denitrification filters and instrumentation air will reduce maintenance and increase reliability. Conversion of Effluent Pumps from seal water to graphite packing will reduce water demand.

C. Has the project previously been submitted to MWIFA for funding consideration? If so, by what project name, has the scope of work changed since that submittal (if so, explain how), and was the project selected to receive funding?

Components of the project submitted in this application are similar to the unsuccessful application made by the City of Hagerstown in FFY24, Hagerstown Wastewater Treatment Plant Improvements Project, and did not receive funding. This application is a phase 2A to follow the planned phase 1, $22,000,000 construction project that is pending confirmation of loan funding in the FFY25 application cycle. This project includes the improvements that were identified as the next highest priority equipment needing replacement to maintain the plant liquids processes safety and reliability.

IV. Project Supporting Documents

A7. The Project can be presumed to mitigate public health and safety hazards posted by water quality problems, flooding, and climate change.

Does not need a paragraph

B6. The project can be credited toward meeting a completed TMDL for Total Nitrogen, Total Phosphorus, sediments, bacteria, or temperature as confirmed by a 4a category listing in the current final integrated Report of Surface Water Quality. *Include attachment.*

The proposed project can be credited toward meeting a completed TMDL for Total Phosphorus for the Antietam Creek sub watershed (02-14-05-02) as shown in Attachment 7 IV.B. 4a. To optimize BNR operation, improvements have been identified, including better control over BNR mixing time, and replacement of oxygen control valves with more responsive intelligent valves.

Operating anaerobic zone mixers with timers will improve biological phosphorus removal. The enhancements to settling will improve the plant's treatment capacity during high flow events by retaining the more settleable solids. These enhancements are expected to improve nitrogen and phosphorus removal, increase reliability, reduce power consumption, and reduce secondary effluent nitrate concentrations, resulting in improved water quality in the receiving streams.

C3. Project provides for energy reduction or alternate energy generation.

The proposed project aims to reduce energy consumption by replacing current equipment with more energy-efficient units and enhancing the operating efficiencies of current processes. To save energy, the BNR will only run mixers for a designated period as opposed to running the mixers all the time. However, the energy saving will be minor. The replacement of substation and MCCs will allow for effective energy metering and management. Installing new substation transformer will reduce the energy loss annually by approximately 74,000 KWh in compare to the 30-40 year old transformers currently in use. See calculation summary in Table 1 Appendix A.

C10. Project <u>provides for a disaster resilience component</u>

The WWTP does currently has only partial backup emergency power to keep the plant running in case of a man-made or natural disaster. Project improvements include installation of a generator to ensure uninterrupted operation of plant processes during an emergency or power outage. The new electrical equipment will include energy metering capabilities, which will enable the effective monitoring and management of energy use across the plant. This feature will also prove to be useful during times of extreme weather conditions, as it will facilitate load curtailment if required. The replacement of the utility power feed conductors will improve plant resilience. The aging Storm Water Pumps will be replaced to ensure reliable means of mitigating flooding at the plant during wet weather.

Additional Attachments to this Funding Application

1. **Application File:** 01 Hagerstown_Ph2A_Nancy Hausrath_FFY25 SFY27 CW Application.xls
2. **Signed Approval Sheet:** 02 Hagerstown_ Ph2A_Nancy Hausrath_Approval_Signature.pdf
3. **Project Information Street Map File:** 03 Hagerstown_ Ph2A_Nancy Hausrath_Info_Current Street Map.pdf
4. **I. Threshold Criteria, A. Color Copy of MDP PFA File:** 04 Hagerstown_ Ph2A_Nancy Hausrath_I.A_PFA Map.pdf
5. **I. Threshold Criteria, B. Current MDE-approved County Water & Sewer Plan File:** 05 Hagerstown_ Ph2A_Nancy Hausrath_I.B_Water_Sewer Plan.pdf
6. **III. Project Purpose and Summary – Water and Wastewater Rates File:** 06 Hagerstown_ Ph2A_Nancy Hausrath_III.FY2025 Rates.pdf
7. **IV.B. 4a Listing File:** 07 Hagerstown_ Ph2A_Nancy Hausrath_IV.B6_4aReport_SurfaceWQ.pdf
8. **Appendix A Energy Saving Calculation File:** 08 Hagerstown_ Ph2A_Nancy Hausrath_App_A_Energy_Savings

APPLICATION TYPE

Review the Water Quality Funding Eligibility Chart[1] and the Median Household Income/Disadvantaged Community Chart[2] and use the drop down to insert an X in the box next to only ONE of the following:

Consider for the **best possible MDE funding package, which may include (or be limited to) loan.**	X
Consider for **BRF Wastewater Grant and/or Supplemental Assistance Grant, only**.	
Consider for **WQSRF BIL PFAS/Emerging Contaminants (EC) or equivalent only** (i.e., 100% loan principal forgiveness for PFAS/EC projects)	
Consider for **CFMP Grant funding, only.**[3]	

PROJECT INFORMATION

Attach a copy of a current street map with the exact position of the project location clearly marked.

Project Name: Hagerstown Wastewater Treatment Plant Improvements Phase 2B

Project Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740

Provide for the location of the funded activity. If the project spans a large area, enter the address that best represents the center of the project area.

Latitude (MUST be in xx.xxxxxx format)[4]: 39.620097

Longitude (MUST be in xx.xxxxxx format)[4]: -77.707807

County: Washington *(drop down) If multiple, attach a list labeled General Info-Multiple Counties.*

2022 Congressional District[5]: 6 *(drop down) If multiple, attach a list labeled General Info-Multiple Congressional Districts*

2022 Legislative District[6]: 02B *(drop down) If multiple, attach a list labeled General Info-Multiple Legislative Districts.*

Watershed Name and 8-Digit Code[7]: Antietam Creek / 02-14-05-02 *(drop down)*

Select according to the project location (for WWTPs/WRFs, identify according to the permitted point of discharge) from the drop down list. If multiple, attach a list labeled General Info-Multiple Watersheds and 8-Digit Codes.

National Flood Insurance Program CID[8]: NA For CFMG projects, only.

Current Owner of project/infrastructure: City of Hagerstown

Future Owner of project/infrastructure: City of Hagerstown

If the future owner is not the same as the current owner, please provide a copy of the written agreement between parties.

APPLICANT INFORMATION

Applicant should be the entity to receive, and be legally responsible for, SRF and/or grant funding

Applicant Name (as it would appear on a legal agreement): Nancy Hausrath

Federal Tax Identification Number: 5260000794

Applicant Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

County: Washington *(drop down)*

Email Address: NHausrath@Hagerstownmd.org

Phone Number (incl. extension) 301-739-8577, Ext. 677

CONTACT INFORMATION

*Contact should be the individual to be notified if funding is allocated to the project. Additional contacts can be named on the **Signature** sheet.*

Contact Name: Nancy Hausrath

Contact Title: Director

Contact Address (MUST incl. 9-digit zip code): 1 Clean Water Circle, Hagerstown, MD 21740-6848

Contact Email Address: NHausrath@Hagerstownmd.org

Contact Phone Number (incl. extension): 301-739-8577, Ext. 677

[1] https://mde.maryland.gov/programs/water/WQFA/Documents/WQ%20Subsidy%20Chart-FFY24-FINAL.pdf
[2] https://mde.maryland.gov/programs/water/WQFA/Documents/MHI-Data%2011-2024_FINAL.pdf
[3] https://mde.maryland.gov/programs/Water/StormwaterManagementProgram/Pages/floodmgmt.aspx
[4] https://www.latlong.net/degrees-minutes-seconds-to-decimal-degrees
[5] https://planning.maryland.gov/Redistricting/Pages/2020/congDist.aspx
[6] https://planning.maryland.gov/Redistricting/Pages/2020/legiDist.aspx
[7] https://mde.maryland.gov/programs/Water/TMDL/DataCenter/Pages/8DigitWatershed.aspx
[8] https://www.fema.gov/cis/MD.html

VI. PROJECT SCHEDULE

Provide the information requested and complete the table below.

Current Project Status: Planning *Select from the drop down and enter the percent completed for this phase in the table below*

Phase	Start (Month/Year)	Completion (Month/Year)	Percent Completed
Planning	January-26	November-26	5%
Design	December-26	October-27	0%
Bidding	December-27	February-28	0%
Construction	February-28	August-30	0%

PROJECTS IN CONSTRUCTION PRIOR TO MDE'S VERIFICATION OF COMPETITIVE PROCUREMENT AND COMPLIANCE WITH ALL PROGRAMMATIC REQUIREMENTS WILL NOT BE FUNDED. DO NOT SUBMIT APPLICATIONS FOR PROJECTS THAT ARE, OR WILL BE, IN CONSTRUCTION PRIOR TO THESE REVIEWS BEING COMPLETED BY MDE.

Name of A/E Firm: Black & Veatch
A/E Firm Contact: Betsy Baldwin
A/E Firm Contact Email Address: BaldwinB@bv.com
A/E Firm Contact Phone Number (incl. extension): 571-366-6953

VII. PROJECT FUNDING

Complete tables A and B below for the project. Total Funding Source and Total Funding Uses should match.

A. Project Funding Sources

This Request		Amount
Total $ of MWIFA Funding Requested, regardless of source	(x)	$ 11,000,000
Total $ of Green Components (identified in Section II)		$ -

Additional Funding	Amount
$ of Previous Grant from MWIFA*	$ -
$ of Previous SRF from MWIFA*	$ -

		Amount	Funds Secured? (Yes/No) dropdown[1]	
$ from Applicant*		$ 1,650,000	Yes	*If "Yes"[1]*
$ from U.S. Army Corps of Engineers*				*If "Yes"[1]*
$ from USDA Rural Development*				*If "Yes"[1]*
$ from DHCD Community Development Block Grant*				*If "Yes"[1]*
$ from Water Infrastructure Finance and Innovation Act (WIFIA)*				*If "Yes"[1]*
$ from Congressionally-Directed Spending (aka "Earmarks")*				*If "Yes"[1]*
$ from Other*				*If "Yes"[1]*
Specify:				
	(y)	$ 1,650,000		*Will autocalc*
Project Funding Sources Total	(x + y)	**$ 12,650,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

B. Project Funding Uses

	Amount	Use of MWIFA $? (Yes/No) dropdown[2]	
$ for A/E Planning*	$ 200,000	No	*If "Yes"[2]*
$ for A/E Design*	$ 700,000	No	*If "Yes"[2]*
$ for A/E Construction Management*	$ 500,000	No	*If "Yes"[2]*
$ for Construction*	$ 10,000,000	Yes	*If "Yes"[2]*
$ for Land*	$ -	No	*If "Yes"[2]*
$ for Contingency*	$ 1,000,000	Yes	*If "Yes"[2]*
$ for Administrative*	$ 250,000	No	*If "Yes"[2]*
$ for Other*	$ -	No	*If "Yes"[2]*
Project Funding Uses Total	**$ 12,650,000**		***Will autocalc[3]***

** Include $ for project planning/design/construction already completed*

[1] If answer is "Yes," provide a copy of funding confirmation letter.

[2] Select "Yes" if funding requested in this application will be used for this line item.

[3] Will automatically calculate. **Project Funding Sources Total must match Project Funding Uses Total.**

MDE APPLICATION Questions

III. Project Purpose and Summary

A. What is the proposed Project? Include the existing and proposed capacities, length and size of sewer pipes, location of service area, etc.

The Hagerstown Wastewater Treatment Plant Improvements Project Phase 2B aims to further enhance the City of Hagerstown's (City's) ability to meet the Total Phosphorous (TP) effluent limits while improving plant reliability and safety. The project focuses on solids handling improvements. The project includes automation of primary clarifier scum removal, upgrades to biosolids storage tank improvements to reduce phosphorous return. This application includes improvements at the biosolids processing facility for replacement of the silo, roof, and implementation of 2024 Dust Hazard Analysis (DHA) recommendations and facility fire suppression systems to improve safety and prolong equipment life inside the facility.

Due to the equipment's age and outdated process technologies, the plant is struggling to meet regulatory requirements, particularly during wet weather flow, resulting in high equipment maintenance, excessive power consumption, and regulatory violations. The planned improvements will focus on enhancing operational efficiency, reliability, redundancy, and reducing power usage. Plant improvements will be multi-year projects (beginning design in 2026 and construction completion in 2030) based on funding availability, bids received, effects on rate structure, and affordability of the customer base. See Attachment 6 for approved water and wastewater rate structure. The City's existing wastewater treatment plant (WWTP) is currently rated for a capacity of 8.0 million gallons per day (mgd). The WWTP services a population of 49,635 users (2024 population) in the City of Hagerstown and some surrounding areas. The proposed WWTP improvements will secure a consistent high-quality water discharge into the receiving streams, provide added safety to the aging infrastructure, sustain the existing WWTP treatment capacity, and improve plant reliability in meeting permit limits.

B. What is the purpose of the project, why is the project needed, and what is the problem being corrected?

The purpose of the selected projects is to improve Total Phosphorus removal, treatment reliability, and improve biosolids facility operations safety.

The scum conveyance system at the plant are not functioning properly and upgrading them will reduce maintenance and increase reliability. The project is also focused on reducing phosphorous return from the biosolids filtrate recycle stream to make the treatment process more consistent to operate. The biosolids processing facility operates four days per week, and the high nutrient filtrate makes control of oxygen in the aeration basins challenging, especially during summer where ortho-phosphorous concentration rises in the filtrate stream. The solids storage tank mixing improvements will help mitigate septic conditions contributing to high levels of ortho-phosphorous. The replacement of the biosolids processing facility silo and roof, along with DHA improvements, will improve operational safety.

C. Has the project previously been submitted to MWIFA for funding consideration? If so, by what project name, has the scope of work changed since that submittal (if so, explain how), and was the project selected to receive funding?

Components of the project submitted in this application are similar to the unsuccessful application made by the City of Hagerstown in FFY24, Hagerstown Wastewater Treatment Plant Improvements Project, and did not receive funding. This application is a phase 2B to follow the planned phase 1, $22,000,000 construction project that is pending confirmation of loan funding in the FFY25 application cycle. This project includes the improvements that were the highest priority equipment to maintain plant biosolids processing safety and reliability.

IV. Project Supporting Documents

A7. The Project can be presumed to mitigate public health and safety hazards posted by water quality problems, flooding, and climate change.

Does not need a paragraph

B6. The project can be credited toward meeting a completed TMDL for Total Nitrogen, Total Phosphorus, sediments, bacteria, or temperature as confirmed by a 4a category listing in the current final integrated Report of Surface Water Quality. *Include attachment.*

The proposed project can be credited toward meeting a completed TMDL for Total Phosphorus for the Antietam Creek sub watershed (02-14-05-02) as shown in Attachment 7 IV.B. 4a. To optimize solids storage and processing that will lower nutrient filtrate return from biosolids storage processing facility.

C3. Project provides for energy reduction or alternate energy generation.

The proposed project aims to reduce energy consumption by replacing current equipment with more energy-efficient units and enhancing the operating efficiencies of current processes. The project includes the replacement of solids holding tank aging blowers and mixers with mechanical mixing to achieve forecasted savings of 141,400 kWh per year. See calculation summary in Table 1 Appendix A.

C10. Project provides for a disaster resilience component

In the event of extreme weather conditions causing a power outage at the plant, there is a risk of the biosolids processing facility shutting down with dried material inside. On restarting the process, the dried solids are exposed to oxygen at high temperatures, which can lead to ignition of the dried material and any accumulated dust in the system poses a potential risk of explosion. Isolating various pieces of equipment, like the silo, under DHA improvements will help improve resiliency of the plant and act as a protective measure for equipment and personnel. Fire suppression systems will also be improved at the biosolids processing facility to mitigate damage.

Additional Attachments to this Funding Application

1. **Application File:** 01 Hagerstown_Ph2B_Nancy Hausrath_FFY25 SFY27 CW Application.xls
2. **Project Summary:** 02 Hagerstown_ Ph2B_Nancy Hausrath_Project Summary.pdf
3. **Project Information Street Map File:** 03 Hagerstown_ Ph2B_Nancy Hausrath_Info_Current Street Map.pdf
4. **I. Threshold Criteria, A. Color Copy of MDP PFA File:** 04 Hagerstown_ Ph2B_Nancy Hausrath_I.A_PFA Map.pdf
5. **I. Threshold Criteria, B. Current MDE-approved County Water & Sewer Plan File:** 05 Hagerstown_ Ph2B_Nancy Hausrath_I.B_Water_Sewer Plan.pdf
6. **III. Project Purpose and Summary – Water and Wastewater Rates File:** 06 Hagerstown_ Ph2B_Nancy Hausrath_III.FY2025 Rates.pdf
7. **IV.B. 4a Listing File:** 07 Hagerstown_ Ph2B_Nancy Hausrath_IV.B6_4aReport_SurfaceWQ.pdf
8. **Appendix A Energy Saving Calculation File:** 08 Hagerstown_ Ph2B_Nancy Hausrath_App_A_Energy_Savings