

EMERGENCY ACTION PLAN

ROANOKE CREEK DAM #72A

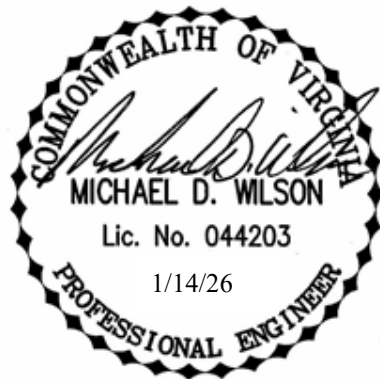
VA DCR #037002

36.9916°N, 78.5564°W

Charlotte County, Virginia

July 2020

Updated Contact Names and Numbers Jan. 14, 2026



H&P PROJECT NO.

20252736

CONTACT:

Mike Wilson, PE
Director of Engineering

SUBMITTED TO:

Town of Drakes Branch
4801 Drakes Main St.
P.O. Box 191
Drakes Branch, VA 23937

2524 Langhorne Road | Lynchburg, VA 24501
(434) 847-7796 | www.HandP.com



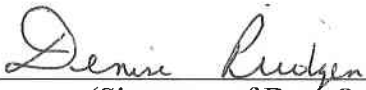
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Certification by Dam Owner/Operator

See new contacts on next sheet

I certify that procedures for implementation of this Emergency Action Plan have been coordinated with and a copy given to each local Emergency Services Coordinator serving the areas potentially impacted by the dam. Also, that a copy of this Emergency Action Plan has been filed with the Virginia Department of Emergency Management in Richmond and a copy of the Dam Break Inundation Map has been provided to the local government office with plat and plan approval authority or zoning responsibilities as designated by the locality for each locality in which the dam break inundation zone resides; that this plan shall be adhered to during the life of the project; and that the information contained herein is current and correct to the best of my knowledge.



(Signature of Dam Owner/Operator)

This 23rd day of July, 2020

Printed Name/Title: Denise Pridgen, Mayor
Town of Drakes Branch

Certification by Preparer

I certify that the information provided in this report has been examined by me and found to be true and correct in my professional judgment.



This 10th day of July, 2020

Printed Name: Michael D. Wilson, PE
Title: Director of Municipal & Government Engineering
Address: 2524 Langhorne Road Lynchburg, VA 24501
Phone: 434-847-7796 (office); 434-546-6156 (cell)

Certification by Dam Owner/Operator

I certify that procedures for implementation of this Emergency Action Plan have been coordinated with and a copy given to each local Emergency Services Coordinator serving the areas potentially impacted by the dam. Also, that a copy of this Emergency Action Plan has been filed with the Virginia Department of Emergency Management in Richmond and a copy of the Dam Break Inundation Map has been provided to the local government office with plat and plan approval authority or zoning responsibilities as designated by the locality for each locality in which the dam break inundation zone resides; that this plan shall be adhered to during the life of the project; and that the information contained herein is current and correct to the best of my knowledge.



(Signature of Dam Owner/Operator)

This 14th day of January, 2026

Printed Name/Title: Deborah Kennedy, Mayor
Town of Drakes Branch

EMERGENCY ACTION PLAN FOR HIGH AND SIGNIFICANT HAZARD IMPOUNDING STRUCTURES

Reference: Impounding Structure Regulations, 4VAC 50-20-10 et seq., including 4VAC 50-20-175, Virginia Soil and Water Conservation Board

I. BASIC INFORMATION

A. Impounding Structure

Name: Roanoke Creek Dam #72A
Inventory Number: VA037002
Other Name (if any): Drakes Lake

B. Hazard Potential Classification, Virginia Dam Safety Regulations

Low Significant **High** (Circle One)

C. Dam Owner

Name: Town of Drakes Branch
Address: 4801 Drakes Main St., PO Box 191, Drakes Branch, VA 23937

D. Primary Dam Operator

Name: Cary Brazil
Address: 4801 Drakes Main St., PO Box 191, Drakes Branch, VA 23937
Telephone: Business: (434) 568-3600 Mobile: (434) 208-0618

Secondary Dam Operator

Name: Ralph Simpson
Telephone: Mobile: (607) 644-4981

E. Primary Rain/Staff Gage Observer

Name: Cary Brazil
Address: 4801 Drakes Main St., PO Box 191, Drakes Branch, VA 23937
Telephone: Work: (434) 568-3600 Mobile: (434) 208-0618

Secondary Rain/Staff Gage Observer

Name: Ralph Simpson
Telephone: Mobile: (607) 644-4981

F. 24-Hour Dispatch Center

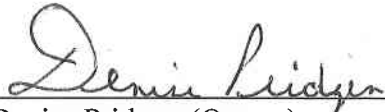
Name: Charlotte County Sheriff's Department
Telephone: Non-Emergency: (434) 542-5141 or emergency # 911

G. Local Government Emergency Services Coordinator

Name: Landon Green, Charlotte County Administrator
Telephone: Business: (434) 542-5117


II. CERTIFICATION See new contacts on next sheet

We, the undersigned, this date acknowledge the receipt of this plan as the Emergency Operations Plan to protect life and reduce property damage in case of a breach of the Roanoke Creek Dam #72A.




Denise Pridgen (Owner)
Town of Drakes Branch Mayor

7-23-2020
Date



James Napier
Primary Dam Operator / Primary Staff Gauge Observer

7-27-2020
Date



Matthew Beamish
Secondary Dam Operator / Secondary Staff Gauge Observer

7-24-2020
Date



Daniel Witt
Charlotte County Emergency Services Coordinator
Charlotte County Administrator

7-23-2020
Date

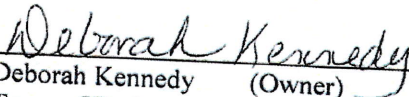


Sheriff Royal S. Freeman
Charlotte County Sheriff's Office

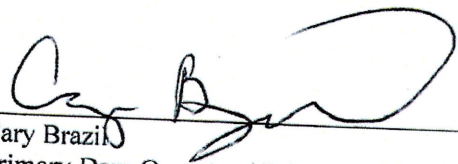
7-23-2020
Date

II. CERTIFICATION


We, the undersigned, this date acknowledge the receipt of this plan as the Emergency Operations Plan to protect life and reduce property damage in case of a breach of the Roanoke Creek Dam #72A.


Deborah Kennedy (Owner)
Town of Drakes Branch Mayor

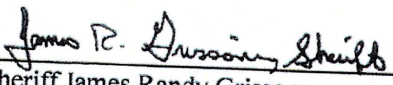
1-14-26
Date


Cary Brazil
Primary Dam Operator / Primary Staff Gauge Observer

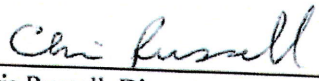
1-14-26
Date


Ralph Simpson
Secondary Dam Operator / Secondary Staff Gauge Observer

1-14-26
Date


Sheriff James Randy Grissom
Charlotte County Sheriff's Office

01-15-2026
Date


Chris Russell, Director
Charlotte County Emergency Communication Center

1-14-26
Date

III. EMERGENCY ACTION PLAN OVERVIEW

The Dam Owner, Dam Operator or Designee may use the following Table to weather conditions and operational conditions at the dam to determine the appropriate actions for notifying emergency personnel during potential and actual emergencies.

Step 1: Emergency Condition Detection	Event Detection: See Section VII		
Step 2: Emergency Level	Assess Situation: Determine Emergency Level Using Section VII		
	Emergency Stage I	Emergency Stage II	Emergency Stage III
	Non-Emergency Incident	Potential dam failure situation	Urgent
	Slowly developing situation	Quickly developing situation	Dam failure is imminent or in progress
	See Definition Below	See Definition Below	See Definition Below
Step 3: Notification & Communication	Stage I Notification List See Section IV Subsection A	Stage II Notification List See Section IV Subsection B	Stage III Notification List See Section IV Subsection C
Step 4: Expected Action	Inspect Dam Every 6 to 12 hours: Monitor & Listen to Weather Forecasts	Inspect Dam Every 2 hours: Notify Emergency Responders	Constant inspection of Dam, Continuous contact with Emergency Responders
Step 5: Termination and Follow Up	Termination of Monitoring Conditions at the Dam and Proceed to evaluate damages and plan for repairs		

Surveillance monitoring and observing instrument readings at the dam will be the normal methods of detecting potential emergency situations. For conditions beyond the normal range of operations contact the Charlotte County Emergency Communication Center for assistance with evaluation of the conditions. Each event or situation will fall into one of the following Stages:

Emergency Definitions

Stage I – Non-emergency, failure unlikely, storm development or operational malfunctions are slow in escalation to a potential emergency. This Stage indicates a situation is developing such that the dam is not in danger of failing, but if it continues failure may be possible. This stage also includes initiation of a flood watch or flood warning by the National Weather Service in the watershed draining to the lake / dam in question.

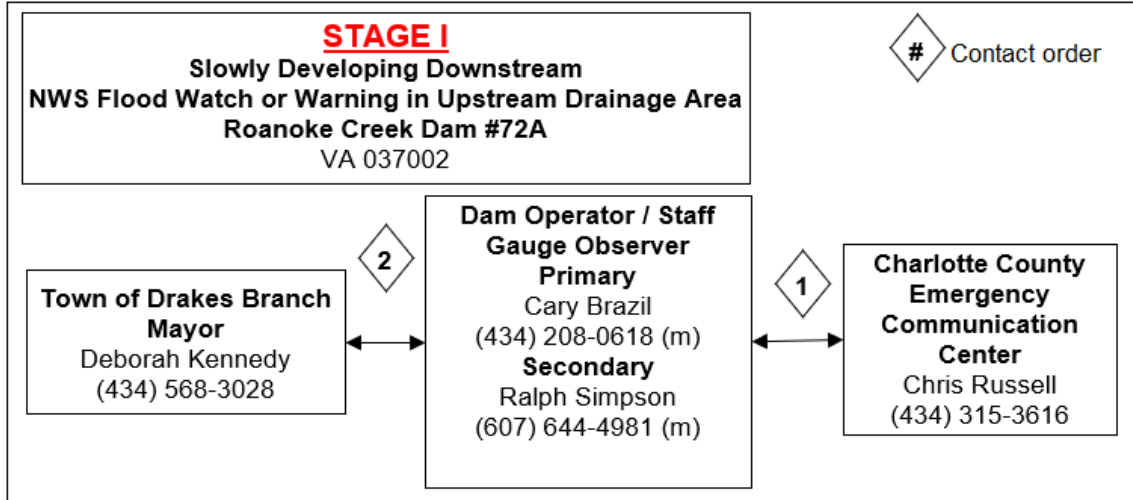
Stage II – Potential Failure, storm development or operational malfunction are quickly accelerating that could result in failure of the dam. This Stage indicates that a situation is developing that could result in a dam failure.

Stage III – Imminent Failure, storm or operational malfunction has reached a point that the failure of the dam has started or is imminent. This Stage indicates dam failure is expected or occurring and may result in flooding that will threaten life and/or property downstream of the dam.

IV. NOTIFICATION FLOW CHARTS

A. STAGE I NOTIFICATION

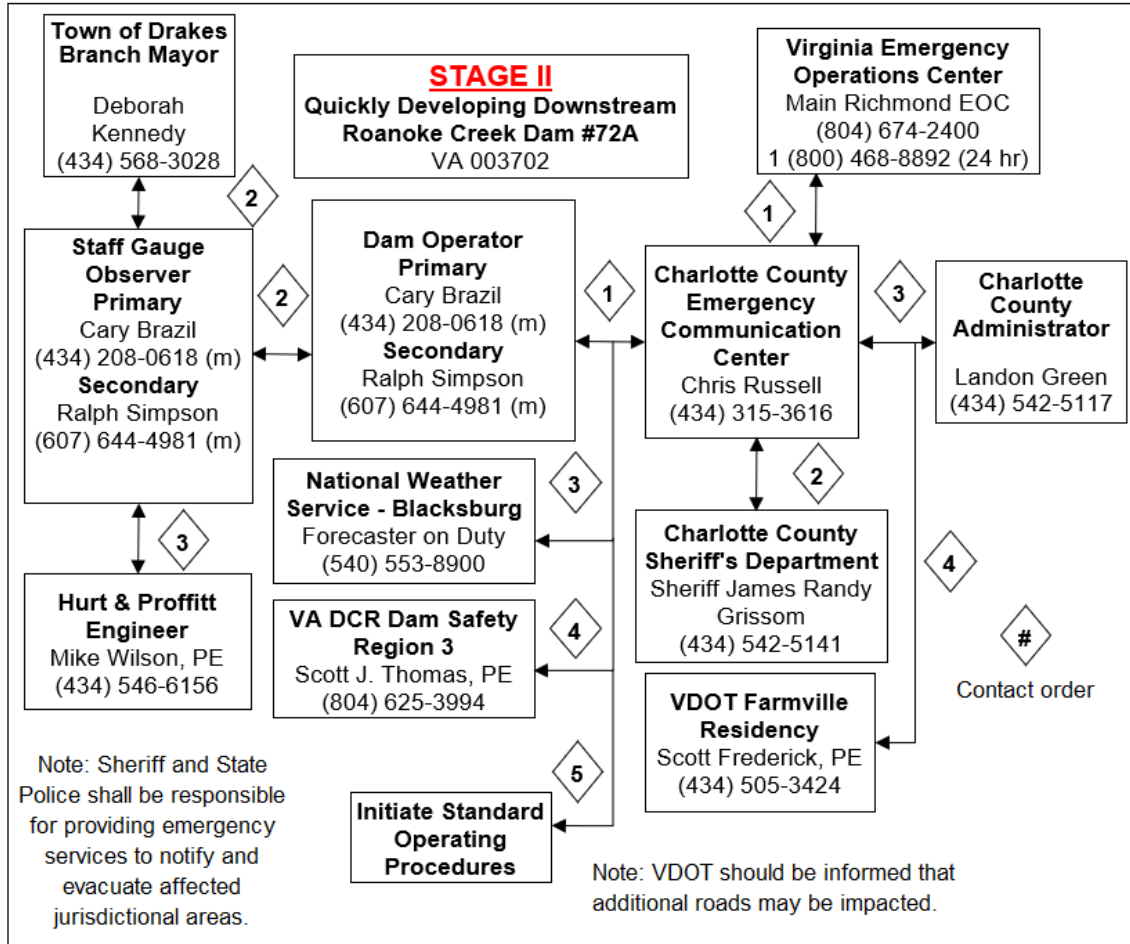
See Section VII, Subsection B for Stage activation thresholds and Section VII, Subsection C for response during darkness, adverse weather, weekends, and holidays.



Message from dam operator to Charlotte County Emergency Communication Center: *I am at **Roanoke Creek Dam #72A** evaluating the general conditions at the dam and coordinating with the staff gage observer as recommended in the emergency action plan. Based on the current situation, the dam is at a **STAGE I** condition. If the impending storm occurs, we may move to stage II and perform more frequent evaluations; otherwise we will visit and make observations at the dam and emergency spillway every six hours.*

B. STAGE II NOTIFICATION

See Section VII, Subsection B for Stage activation thresholds and Section VII, Subsection C for response during darkness, adverse weather, weekends, and holidays.

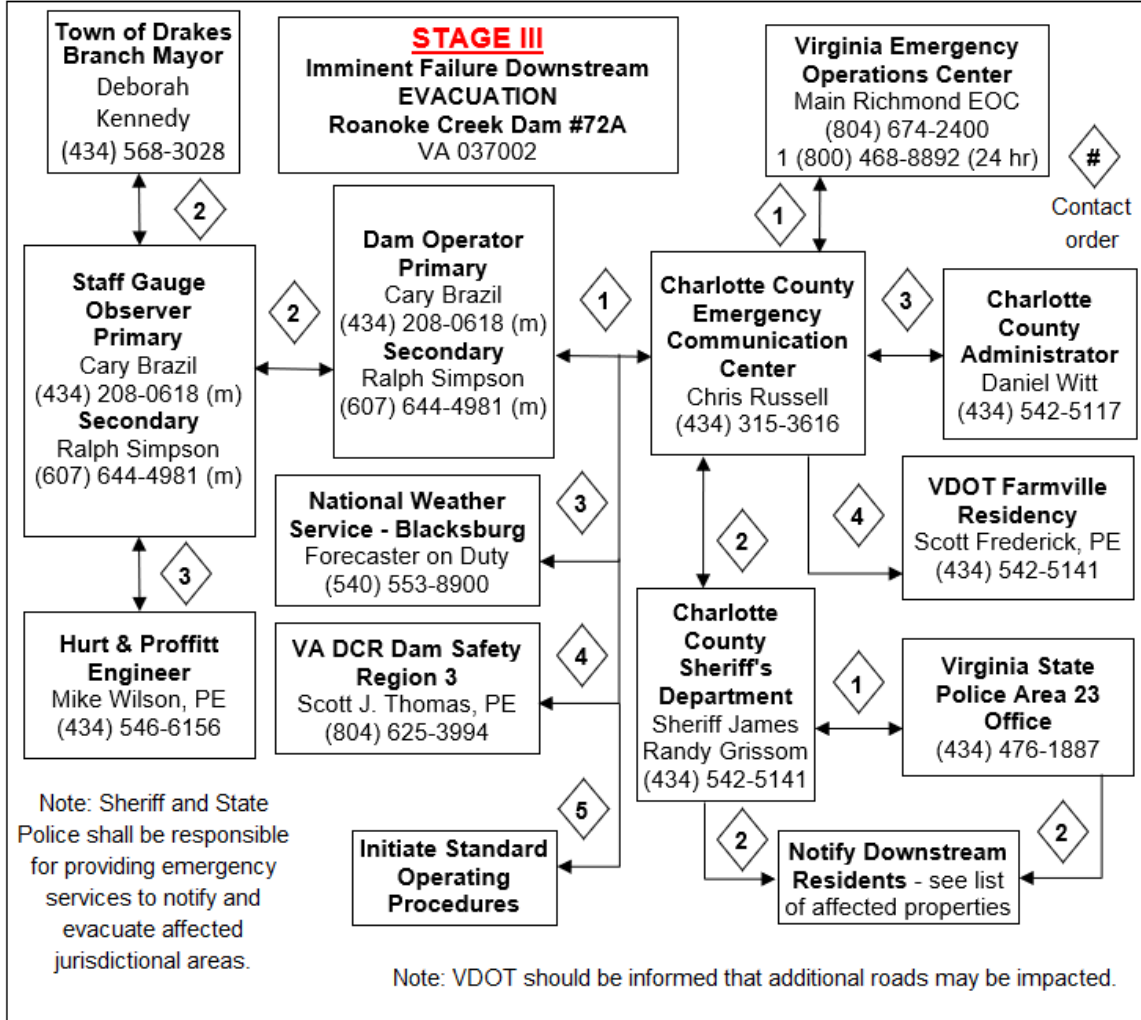


Message from dam operator to Charlotte County Emergency Communication Center: *I am at Roanoke Creek Dam #72A (or have been to the dam) and the water level has risen into the emergency spillway to the threshold established in the emergency action plan to move to the Stage II Emergency Level. Based on the current situation, the dam is at a STAGE II condition. Please prepare your personnel in case an evacuation is necessary and continue to initiate your standard operating procedures (SOP). I will be observing the dam and emergency spillway every 2 hours.*

Note: Standard Operating Procedures shall include notification of the evacuation team, contacting the National Weather Service for rainfall projections, and contacting the Virginia Emergency Operations Center. Charlotte County Emergency Communication Center is the local Emergency Operations Center.

C. STAGE III NOTIFICATION

See Section VII, Subsection B for Stage activation thresholds and Section VII, Subsection C for response during darkness, adverse weather, weekends, and holidays.



Message from dam operator to Charlotte County Emergency Communication Center: *I am at Roanoke Creek Dam #72A and the water level has risen in the emergency spillway to the threshold established in the emergency action plan to move to the Stage III Emergency level. Based on the current situation, the dam is at a STAGE III condition. Please proceed with the Standard Operating Procedures. I will remain at the dam to monitor continuously until the dam breaks or the water level recedes to safe levels and the Charlotte County Emergency Communication Center directs me to terminate my responsibility.*

Note: Charlotte County Emergency Communication Center is the local Emergency Operations Center.

Roanoke Creek Dam #72A Emergency Contact List

Downstream Structures

Structure Number	Sheet Number	OWNER NAME	OWNER ADDRESS	PARCEL ADDRESS	CITY	STATE	ZIP	PHONE NUMBER	Tax Map #
3-1	IND-MAP_03	LEK Rentals LLC	4475 Highway 59	252 Westpoint Stevens Road	Keysville	VA	23947		63-1-5
N/A	IND-MAP_03	LEK Rentals, LLC.	4475 Highway 59	214 Westpoint Stevens Road	Keysville	CA	23947		63A4-3-7-3
3-2	IND-MAP_03	Wilmouth, Douglas & Sherry	403 Old Kings Road		Drakes Branch	VA	23937	434-568-5777	63A4-3-7-1
3-3	IND-MAP_03	Beavers, Kenneth or Shaun	124 Westpoint Stevens Road	124 Westpoint Stevens Road	Drakes Branch	VA	23937		63A4-A-53
3-4	IND-MAP_03	Kozlik, Lawrence & Angela	160 Parker Street	5035 Drakes Main Street	Jarvisburg	NC	27947	434-568-5014	63A4-A-55
3-5	IND-MAP_03	Wilmouth, Douglas & Sherry	403 Old Kings Road	150 Westpoint Stevens Road	Drakes Branch	VA	23937	434-568-5777	63A4-A-52
3-6	IND-MAP_03	Kozlik, Lawrence & Angela	160 Parker Street	5015 Drakes Main Street	Jarvisburg	NC	27947	434-568-5014	63A4-A-50
3-7,8	IND-MAP_03	Moiczek, Matthew	1086 County Line Road	4960 & 5000 Drakes Main Street	Keysville	VA	23947		63A4-A-92
3-9	IND-MAP_03	Parker Oil Company, Inc.	PO Box 120	4959 Drakes Main Street	South Hill	VA	23970		63A4-A-49
3-10,11	IND-MAP_03	Smelser, Jackie Lee Jr. & Kimberly Dawn	135 Westpoint Stevens Road	135 Westpoint Stevens Road	Drakes Branch	VA	23937		63A4-A-48
3-12	IND-MAP_03	Bridge (Rte. 47)							
3-13	IND-MAP_03	Town of Drakes Branch	PO Box 191	150 Depot Street	Drakes Branch	VA	23937	434-568-3091	63A4-A-93B
3-14	IND-MAP_03	Gregory-Williams, Karen	12301 Morning Creek Road	125 Proctor Street	Glen Allen	VA	23059		63A4-A-100
3-14A	IND-MAP_03	Braxton, Nermiah	401 Carey Road	4870 Drakes Main Street	Charlotte CH	VA	23923		63A4-A-105
3-15	IND-MAP_03	Bunn, Jennifer	506 Kesterson Lane	4880 & 4882 Drakes Main Street	Victoria	VA	23974		63A4-A-101
3-16	IND-MAP_03	Town of Drakes Branch	PO Box 191	4881 Drakes Main Street	Drakes Branch	VA	23937	434-568-3091	63A4-A-30
3-17	IND-MAP_03	Griffith Heating & Air Conditioning, Inc	500 Scott Road	4875 Drakes Main Street	Saxe	VA	23967		63A4-A-27
3-17A	IND-MAP_03	Masonic Lodge	4871 Main Street	4869 & 4871 Drakes Main Street	Drakes Branch	VA	23937		63A4-A-26
3-17B	IND-MAP_03	Braxton, Nermiah	401 Carey Road	4865 Drakes Main Street	Charlotte CH	VA	23923		63A4-A-25
3-18	IND-MAP_03	Braxton, Nermiah	401 Carey Road	4861 Drakes Main Street	Charlotte CH	VA	23923		63A4-A-24
3-18A	IND-MAP_03	Town of Drakes Branch	PO Box 191	4849 Drakes Main Street	Drakes Branch	VA	23937	434-568-3091	63A4-A-23
3-19	IND-MAP_03	Town of Drakes Branch	PO Box 191	4831 Drakes Main Street	Drakes Branch	VA	23937	434-568-3091	63A4-A-22
3-20	IND-MAP_03	Black, Frederick	188 Conservation Lane	4860 Drakes Main Street	Keysville	VA	23937		63A4-A-106
3-21	IND-MAP_03	Griffith, Richard & Nora	500 Scott Road	Harold Street & Proctor Street	Saxe	VA	23967		63A4-A-116
3-22	IND-MAP_03	Town of Drakes Branch	PO Box 191	4830 Drakes Main Street	Drakes Branch	VA	23923		63A4-A-116A
3-22A	IND-MAP_03	Town of Drakes Branch - Fire House	-	4818 Drakes Main Street	Drakes Branch	VA	23923		63A4-A-117
3-23	IND-MAP_03	Town of Drakes Branch	PO Box 191	4800 & 4818 Drakes Main Street	Drakes Branch	VA	23937		63A4-A-118
3-24	IND-MAP_03	M S Rentals LLC	1736 Tollhouse Highway	4794 Drakes Main Street	Drakes Branch	VA	23937		63A4-A-119
3-25	IND-MAP_03	Khepre Naguel Tribal Trust	PO Box 297	4819 Drakes Main Street	Charlotte CH	VA	23923		63A4-A-21
3-26	IND-MAP_03	Docsol, Isaac	1011 Marion Church Road	4790 Drakes Main Street	Salters	SC	29580		63A4-A-120
N/A	IND-MAP-03	Town of Dradke Branch - Town Hall	PO Box 191	4801 Drakes Main Street	Drakes Branch	VA	23937		63A4-5-B
3-27	IND-MAP_03	Atkins, Floyd & Annie	C/O Lydia Jackson, 108 W 141 Street, Apt 3F	-	New York	NY	10026		63A4-A-125
3-28	IND-MAP_03	Shepherd, Norman	146 Moss Creek Lane	4768 Drakes Main Street	Keysville	VA	23947		63A4-A-122
3-29	IND-MAP_03	Town of Drakes Branch	PO Box 191	4789 Main Street	Drakes Branch	VA	23937		63A4-A-18
3-30	IND-MAP_03	The Bank of Charlotte County	PO Box 336	4767 Main Street	Phenix	VA	23959-0336		63A4-A-15
3-31,32	IND-MAP_03	Town of Drakes Branch	PO Box 191	Drakes Main Street	Drakes Branch	VA	23937		63A4-A-94A
3-33	IND-MAP_03	Town of Drakes Branch	PO Box 191	Drakes Main Street	Drakes Branch	VA	23937		63A4-A-94B
3-34	IND-MAP_03	Railroad							
5-1	IND-MAP_05	Bridge (Rte. 642)							
6-1,2	IND-MAP_06	Howard, Shannon Lacks	160 Harpster Avenue	160 Harpster Avenue	Saxe	VA	23967		71A-A-18
6-3	IND-MAP_06	Gravel Hill LLC	C/O Teresa Flores, PO Box 7284	150 Harpster Avenue	Hampton	VA	23666		71A-A-20
7-1	IND-MAP_07	Tucker, Ryvers & Patricia	C/O Winifred Dunn, 5025 Scuffletown Road	135 Sylvan Hill Road	Saxe	VA	23967		71A-A-30
7-2	IND-MAP_07	Tucker, Ryvers & Patricia	C/O Winifred Dunn, 5025 Scuffletown Road		Saxe	VA	23967		71A-A-29
7-3	IND-MAP_07	Toombs, Steven	C/O Derek Toombs, 1801 Brickhouse Road		Randolph	VA	23962		71A-A-28A
7-4	IND-MAP_07	Veasey, David & Amanda	PO Box 297	6395 Saxkey Road	Saxe	VA	23967		71A-A-22
7-5	IND-MAP_07	Bridge (Rte. 612)							
7-6	IND-MAP_07	Moon, James H & Rodney W	PO Box 46	170 Hailey Road	Saxe	VA	23967		71A-A-29B
7-7, 7-8, 7-9	IND-MAP_07	Garrett, Nancy H	9668 Manassas Forge Drive		Manassas	VA	20111		71A-A-26
9-1	IND-MAP_09	Newcombe, Shane & Susan Pennington	PO Box 64	3717 Mulberry Hill Road 6000 Roanoke Station Road	Randolph	VA	23962		77A-1-64
9-2	IND-MAP_09	Historic Staunton River Foundation	PO Box 1		Randolph	VA	23962		77A-1-109
9-3	IND-MAP_09	Historic Staunton River Foundation, Inc.	PO Box 1		Randolph	VA	23962		77A-1-102
9-4	IND-MAP_09	Bridge (Rte. 607)							
9-5	IND-MAP_09	Unknown			Randolph	VA	23962		R.O.W.

V. STATEMENT OF PURPOSE

This Emergency Action Plan (EAP) is an effort to safeguard the lives and reduce damage to the property of the citizens of Charlotte County living along Twittys Creek and downstream, in the unlikely event of failure of the Roanoke Creek Dam #72A or flooding caused by large runoff.

Impounded water upstream of a dam when released uncontrollably may threaten lives in the flow path downstream or cause damage to homes, roads, bridges and any other infrastructure(s) in its way. This uncontrolled release occurs when the dam or a part of the dam breaks and stored water is released.

VI. PROJECT DESCRIPTION & DAM ACCESS MAP

The impounding structure, known as Roanoke Creek Dam #72A or Inventory Number VA037002, is operated by the Town of Drakes Branch in Charlotte County, Virginia. The site is located along a private access road off of West Point Stevens Road (State Route 623) in Charlotte County, VA.

The dam is classified as a High Hazard Dam as determined by the Dam Break Inundation Zone Analysis performed by Hurt & Proffitt, Inc in December 2013. Multiple structures (residential / business) and six public roadways (Route #47, Route #642, Route #637, Route #612, Route #641, and Route #607) are impacted downstream of / on the dam during dam breach related emergency events.

Roanoke Creek Dam #72A creates an approximate 154 acre impoundment used for flood control / recreation. The drainage area is approximately 9,920 acres or 15.5 square miles. The normal pool flood capacity storage is 455 acre-feet at the normal pool elevation of 415.8 feet. The maximum storage capacity is approximately 5,535 acre-feet at top of dam elevation 444.1 feet.

Downstream of the dam, Twittys Creek flows through commercial and residential areas.

The main components of the dam are (information taken from Hurt & Proffitt, Inc. December 6, 2013 Roanoke Creek Dam #72A DBIZ Analysis and DCR Dam Safety's DSIS system):

- Homogenous earth embankment approximately 614 feet long with a crest elevation of approximately 444.1 feet. Dam is approximately 43.9 feet tall.
- 2.71H:1V upstream embankment slope, a 10.6 foot wide crest, and 2.62H:1V downstream embankment slope.
- NRCS designed intake tower with a 54" RCP outfall pipe at an elevation of 415.8 feet (normal pool elevation).
- Earthen broad-crested emergency spillway with a crest elevation of approximately 436.8 feet. The emergency spillway is 297 feet wide with a total depth of 7.3 feet.



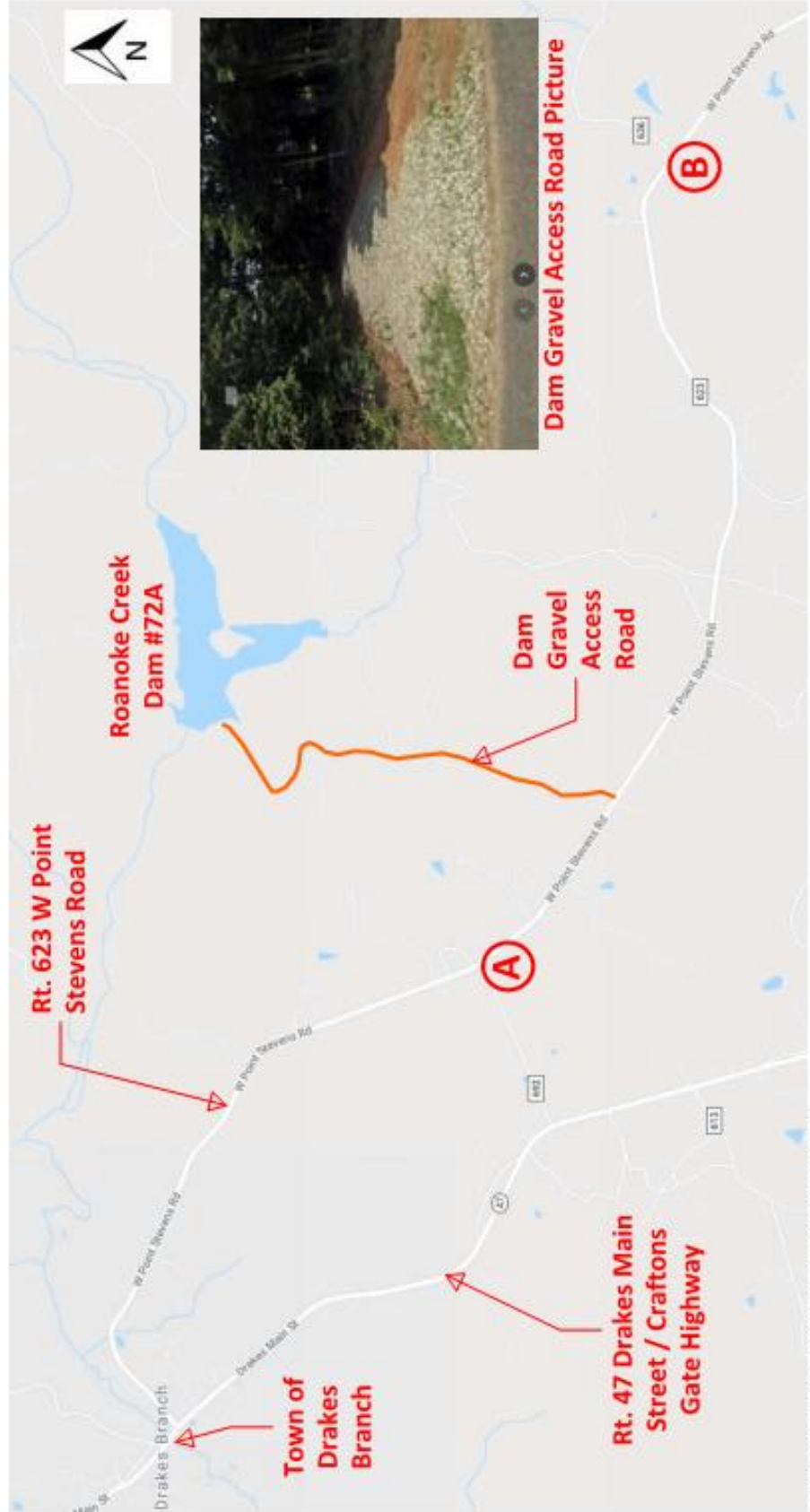
VA037002 Roanoke Creek Dam #72A – EAP Dam Access Map

Created by: David P. Wilmoth, PE, CFM, PH; Hurt & Proffitt, Inc.
Note: Map Not to Scale

Date: 07/10/2020

Access to Dam from Town of Drakes Branch: Access road located approximately 0.7 miles southeast of the Route 623 W Point Stevens Road & Route 692 WPA Road intersection (**MAP POINT A**). Turn left (northeast) on the gravel road and follow approximately 1.7 miles to Dam. Please note gravel road is gated approximately half-way to the Dam.

Access to Dam from Rt. 623 W Point Stevens Road (heading northwest towards Drakes Branch from US 360): Access road located approximately 2.4 miles northwest of the Rt. 623 W Point Stevens Road & County Route 636 intersection (**MAP POINT B**). Turn right (northeast) on the gravel road and follow approximately 1.7 miles to Dam. Please note gravel road is gated approximately half-way to the Dam.



Map and Picture Obtained from Google Maps (07-10-2020)

VII. EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

A. Levels of Emergency

- a. **STAGE I** (Slowly Developing Situation) indicates a flood watch, flood warning, or heavy continuous rain or excessive flow of water from ice or snow melt. Dam should be inspected every **6 to 12 hours** and weather forecasts should be monitored for changing conditions. As mentioned above, this stage does include initiation of a flood watch or flood warning by the National Weather Service in the watershed draining to the lake / dam in question.

- b. **STAGE II** (Quickly Developing Situation) condition indicates that a potentially serious condition is developing and failure could occur if the condition does not improve. Upon initiation of a **STAGE II** condition the Operator is to activate the notification flowchart alerting them to the situation. Then begin **2-hour** monitoring conditions and take preventative actions as necessary.

- c. **STAGE III** (Imminent Failure Situation) condition indicates that a failure is imminent or has already occurred. During these conditions the full EAP should be initiated including evacuations and road closures, as well as **continuous** observation.

Use the following table to identify proper emergency levels:

EVENT	SITUATION	EMERGENCY LEVEL
National Weather Service (NWS) Event	NWS has issued a flood watch or hurricane watch for the watershed flowing directly to the dam	1
	NWS has issued a flood warning or hurricane warning for the watershed flowing directly to the dam	1
Emergency Spillway Flow	Debris blocking spillway causing lake level to rise	1
	Spillway flowing with active gully erosion	2
	Any spillway overtopping flow within 6.8 feet of the top of the dam (0.5 feet of water within the spillway)	2
	Spillway flowing with advancing head cut that is threatening the control section	3

	Any spillway overtopping flow within 1.3 feet of the top of the dam (6.0 feet of water within the spillway)	3
Dam Breach	Dam Breach in progress, uncontrolled release	3
Embankment Overtopping	Any overtopping flow or within 1.0 feet of the top of the dam, water level rising	3
Seepage	New seepage areas on or near the dam	1
	New seepage areas with cloudy discharge or increasing flow rate	3
	Rapid flow rate increase with cloudy discharge from existing seepage area(s)	3
Sinkholes	Observation of new sinkhole on embankment	1
	Rapidly enlarging sinkhole	3
Embankment Cracking	New cracks in the embankment greater than 1/4 inch wide without seepage	1
	Cracks with no seepage; water below cracked area	1
	Cracks in embankment with clear seepage	2
	Cracks in embankment with rapidly increasing or cloudy seepage	3
Principal Spillway / Structural	Cracks in concrete section greater than 1/4 inch wide without seepage	1
	Cracks in concrete section greater than 1/4 inch wide with cloudy seepage	2
	Mass movement of reinforced concrete pipe structure / riser	3
Low Flow Valve Operation	Low flow valve is stuck in the open condition / will not close resulting in uncontrolled release of water from the dam	2
Embankment Movement	Visual movement / slippage of the embankment slope	1
	Sudden or rapidly progressing slides of the slopes	3
Vortex in Pond	Whirlpool with discharge downstream	3
Earthquake	Measurable earthquake felt or reported on or within 50 miles of the dam	1
	Earthquake resulting in visible damage to the dam	1

	Earthquake resulting in new seepage flow with cloudy discharge or increasing flow rate	3
	Earthquake resulting in potential uncontrolled release of water from the dam	3
Security Threat, Sabotage & Vandalism	Verified bomb threat that, if carried out, could result in damage to the dam	1
	Detonated bomb that has resulted in damage to the dam or its appurtenances	1
	Damage to the dam or appurtenances with no impacts to the functioning of the dam	1
	Damage to the dam or appurtenances that has resulted in seepage flow	1
	Damage to the dam or appurtenances that has resulted in seepage flow with cloudy discharge or increasing flow rate	3
	Damage to the dam or appurtenances that has resulted in a potential uncontrolled water release	3

B. Emergency Level due to Risk of Overtopping

During a full 6-hour Probable Maximum Flood storm event, this dam does overtop. The modeled maximum water surface elevation during such a storm event would be **446.4'** (2.3 feet above the dam crest). Rainfall and monitoring condition for each emergency stage are listed below:

STAGE I EMERGENCY

During a **Stage I** Condition, monitoring / observations of the dam / emergency spillway by the Dam Operator / Staff Gauge Observer should be performed every **6 to 12 hours**.

STAGE II EMERGENCY

If the emergency spillway is flowing with **0.5 feet (6 inches)** of water (6.8 feet freeboard), a **STAGE II** Condition should be immediately initiated and monitoring / observations of the dam / emergency spillway will be performed **every 2 hours**.

The modeled rainfall for the dam's watershed (area draining to the dam) necessary to cause a **Stage II Emergency Condition** is:

- 8.90 inches per 6 hours
- 10.5 inches per 12 hours
- 11.8 inches per 24 hours

Conditions at the dam should be monitored and if deterioration of the embankment continues a **Stage III** condition should be initiated.

VIII. GENERAL RESPONSIBILITIES UNDER THE EAP

A. Dam Owner Responsibilities

The Town of Drakes Branch maintains the dam and Cary Brazil from the Town of Drakes Branch is the dam operator / staff gauge observer. The dam operator is an employee of the Owner (Town of Drakes Branch) and is part of the team that observes the dam yearly during inspections and routine maintenance. The operator is also on call during high water conditions. See the notification flowchart in Section II for emergency phone numbers.

If an observer notices the water elevation reaching the crest of the spillway or the potential failure of the dam, he/she should call the dam operator. At this time, Cary Brazil is both the dam operator and staff gauge observer. The operator will then be in charge of monitoring the situation, implementing the EAP, and informing the Charlotte County Emergency Communication Center.

The observer/operator shall first notify the Director of the Charlotte County Emergency Communication Center and then proceed to contact the appropriate personnel listed in the Notification Flowchart. The observer /operator shall coordinate all emergency procedures associated with the dam. He/she shall also update the emergency center if the situation changes.

The address / telephone number for the dam owner / dam operator:

<u>Town of Drakes Branch</u>	<u>Dam Operator</u>
4800 Main Street	Cary Brazil
Drakes Branch, VA 23937	
Business: (434) 568-3600	Cell: (434) 208-0618

B. Responsibility for Notification

***SEE SECTION II FOR STAGES I, II & III NOTIFICATION CHARTS**

In an emergency situation, the dam operator will call the Director of the Charlotte County Emergency Communication Center, the National Weather Service, and Department of Conservation and Recreation (DCR) Dam Safety Office. The observer/operator shall also be the point of contact for coordinating all media information about the situation. The operator shall ensure that DCR Dam Safety Office, and VDOT are kept updated as the situation changes.

The local authorities will be responsible for initial emergency road closing, but VDOT will have to inspect the road(s) once the emergency has ended to determine if the road(s) was impacted. If the road(s) was impacted, VDOT will be responsible for the permanent closure while the road(s) is being repaired. When contacting VDOT, the operator shall inform them that additional roads may be impacted by the dam failure or high water. These include Route #47 (Main Street), Route #642 (Mossing Ford Road), Route #637 (West Saxkey Rd.), Route #612 (Hermon Road), Route #641 (Mulberry Hill Rd.), Route #607 (River Road), and preventing the public in the affected flood wave areas.

- ✓ Telephone/Reverse 911 automated warning systems
- ✓ Police/fire/sheriff radio dispatch vehicles with loudspeakers, bullhorns, etc.
- ✓ Personal runners from door-to-door alerting residents
- ✓ Radio/television broadcasts for area involved

C. Responsibility for Evacuation

Per the hazard classification report there are residential houses, public roads, and businesses in the inundated areas at this time. If a dam failure is imminent, any members of public that happen to be downstream of the dam should be advised to stay out of the inundation area or immediately move to higher ground.

Any additional notifications or evacuations should be determined by the Charlotte County Emergency Communication Center, Charlotte County Sheriff's Office, and the State Police. The dam owner shall not assume, or usurp, the responsibility of the government authorities for evacuation of people.

The Sheriff's Department shall implement an evacuation upon receiving the order from the Charlotte County Emergency Communication Center, or Charlotte County Emergency Communication Center's designated representative. Upon activation of the Emergency Siren, the Sheriff's Department shall give the order for all personnel to begin with evacuation procedures.

The following outline further explains the Evacuation procedure:

1. Monitoring the situation and, if time permits, review of evacuation plans.
2. Begin Stage I, II, and III
3. Evacuating the inundation areas, if conditions warrant.
4. Expanding Direction and Control as well as beginning Emergency Public Information and operating shelters.
5. Provide Situation Reports to the State Emergency Operations Center (804-674-2400 or 800-468-8892)

D. Responsibility for Duration, Security, Termination, and Follow-up

Only authorized personnel shall be allowed on the dam site. These personnel include the operator, and local authorities who have been cleared by the operator. Due to the nature of the facility, all personnel shall be cleared by the operator prior to accessing the site. All access gates to the dam shall be closed and locked.

The following DCR guideline should be followed:

1. Once the Stage III condition has been met the dam operator / staff gauge observer will continue to provide the Charlotte County Emergency Communication Center Director (CCECCD) with information concerning water level rise, erosion in the emergency spillway and/or dam overtopping. It is particularly important for the CCECCD to know when the breach is occurring to evacuate their rescue personnel. The dam operator / staff gauge observer will remain at the dam until the dam breaks and is released from duty by the CCECCD.
2. Regional flooding may occur prior to an incident at this dam and could continue for long periods of time. The dam operator / staff gauge observer needs to have plans for staying or returning to the dam as conditions worsen. The termination responsibility should be handled by the CCECCD (termination of disaster response activities).

The dam operator shall be on-site to monitor the developing conditions per Section VII, Subsection B Emergency Level due to Risk of Overtopping but shall in no way place themselves in harm's way during observations. The operator shall provide necessary updates to the Charlotte County Emergency Communication Center, DCR, VDOT, and NWS from the time the emergency starts to when it has been terminated.

The dam operator shall be responsible for determining when the dam related emergency is over. The state and local emergency management officials are responsible for termination of disaster response activities.

The dam owner will be responsible for setting up a meeting with all participants (DCR, Charlotte County, VDOT, etc.) to go over the event and determine what changes need to be made to the Emergency Action Plan. The results of the evaluation should be documented in a written report.

E. EAP Coordinator Responsibility

Cary Brazil with the Town of Drakes Branch is the EAP Coordinator and has overall responsibility for implementing the EAP, including training the key participants and periodic reviewing, test, and updating of the EAP.

The EAP Coordinator's Duties include the following:

- Training the key EAP participants to handle an emergency situation at the Roanoke Creek Dam #72A.
- Annually reviewing the EAP with the key EAP participants for any required changes to personnel or contact information and distributing copies of the revised plan.
- Testing the EAP.
- Submitting EAP revisions to the DCR Dam Safety Office

The key EAP participants are the following:

- Deborah Kennedy – Dam Owner
- Cary Brazil – Primary Dam Operator / Primary Staff Gauge Observer
- Ralph Simpson – Secondary Dam Operator / Secondary Staff Gauge Observer
- Landon Green - Charlotte County Administrator
- Chris Russell - Charlotte County Emergency Communication Center
- Sheriff James Randy Grissom- Charlotte County Sheriff's Office

The telephone numbers for the key participants are listed on the notification flowchart in Section II. The procedures for carrying out the phases of the EAP are described in the previous section.

IX. PREPAREDNESS

Levels of Emergency

The three levels of emergency are a Stage I, II or III Condition:

- A Slowly Developing Situation (Stage I) indicates a flood watch, flood warning, or heavy continuous rain or excessive flow of water from ice or melt. As mentioned above, this stage does include initiation of a flood watch or flood warning by the National Weather Service in the watershed draining to the lake / dam in question.
- A Quickly Developing Situation (Stage II) indicates that a potentially serious condition is developing and failure could occur if the condition does not improve. This means the emergency spillway is flowing with 0.5 feet (6 inches) of water. During a Stage II Condition downstream residents and the County's emergency communication office should be kept informed about the situation.
- An Imminent Failure Situation (Stage III) indicates that failure is imminent or has already occurred. The emergency spillway is flowing with 6.0 feet of water (1.3 feet freeboard). During Stage III Conditions the full EAP should be initiated.

A. Prevention of emergency conditions from developing, if possible during a Stage II Condition Emergency.

If there are signs of outside conditions developing that could cause a dam failure, such as a warning of upcoming large storm events (ie. hurricanes), an upstream dam failure is eminent, or signs of non-storm related dam failure the dam operator should contact the Charlotte County Emergency Communication Center and explain the situation and the potential for dam failure.

The following actions should also be taken by the dam operator to minimize the potential of dam failure:

- Removing debris from around the primary outlet structure.
- Removing debris found within the emergency spillway
- Installing a siphon or large scale pump to allow the water elevation to lower.
- Placing sandbags on the crest of the embankment.
- Bring in equipment needed to illuminate the spillway operating deck, or distress areas of the dams during adverse weather or periods of darkness.

Because of uncertainties about the effectiveness, these preventive actions should be carried out simultaneously with appropriate notification.

B. Surveillance

The operator and staff should monitor the status of weather fronts through the National Weather Service (NWS). The NWS maintains a hurricane center that reports on hurricanes, tropical storms & tropical depressions as they travel and affect coastal and inland areas. The web site address is:
<http://www.nhc.noaa.gov/>

The expected response time to the dam from the dam operator's / staff gauge observer's home should be less than one (1) hour from the time they receive the information that a flood watch has been declared. The dam operator and / or staff gauge observer should never put themselves in harm's way. In the event a hurricane or tropical depression occurs with high winds the dam operator / staff gauge observer shall use extreme caution monitoring conditions.

Preplanned access routes should be utilized given that small streams crossing under state roads may flood preventing safe access. The dam operators and gauge observers should never attempt to cross a road that has flood water crossing it at a depth greater than one half (0.5) foot (6 inches) unless the vehicle is specially designed for that purpose.

The dam operator and / or Staff Gauge Observer is responsible for monitoring the water elevation. Currently there is no existing staff gauge located at the dam in question. It is the responsibility of the Dam Operator / Staff Gauge Observer to be able to accurately read the flow depths within the existing emergency spillway for EAP stage trigger purposes. Prior to a Stage II emergency, the Dam Owner will be responsible for installing a device or identifying a way to accurately read water depths within the existing emergency spillway for EAP stage level purposes.

When the emergency spillway is flowing with 0.5 feet (6 inches) of water, the dam operator should initiate the EAP under a **Stage II Condition**. If the emergency spillway is flowing with 6.0 feet (1.3 feet of freeboard) of water, the condition should be upgraded to a **Stage III Condition**.

Currently there is no remote surveillance at the site.

C. Response during periods of darkness, adverse weather, weekends, and holidays

Currently there is no existing staff gauge located at the dam in question. It is the responsibility of the Dam Operator / Staff Gauge Observer to be able to accurately read the flow depths within the existing emergency spillway for EAP stage trigger purposes. Prior to a Stage II emergency, the Dam Owner will be

responsible for installing a device or identifying a way to accurately read water depths within the existing emergency spillway for EAP stage level purposes.

The staff gauge (or Dam Owner's chosen method to accurately measure water depths within the existing emergency spillway) should be easily read from the location chosen by the staff gauge observer with a flashlight after dark. For periods of darkness or adverse weather, the operator shall have emergency equipment brought in to illuminate the spillway, operating deck, or distress areas of the dams as soon as activation of the spillway or potential dam failure is determined. These lights shall be installed with access to backup generators, if needed.

During weekends or holidays, there shall be an acceptable replacement designated to act as the dam operator and EAP Coordinator. This individual shall be trained in all the same procedure as the dam operator and EAP Coordinator.

D. Access to the site

The dam site is accessed via an access road from West Point Stevens Road (State Route 623). Due to potential hazards with the access route, it is recommended that the dam be accessed and observed from "high ground." No vehicles are allowed on top of the dam during **Stage II** or **Stage III** conditions.

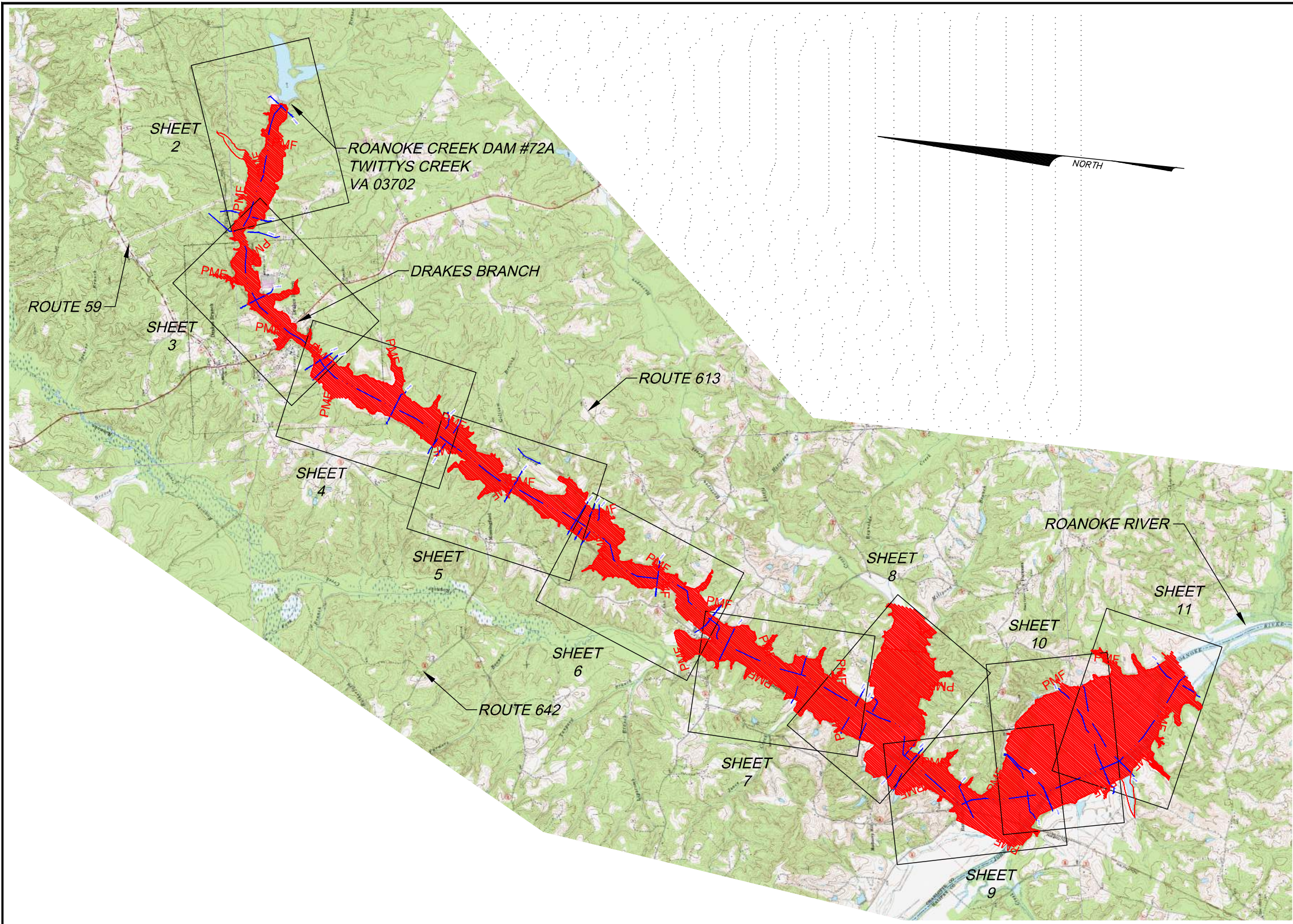
E. Alternative Systems of Communication

Communications during a major rainfall event may be problematic. Telephone land lines may be used as the first means of communication. Cellular telephones can be used to supplement the land lines. Unfortunately, telephone lines like electrical lines are subject to being broken by falling trees so radio communication during these events is normally required.


X. INUNDATION MAPS

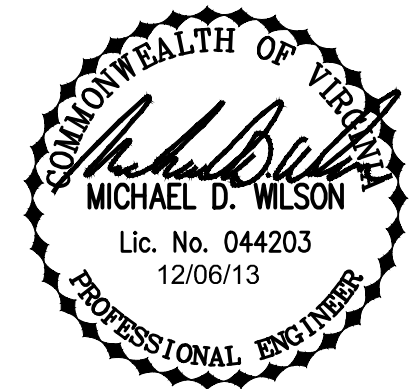
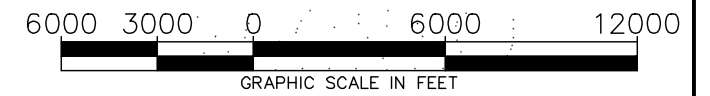
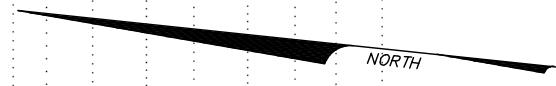
A Dam Break Inundation Zone Study was completed by Hurt & Proffitt, Inc. in December of 2013 which included the development of dam break inundation maps (dated 12/06/13). Inundation maps on the following sheets were obtained from the December 2013 Hurt & Proffitt Dam Break Inundation Zone Study.

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DESIGN FLOODS LEGEND

 100% PMF WITH BREACH




The information contained on this map is prepared for use in the notification of downstream property owners by emergency response personnel.

Aerial mapping and digital contours taken from GIS Information for Charlotte County, VA. Areas at dams and road crossings were field surveyed by Hurt & Proffitt, Inc.

Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map, and summary table on sheet 12 - 15.

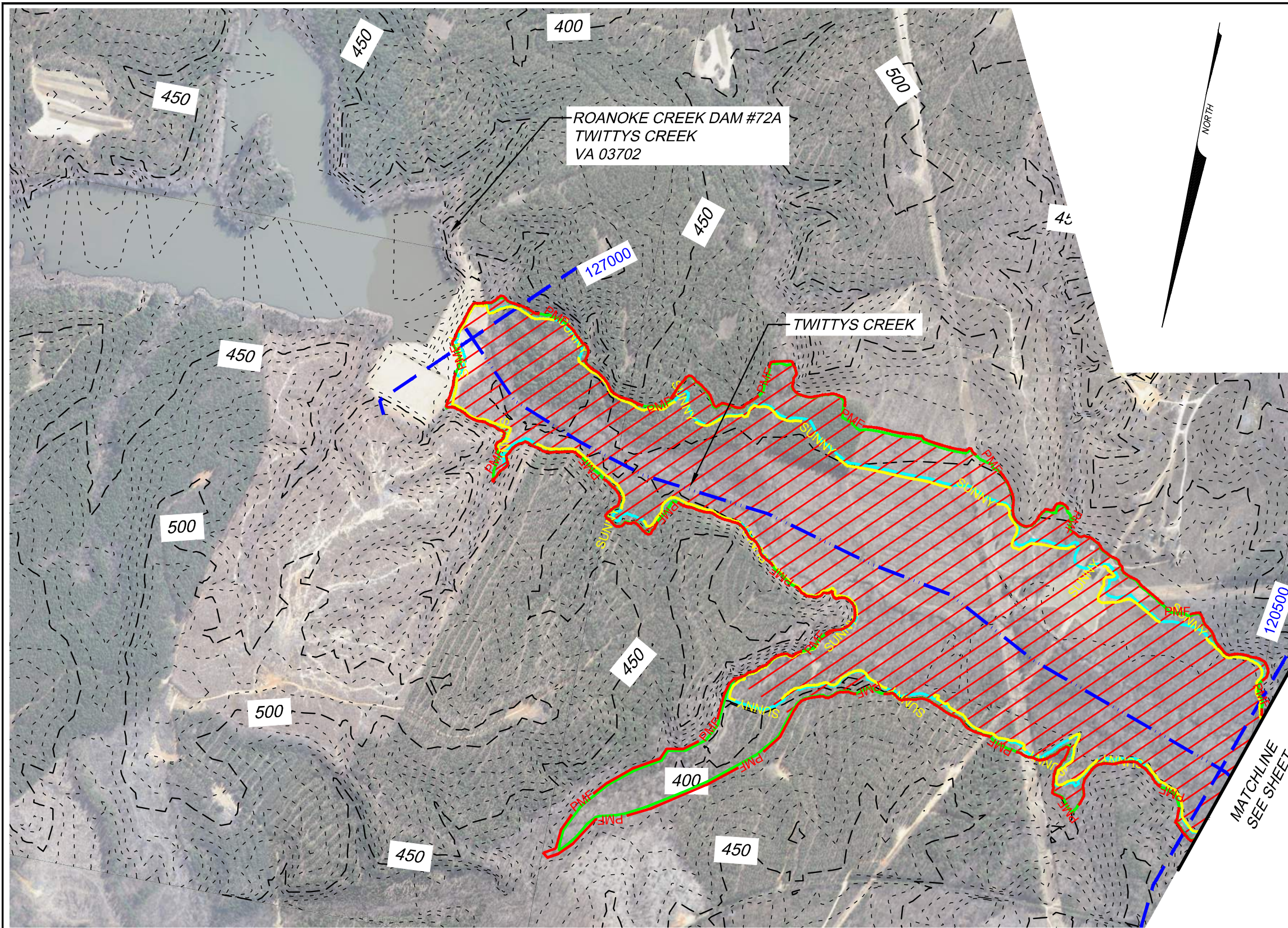
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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

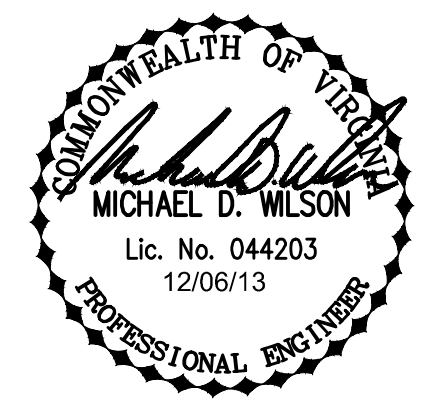
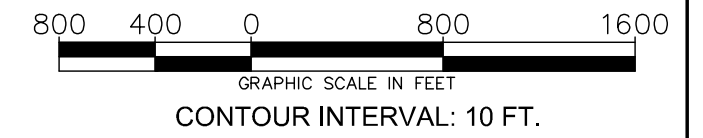
PROJECT NO.	20130453
G.L. NO.	304-09-D3.7
FILE NO.	G-13962
DATE:	12/06/13
DRAWN BY:	SHC
CHECKED BY:	MDW

SHEET NO.
1 OF 15



DESIGN FLOODS LEGEND

- **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
- 90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
- **SNY** SUNNY DAY BREACH
- ▨ **PMF** 100% PMF WITH BREACH
- MAJOR CONTOUR
- MINOR CONTOUR
- STREAM CENTER LINE
- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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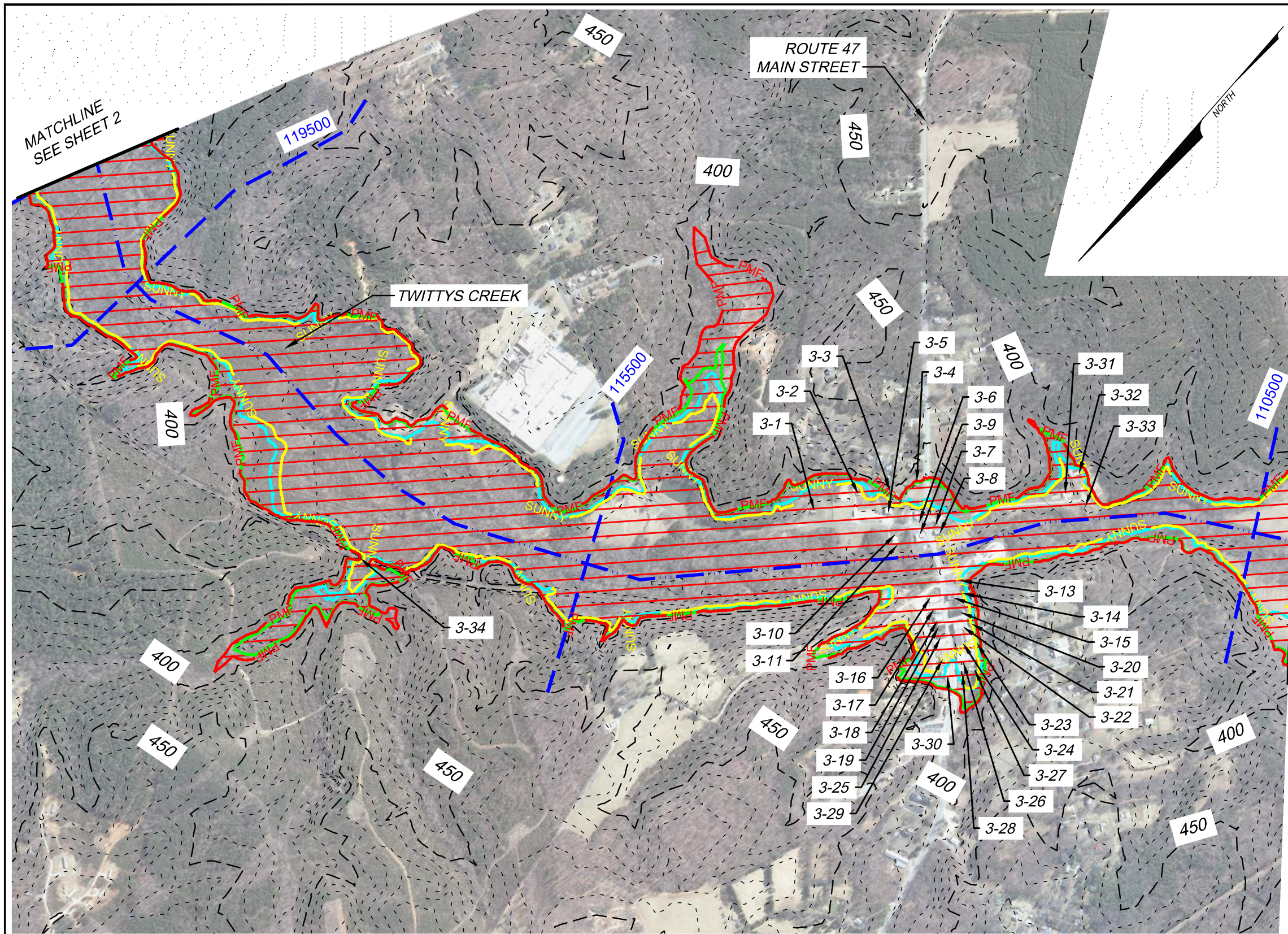
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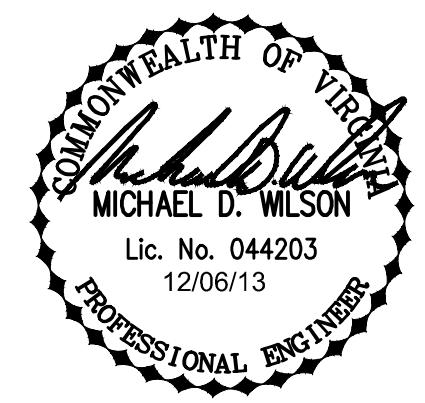
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 2 OF 15
G.L. NO.	304-09-D3.7	
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DESIGN FLOODS LEGEND

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- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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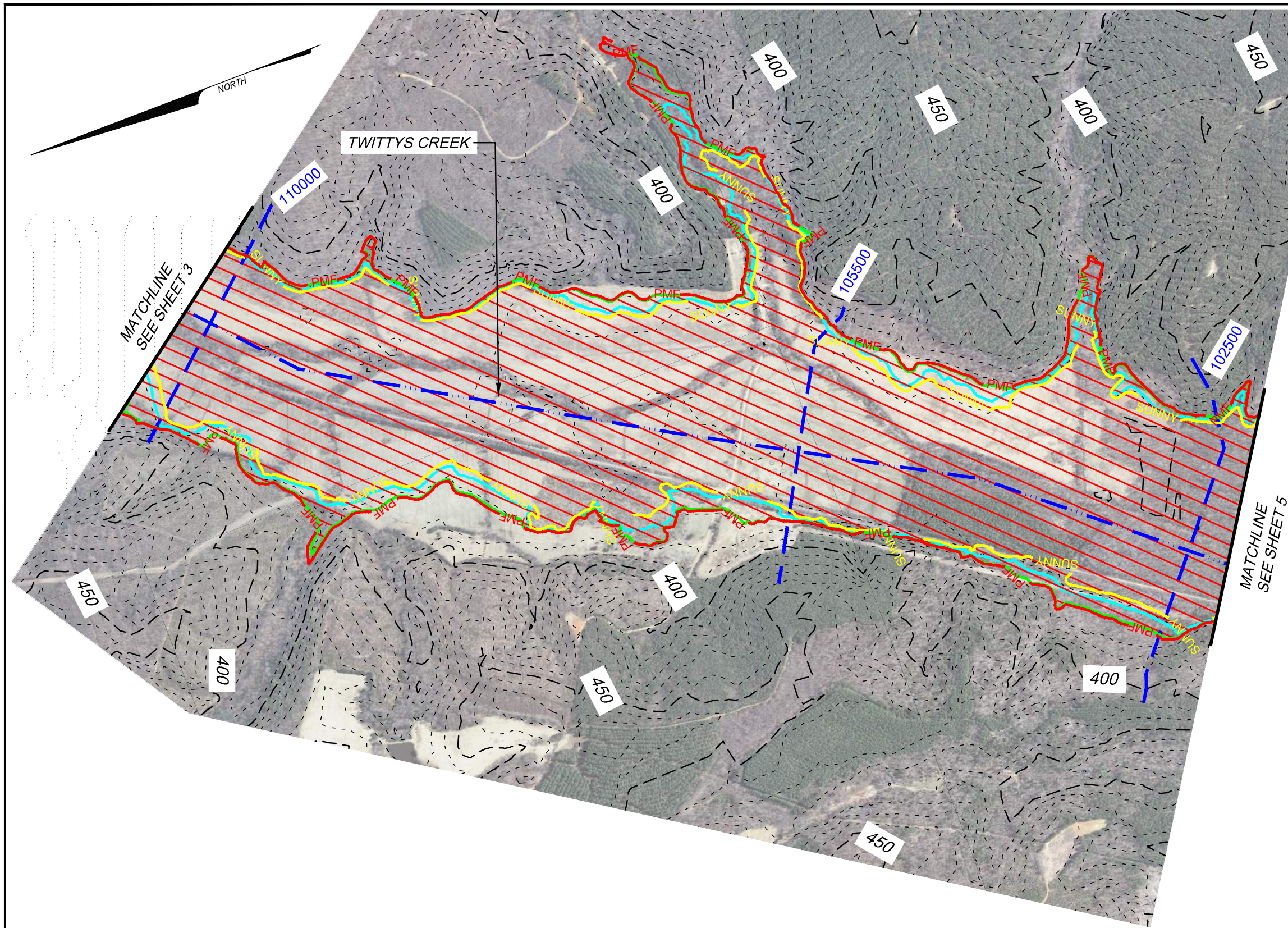
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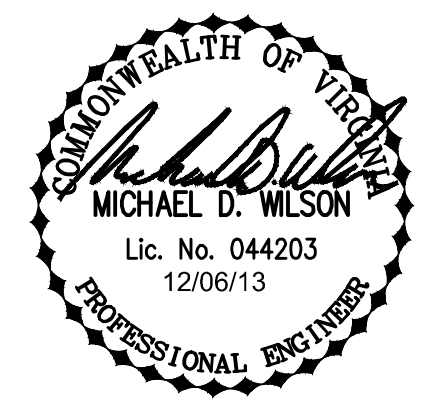
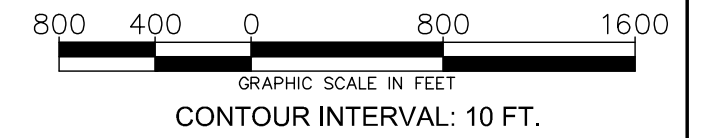
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 3 OF 15
G.L. NO.	304-09-D3.7	
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DESIGN FLOODS LEGEND

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- 2-1** IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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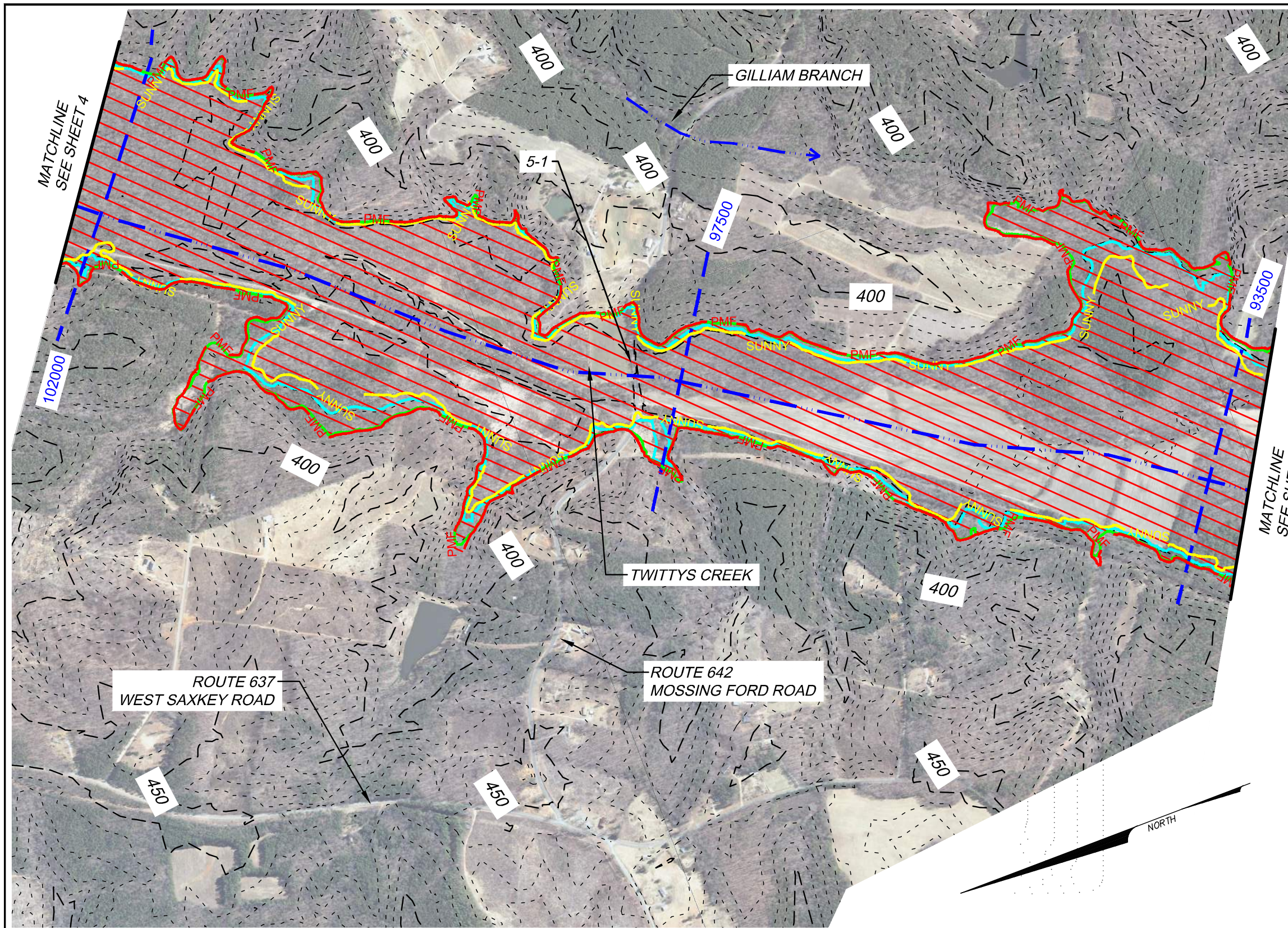
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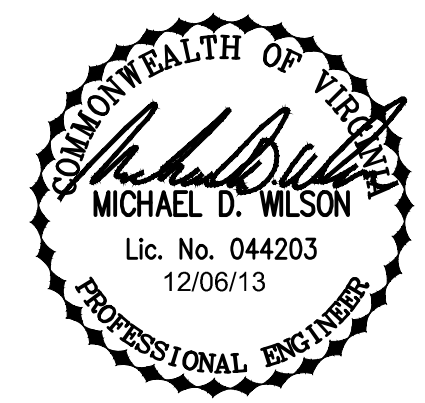
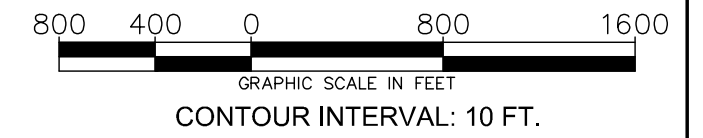
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 4 OF 15
G.L. NO.	304-09-D3.7	
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DESIGN FLOODS LEGEND

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- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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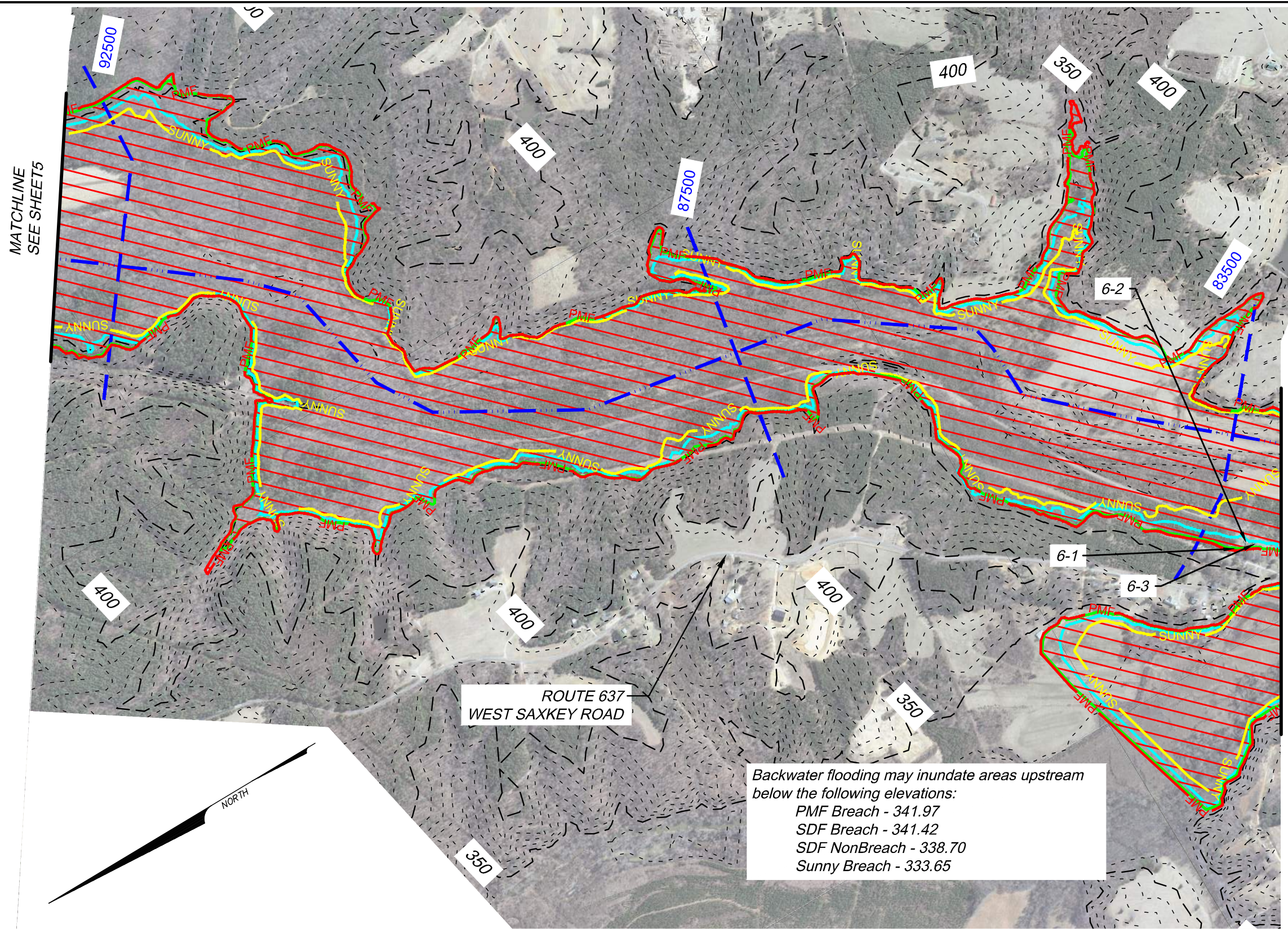
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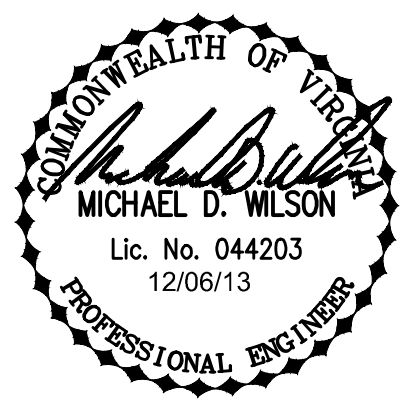
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 5 OF 15
G.L. NO.	304-09-D3.7	
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DESIGN FLOODS LEGEND

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	90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
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	STREAM CENTER LINE
	IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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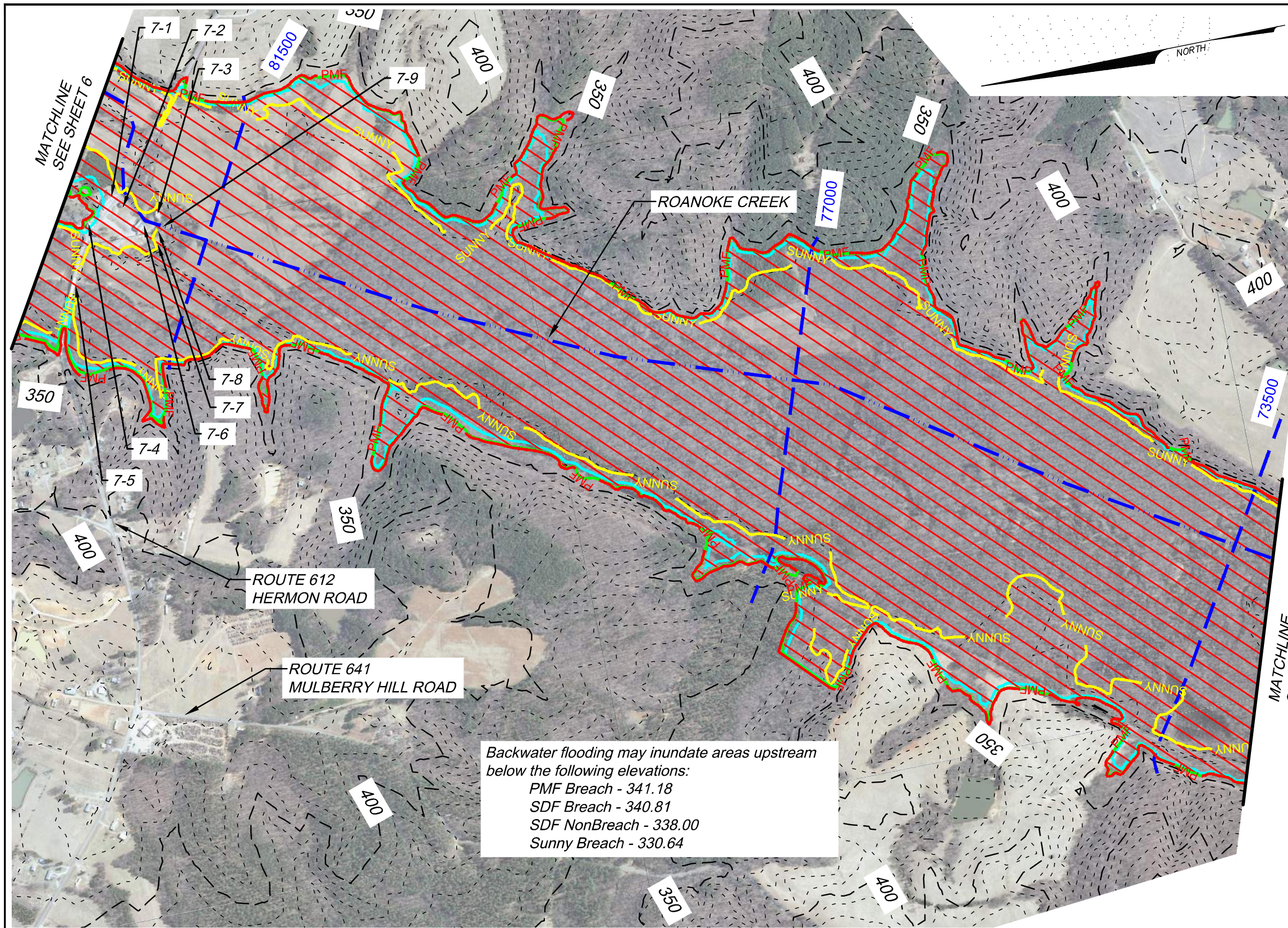
Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map, and summary table on sheet 12 - 15.

Backwater flooding may inundate areas upstream below the following elevations:
 PMF Breach - 341.97
 SDF Breach - 341.42
 SDF NonBreach - 338.70
 Sunny Breach - 333.65

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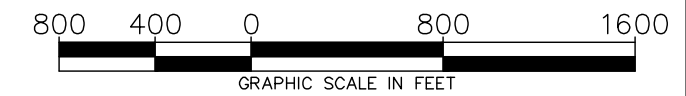
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 6 OF 15
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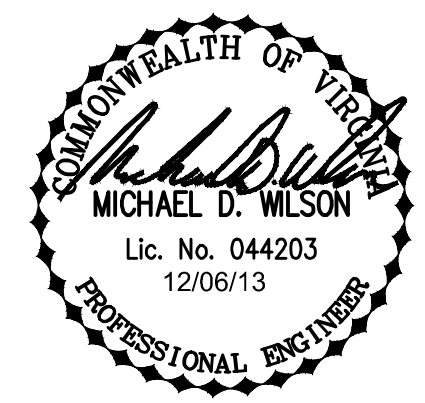


DESIGN FLOODS LEGEND

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- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



CONTOUR INTERVAL: 10 FT.



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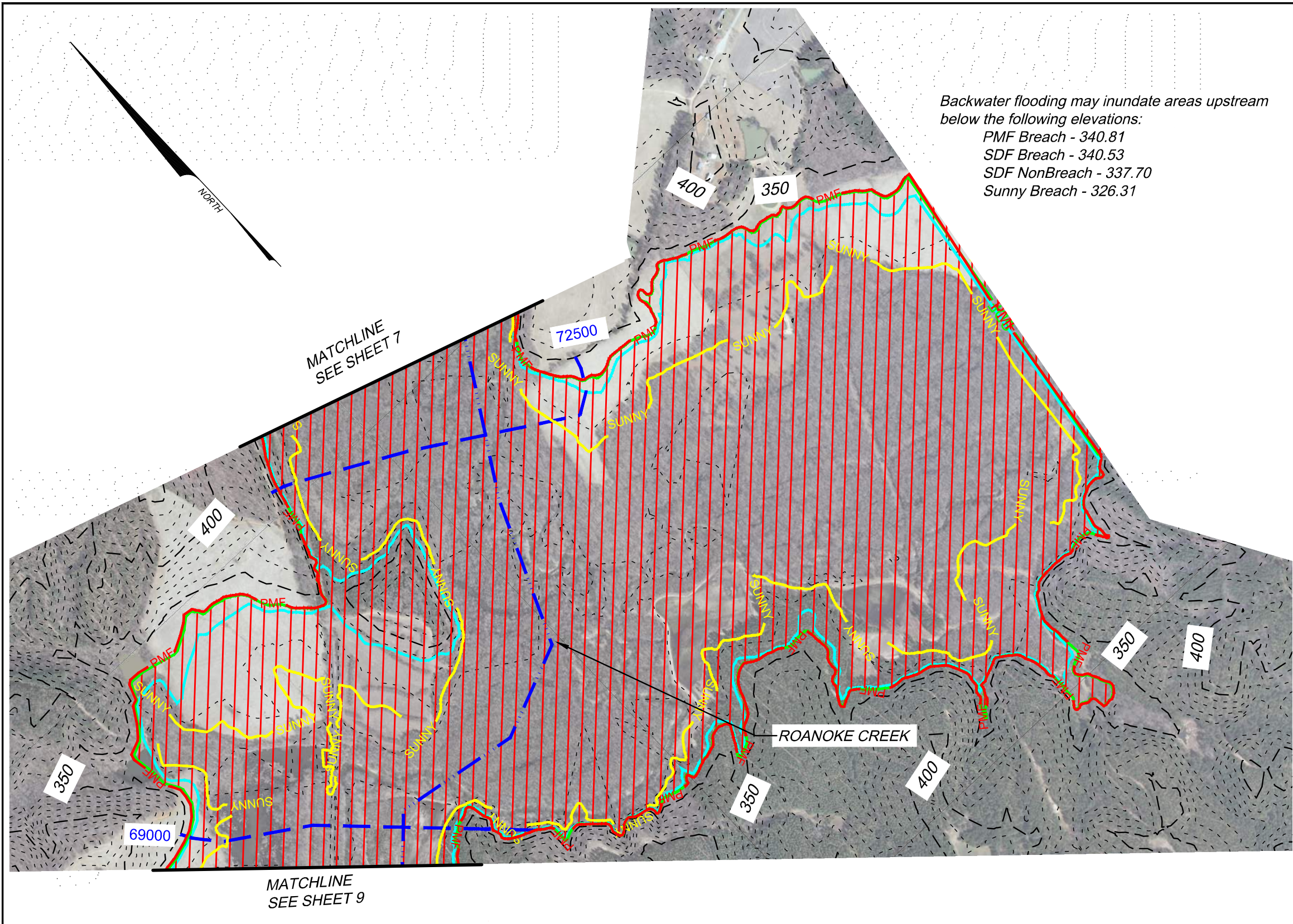
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Backwater flooding may inundate areas upstream below the following elevations:
 PMF Breach - 341.18
 SDF Breach - 340.81
 SDF NonBreach - 338.00
 Sunny Breach - 330.64

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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

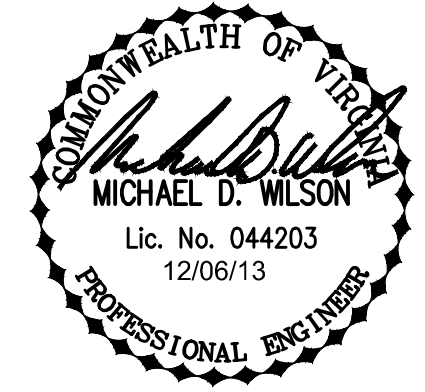
PROJECT NO.	20130453	SHEET NO. 7 OF 15
G.L. NO.	304-09-D3.7	
FILE NO.	G-13962	
DATE:	12/06/13	
CHECKED BY:	MDW	



Backwater flooding may inundate areas upstream below the following elevations:
 PMF Breach - 340.81
 SDF Breach - 340.53
 SDF NonBreach - 337.70
 Sunny Breach - 326.31

DESIGN FLOODS LEGEND

- SDF 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
- 90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
- SNY SUNNY DAY BREACH
- ▭ PMF 100% PMF WITH BREACH
- MAJOR CONTOUR
- MINOR CONTOUR
- STREAM CENTER LINE
- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



The information contained on this map is prepared for use in the notification of downstream property owners by emergency response personnel.

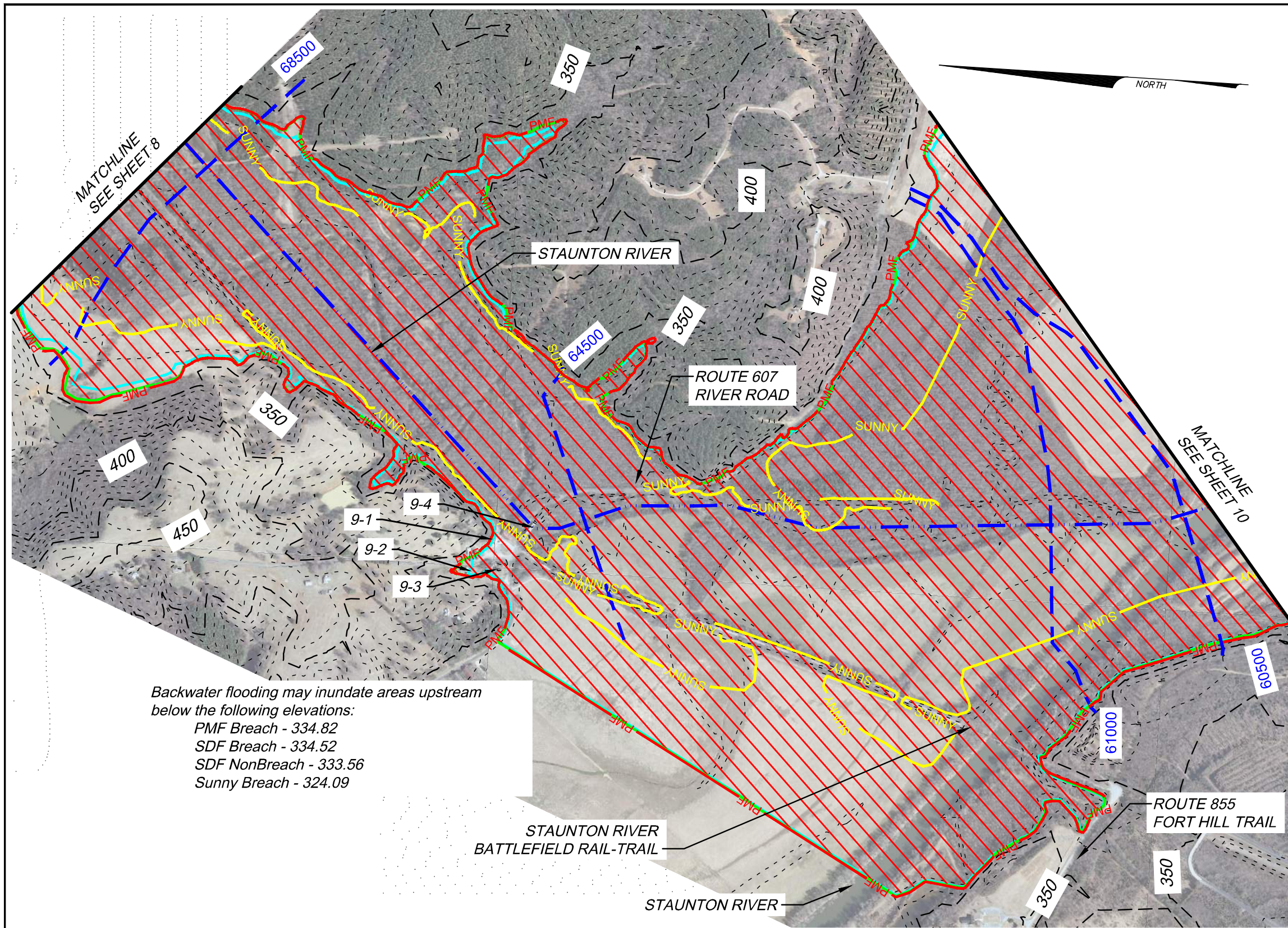
Aerial mapping and digital contours taken from GIS Information for Charlotte County, VA. Areas at dams and road crossings were field surveyed by Hurt & Proffitt, Inc.

Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map, and summary table on sheet 12 - 15.

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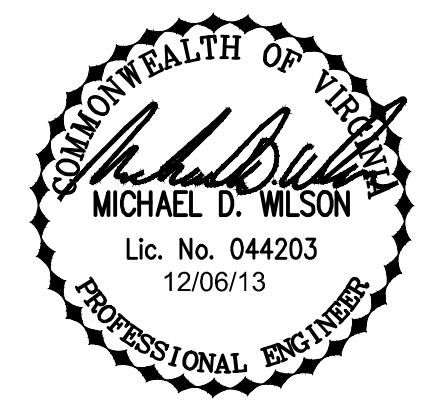
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 8 OF 15
G.L. NO.	304-09-D3.7	
FILE NO.	G-13962	
DATE:	12/06/13	
DRAWN BY:	SHC	
CHECKED BY:	MDW	



DESIGN FLOODS LEGEND

- **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
- - - 90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
- **SNY** SUNNY DAY BREACH
- ▭ **PMF** 100% PMF WITH BREACH
- - - MAJOR CONTOUR
- - - - - MINOR CONTOUR
- · - · - STREAM CENTER LINE
- 2-1** IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



Backwater flooding may inundate areas upstream below the following elevations:
 PMF Breach - 334.82
 SDF Breach - 334.52
 SDF NonBreach - 333.56
 Sunny Breach - 324.09

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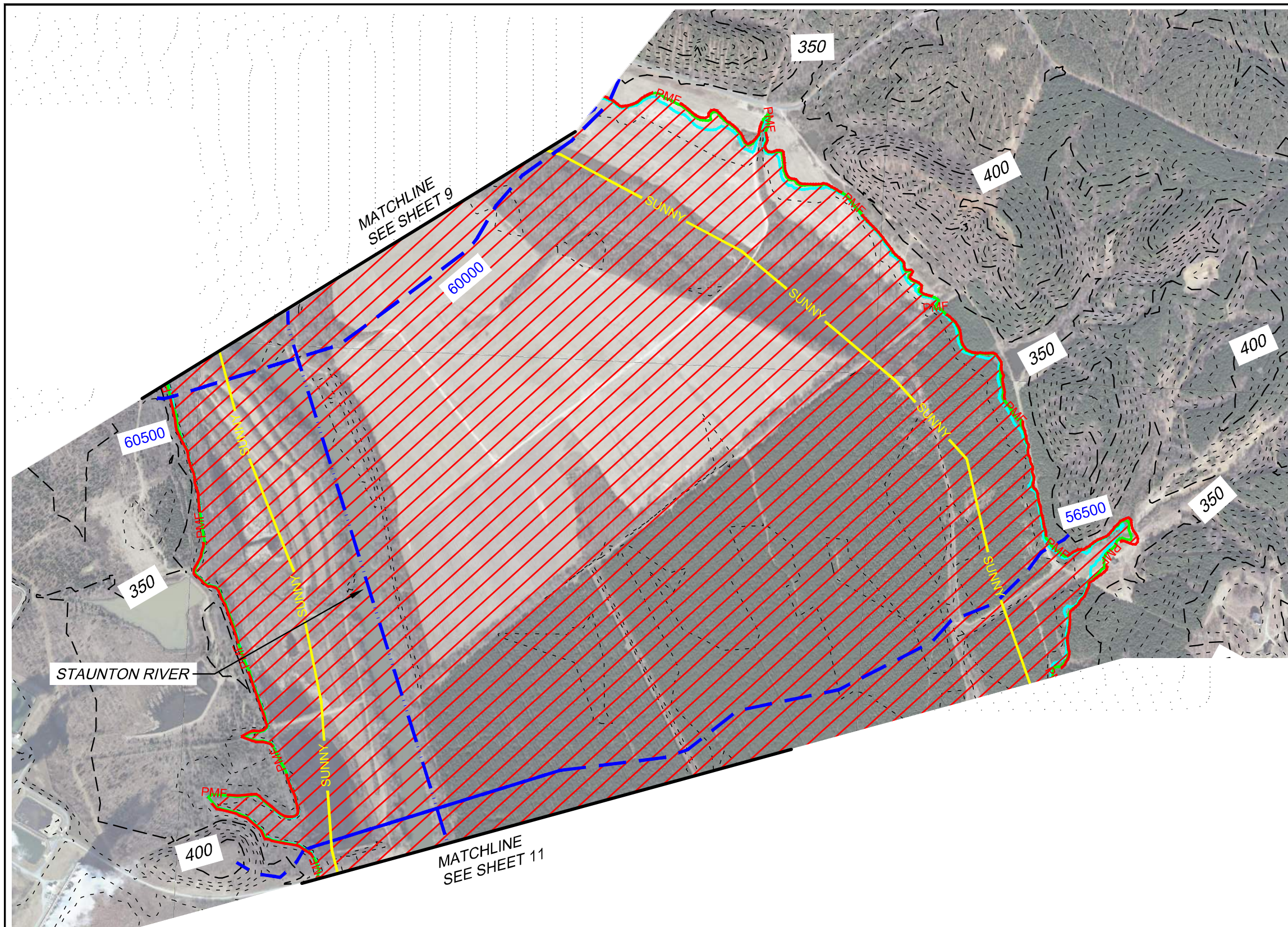
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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453	SHEET NO. 9 OF 15
G.L. NO.	304-09-D3.7	
FILE NO.	G-13962	
DATE:	12/06/13	
CHECKED BY:	MDW	
DRAWN BY:	SHC	

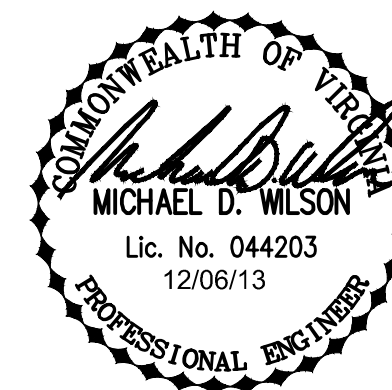


DESIGN FLOODS LEGEND

- **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
- - - 90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
- **SNY** SUNNY DAY BREACH
- ▨ **PMF** 100% PMF WITH BREACH
- MAJOR CONTOUR
- - - MINOR CONTOUR
- - - - STREAM CENTER LINE
- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



GRAPHIC SCALE IN FEET
CONTOUR INTERVAL: 10 FT.



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Aerial mapping and digital contours taken from GIS Information for Charlotte County, VA. Areas at dams and road crossings were field surveyed by Hurt & Proffitt, Inc.

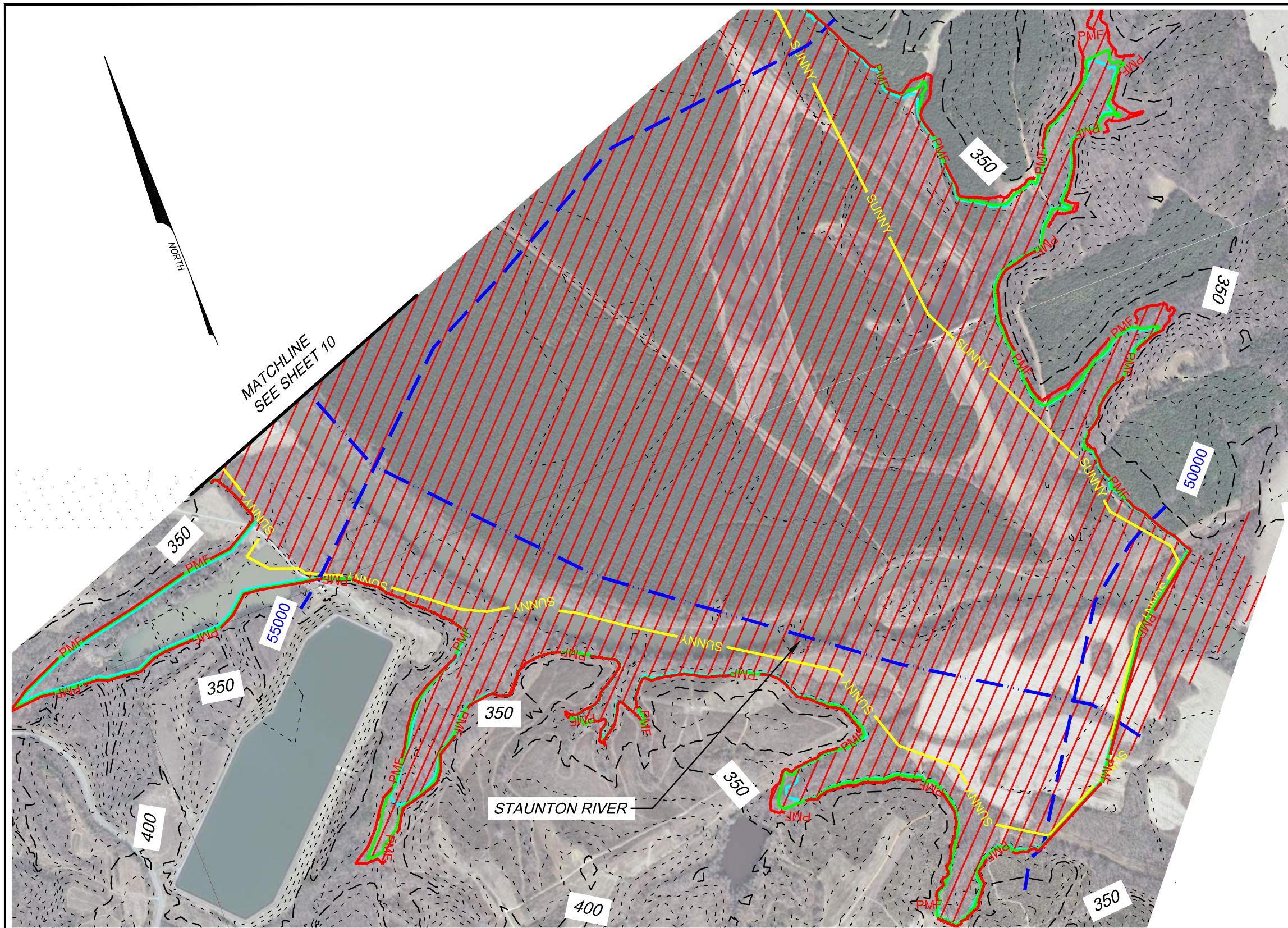
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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

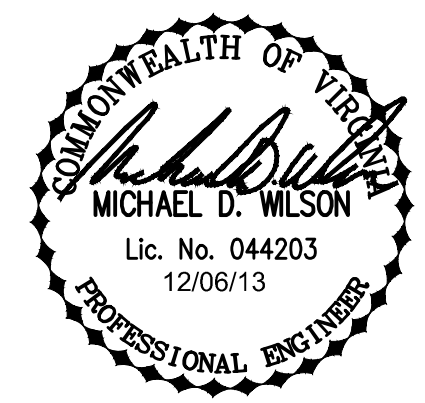
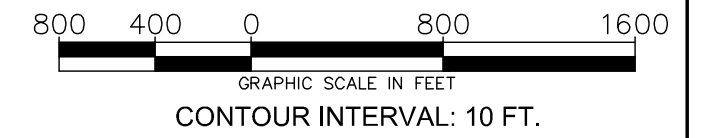
PROJECT NO.	20130453
G.L. NO.	304-09-D3.7
FILE NO.	G-13962
DATE:	12/06/13
DRAWN BY:	SHC
CHECKED BY:	MDW

SHEET NO.
10 OF 15



DESIGN FLOODS LEGEND

- **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
- 90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
- **SNY** SUNNY DAY BREACH
- ▭ **PMF** 100% PMF WITH BREACH
- MAJOR CONTOUR
- MINOR CONTOUR
- STREAM CENTER LINE
- 2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA





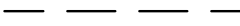
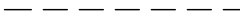


PROJECT NO.	20130453
G.L. NO.	304-09-D3.7
FILE NO.	G-13962
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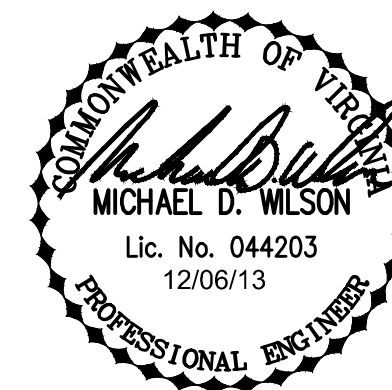
SHEET NO.
11 OF 15

Flood Wave Summary

HEC-RAS Station	Map Sheet Number	Distance from Dam (Miles)	PMF Breach		90% PMF Breach		90% PMF Non Breach		Sunny Breach	
			Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)
114000	3-1	2.46	28.00	40.00	31.00	39.00	32.00	41.00	43.00	60.00
113000	3-2	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-3	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-4	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-5	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-6	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-7	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-8	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-9	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-10	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-11	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-12	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
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113000	3-21	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-22	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-23	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
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113000	3-27	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-28	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-29	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-30	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-31	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00

DESIGN FLOODS LEGEND

-  90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
-  90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
-  SUNNY DAY BREACH
-  100% PMF WITH BREACH
-  MAJOR CONTOUR
-  MINOR CONTOUR
-  STREAM CENTER LINE
-  IMPACTED STRUCTURES (SHEET #-STRUCTURE #)




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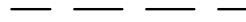
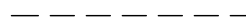

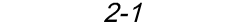


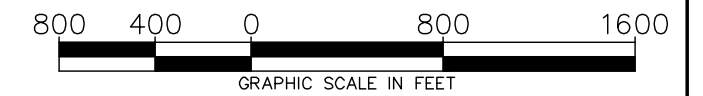
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO. 20130453
 G.L. NO. 304-09-D3.7
 FILE NO. G-13962
 DATE: 12/06/13
 DRAWN BY: SHC
 CHECKED BY: MDW

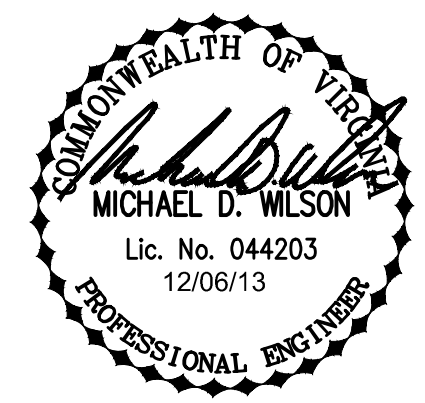
SHEET NO.
12 OF 15

DESIGN FLOODS LEGEND

-  **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
-  90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
-  **SNY** SUNNY DAY BREACH
-  100% PMF WITH BREACH
-  MAJOR CONTOUR
-  MINOR CONTOUR
-  STREAM CENTER LINE
-  IMPACTED STRUCTURES (SHEET #-STRUCTURE #)



CONTOUR INTERVAL: 10 FT.



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Flood Wave Summary

HEC-RAS Station	Map Sheet Number	Distance from Dam (Miles)	PMF Breach		90% PMF Breach		90% PMF Non Breach		Sunny Breach	
			Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)	Time to Initial Floodwaters (min)	Time to Peak Floodwaters (min)
113000	3-32	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
113000	3-33	2.65	32.00	40.00	35.00	39.00	36.00	41.00	46.00	60.00
112900	3-34	2.67	40.00	41.00	55.00	93.00	43.00	88.00	47.00	61.00
97800	5-1	5.53	99.00	163.00	113.00	193.00	109.00	175.00	136.00	179.00
83000	6-1	8.33	157.00	281.00	170.00	291.00	173.00	307.00	223.00	242.00
83000	6-2	8.33	157.00	281.00	170.00	291.00	173.00	307.00	223.00	242.00
82500	6-3	8.43	159.00	286.00	172.00	305.00	175.00	338.00	226.00	250.00
82000	7-1	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-2	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-3	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-4	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-5	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-6	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-7	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-8	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
82000	7-9	8.52	161.00	287.00	174.00	311.00	178.00	347.00	229.00	260.00
65000	9-1	11.74	228.00	310.00	240.00	310.00	252.00	388.00	328.00	437.00
65000	9-2	11.74	228.00	310.00	240.00	310.00	252.00	388.00	328.00	437.00
65000	9-3	11.74	228.00	310.00	240.00	310.00	252.00	388.00	328.00	437.00
64800	9-4	11.78	230.00	313.00	242.00	313.00	256.00	391.00	328.00	449.00

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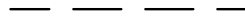
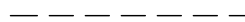

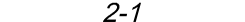


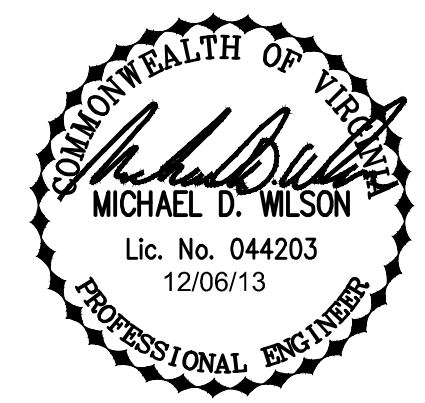
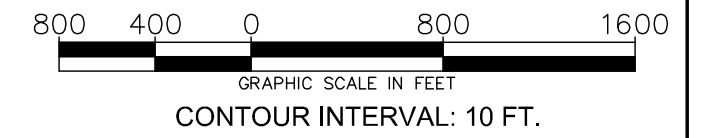
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO. 20130453	SHEET NO. 13 OF 15
G.L. NO. 304-09-D3.7	
FILE NO. G-13962	
DATE: 12/06/13	
DRAWN BY: SHC	
CHECKED BY: MDW	

Maximum Water Elevation At Structures							
HEC-RAS	Structure	Structure	Structure		Maximum Water Elevation		
Station No.	No.		Ground Elev.	PMF-B	90% PMF-B	90% PMF-NB	Sunny Day
114000	3-1	House	377.00	392.18	391.51	385.49	384.00
113000	3-2	House	382.00	391.83	391.15	385.15	383.74
113000	3-3	House	378.00	391.83	391.15	385.15	383.74
113000	3-4	House	390.00	391.83	391.15	385.15	383.74
113000	3-5	Business	378.00	391.83	391.15	385.15	383.74
113000	3-6	Business	377.00	391.83	391.15	385.15	383.74
113000	3-7	House	376.00	391.83	391.15	385.15	383.74
113000	3-8	Business	374.00	391.83	391.15	385.15	383.74
113000	3-9	Business	375.00	391.83	391.15	385.15	383.74
113000	3-10	House	374.00	391.83	391.15	385.15	383.74
113000	3-11	Shed	372.00	391.83	391.15	385.15	383.74
112900	3-12	Bridge (Rte 47)	379.00	395.05	394.19	385.82	383.65
113000	3-13	Pavillion	376.00	391.83	391.15	385.15	383.74
113000	3-14	Business	372.00	391.83	391.15	385.15	383.74
113000	3-15	Business	376.00	391.83	391.15	385.15	383.74
113000	3-16	Business	376.00	391.83	391.15	385.15	383.74
113000	3-17	Business	375.00	391.83	391.15	385.15	383.74
113000	3-18	Business	377.00	391.83	391.15	385.15	383.74
113000	3-19	Business	378.00	391.83	391.15	385.15	383.74
113000	3-20	Business	376.00	391.83	391.15	385.15	383.74
113000	3-21	Business	377.00	391.83	391.15	385.15	383.74
113000	3-22	Business	376.00	391.83	391.15	385.15	383.74
113000	3-23	Business	378.00	391.83	391.15	385.15	383.74
113000	3-24	Business	377.00	391.83	391.15	385.15	383.74
113000	3-25	Business	380.00	391.83	391.15	385.15	383.74
113000	3-26	Business	377.00	391.83	391.15	385.15	383.74
113000	3-27	Business	378.00	391.83	391.15	385.15	383.74
113000	3-28	Business	379.00	391.83	391.15	385.15	383.74
113000	3-29	Business	383.00	391.83	391.15	385.15	383.74

DESIGN FLOODS LEGEND

-  **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
-  90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
-  **SNY** SUNNY DAY BREACH
-  100% PMF WITH BREACH
-  MAJOR CONTOUR
-  MINOR CONTOUR
-  STREAM CENTER LINE
-  2-1 IMPACTED STRUCTURES (SHEET #-STRUCTURE #)




The information contained on this map is prepared for use in the notification of downstream property owners by emergency response personnel.

Aerial mapping and digital contours taken from GIS Information for Charlotte County, VA. Areas at dams and road crossings were field surveyed by Hurt & Proffitt, Inc.

Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map, and summary table on sheet 12 - 15.

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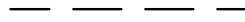
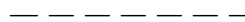

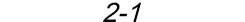


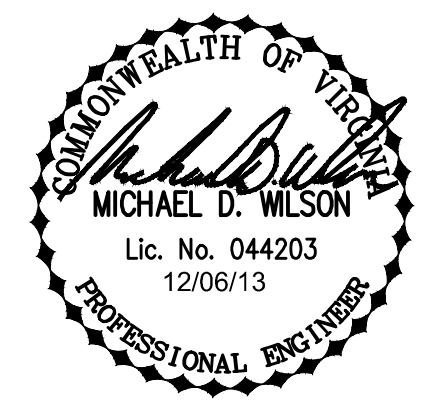
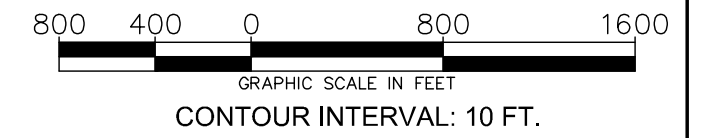
INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO. 20130453	SHEET NO. 14 OF 15
G.L. NO. 304-09-D3.7	
FILE NO. G-13962	
DATE: 12/06/13	
DRAWN BY: SHC	
CHECKED BY: MDW	

Maximum Water Elevation At Structures							
HEC-RAS Station No.	Structure No.	Structure	Structure Ground Elev.	Maximum Water Elevation PMF-B	Maximum Water Elevation 90% PMF-B	Maximum Water Elevation 90% PMF-NB	Sunny Day
113000	3-30	Business	384.00	391.83	391.15	385.15	383.74
113000	3-31	Business	372.00	391.83	391.15	385.15	383.74
113000	3-32	Business	374.00	391.83	391.15	385.15	383.74
113000	3-33	Business	370.00	391.83	391.15	385.15	383.74
112900	3-34	Bridge (R.R.)	400.00	391.83	391.15	385.15	383.74
97800	5-1	Bridge (Rte. 642)	349.80	358.71	358.42	356.27	354.9
83000	6-1	House	344.00	342.35	341.72	339.10	335.78
83000	6-2	House	340.00	342.35	341.72	339.10	335.78
82500	6-3	House	340.00	342.09	341.51	338.80	334.43
82000	7-1	Business	336.00	341.97	341.42	338.70	333.65
82000	7-2	House	335.00	341.97	341.42	338.70	333.65
82000	7-3	House	334.00	341.97	341.42	338.70	333.65
82000	7-4	Business	338.00	341.97	341.42	338.70	333.65
82000	7-5	Bridge (Rte. 612)	339.66	341.97	341.42	338.70	333.65
82000	7-6	Business	336.00	341.97	341.42	338.70	333.65
82000	7-7	House	334.00	341.97	341.42	338.70	333.65
82000	7-8	House	333.00	341.97	341.42	338.70	333.65
82000	7-9	House	333.00	341.97	341.42	338.70	333.65
65000	9-1	Business	334.00	340.19	340.03	337.20	325.16
65000	9-2	Business	335.00	340.19	340.03	337.20	325.16
65000	9-3	House	332.00	340.19	340.03	337.20	325.16
64800	9-4	Bridge (Rte. 607)	332.99	340.19	340.03	337.20	325.16

DESIGN FLOODS LEGEND

-  **SDF** 90% PROBABLE MAXIMUM FLOOD (PMF) WITH BREACH OF DAM
-  90% PROBABLE MAXIMUM FLOOD (PMF) WITHOUT BREACH
-  **SNY** SUNNY DAY BREACH
-  **PMF** 100% PMF WITH BREACH
-  MAJOR CONTOUR
-  MINOR CONTOUR
-  STREAM CENTER LINE
-  IMPACTED STRUCTURES (SHEET #-STRUCTURE #)




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Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map, and summary table on sheet 12 - 15.

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INUNDATION ZONE MAP
DAM BREACH FLOOD ELEVATIONS
ROANOKE CREEK DAM #72A
DRAKES BRANCH, VA

PROJECT NO.	20130453
G.L. NO.	304-09-D3.7
FILE NO.	G-13962
DATE:	12/06/13
DRAWN BY:	SHC
CHECKED BY:	MDW
SHEET NO.	
15 OF 15	

Appendix A

Investigation and Analyses of Dam Break Floods

**Roanoke Creek Dam #72A
Hazard Classification**

December 6, 2013

*Charlotte County, VA
Dam Inventory # VA03702
H&P Project Commission # 20130453*



*Submitted to:
Town of Drakes Branch
4800 Main Street
PO Box 191
Drakes Branch, VA 23937*

*Submitted by:
Michael D. Wilson, P.E.
Project Manager*



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COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

February 26, 2014

Town of Drakes Branch
ATTN: Mary Sands
PO Box 191
Drakes Branch, VA 23937

RE: Roanoke Creek 72A, Inventory Number 03702

Review of the above referenced inundation study dated December 6, 2013 has been completed. The report is considered complete and acceptable.

- Hazard Classification-High Hazard
- Required Spillway Design Flood (SDF)-0.9 PMP
- Existing spillway capacity-0.7PMF

The existing spillway does not currently have the capacity to pass the required SDF, therefore, upgrades are required.

Thank you for your cooperation during this process. If you should have any questions or concerns, please do not hesitate to contact me at 804-786-0113.

Sincerely,

A handwritten signature in cursive script that reads "Amanda Pennington".

Amanda S. Pennington, PE
Regional Engineer
Division of Dam Safety and Floodplain Management

Table of Contents

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 3. Development Upstream of the Dam..... 3
 4. Development Downstream of the Dam..... 3
 5. PMF and Sunny Day Dam Breach Analysis..... 6
 6. Hazard Classification Recommendation..... 8
 7. Inundation Zone Mapping..... 14

Appendix A - Site Map and Cross Section Stations

Appendix B - Drainage Area Map

Appendix C - Calculations

Appendix D - Hydrologic Soil Group Data

Appendix E - Land Use

Appendix F - HEC-HMS Model

Appendix G - HEC-RAS Model Output (Comparison of Water Surface Elevations
 Spillway Design Flood, With Breach Vs. Without Breach; 6-Hour
 PMF with Breach; Sunny Day Breach)

Appendix H – Water Surface Elevation Profiles

Appendix I – Inundation Zone Maps

**Due to their size, the following Appendices were not printed, but are included
 in the attached compact disk.**

Appendix J - HEC-RAS Model Input Data (Geometry Data, Manning’s “n”
 Values, Contraction and Expansion Coefficients)

Appendix K - HEC-RAS Model Output (Sunny Day Breach (Piping Breach)

Appendix L - HEC-RAS Model Output (6-Hour PMF, Without Breach)

Appendix M - HEC-RAS Model Output (6-Hour PMF, With Breach)

Appendix N - HEC-RAS Model Output (90 % 6-Hour PMF, Without Breach)

Appendix O - HEC-RAS Model Output (90 % 6-Hour PMF, With Breach)

Appendix P - HEC-RAS Model Output (Comparison of Water Surface Elevations
Spillway Design Flood, With Breach Vs. Without Breach)

EXECUTIVE SUMMARY

Hurt & Proffitt was under contract with the Town of Drakes Branch to perform dam breach analysis, hazard classification, and inundation zone mapping for Roanoke Creek Dam #72A. This analysis and mapping is required under the Virginia Impounding Structure Regulations section 4VAC50-20 which went into effect September 26, 2008.

Roanoke Creek Dam #72A is a 43.2 foot tall impounding structure, designed for flood control purposes. It is located on Twittys Creek, a tributary to the Staunton River, in Charlotte County, Virginia. There are multiple streets and residences in the study area, downstream of the dam, which are subject to inundation for all of the breach scenarios.

The design does not meet the requirements of the September 26, 2008 revisions to the regulations with respect to dam breach analysis, which has necessitated this study.

The findings of this study indicate that Roanoke Creek Dam #72A should be classified as High Hazard Potential. During PMF storm events, several roads and structures downstream of the dam will be impacted. These include River Road (Route 607), Hermon Road (Route 612), Main Street (Route 47), Mossing Ford Road (Route 642), West Saxkey Road (Route 637), and Mulberry Hill Road (Route 641).

An Incremental Damage Analysis was performed. Based on model output, the Roanoke Creek Dam #72A is overtopped during the 100% PMF and capable of passing the 70% PMF Storm without overtopping. The Virginia Impounding Structure Regulations section 4VAC50-20-50 define the Spillway Design Flood (SDF) as the 90% PMF. Due to the impacts of structures downstream of the dam, the Spillway Design Flood for this dam is 90% of the PMF.

1. GENERAL

The dam is located on Twittys Creek, a tributary to the Staunton River, in Charlotte County, Virginia. From the dam, Twittys Creek flows south approximately 10.6 miles before joining the Staunton River.

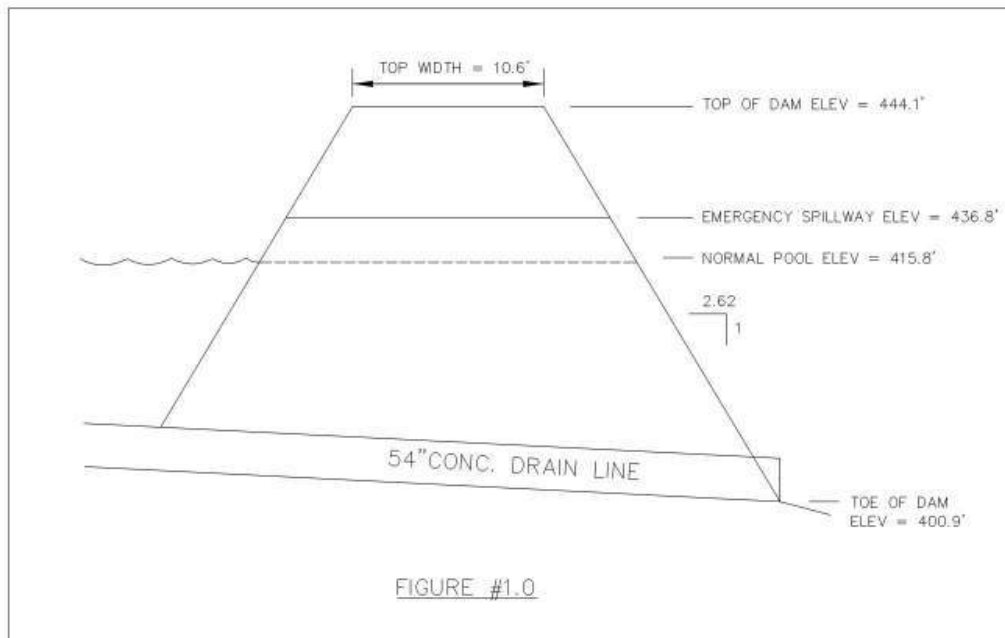
2. DESCRIPTION OF DAM

DESCRIPTION OF DAM

Inventory Number: VA03702
 Latitude: 36°54'29.9"N (USACE National Inventory of Dams)
 Longitude: 78°33'59.8"W (USACE National Inventory of Dams)
 Owner: Town of Drakes Branch
 Located: Charlotte County, Virginia

DAM GEOMETRICS

Top of Dam:	444.1	(Field Survey September 26, 2013)
Downstream Toe:	400.9	(Field Survey September 26, 2013)
Height of Dam:	43.2'	(Calculated)
Crest Length:	614'	(Field Survey September 26, 2013)
Crest Width:	10.6'	(Field Survey September 26, 2013)
Upstream Slope:	2.71:1	(Calculated)
Downstream Slope:	2.62:1	(Calculated)



RESERVOIR

Drainage Area: 15.5 square miles	(USACE National Inventory of Dams)
Maximum Capacity: 5,535 Acre Feet	(USACE National Inventory of Dams)
Maximum Pool Elevation: 436.8	(Field Survey September 26, 2013)
Maximum Pool Surface Area: 444.1 Acres	(VGIN Data)
Normal Capacity: 455 Acre Feet	(USACE National Inventory of Dams)
Normal Pool Elevation: 415.8	(Field Survey September 26, 2013)
Normal Pool Surface Area: 154 Acres	(USACE National Inventory of Dams)
Freeboard: 21.0 feet	(Calculated)

SPILLWAY

Principle Spillway Orifice:

The spillway has a crest elevation of 415.8.

Emergency Spillway:

297' earth channel crest at elevation 436.8 (Field Survey September 26, 2013)

Drain Line:

54" concrete outlet invert 400.2. (Field Survey September 26, 2013)

3. DEVELOPMENT UPSTREAM OF THE DAM

The upstream inundation zone caused by the dam is primarily agricultural area. There are no occupied structures in the upstream inundation area.

The current level of development in the 15.5 square mile drainage area is generally low. This area is located in Charlotte County. According to the land use map found in the Charlotte County GIS website, the majority of the area located in Charlotte County is designated as General Agricultural. Based on land use, the portion of the drainage area in Charlotte County is composed of the following types:

General Agricultural	90%
General Residential	10%

4. DEVELOPMENT DOWNSTREAM OF DAM

Within the study area, there are multiple roads that parallel or cross the river and will be affected by a PMF event and a subsequent failure of the dam. In addition, there are multiple residences and business structures downstream of the dam that would be inundated by a PMF storm. See Appendix A for detailed Map of the area. Notable characteristics of the model include the following:

Dam: The outlet from the dam is cross section 127000 in the HEC-RAS Model.

Route 47: Secondary road represented by cross section 113000 in the HEC-RAS Model. The bridge is located approximately 2.65 miles downstream of the dam. Roadway deck elevation 377.3.

Route 642: Secondary road represented by cross section 98000 in the HEC-RAS Model. The bridge is located approximately 5.49 miles downstream of the dam. Roadway deck elevation 351.8.

Route 607: Secondary road represented by cross section 65000 in the HEC-RAS Model. The bridge is located approximately 11.7 miles downstream of the dam. Roadway deck elevation 333.59.



5. PMF AND SUNNY DAY DAM BREACH ANALYSIS

SELECTION OF DESIGN STORM DURATION

A hydrologic model of the drainage area was developed in Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS version 3.3) (See Appendix F) using the Soil Conservation Service Curve Number methodology (See Appendix C), PMF precipitation values from Hydro Meteorological Report-51 published by the U.S. Army Corps of Engineers (USACE) (See Appendix C). This dam was constructed for flood control purposes. Therefore, for the Sunny Day Breach analysis, the starting water surface elevation is set at the crest of the emergency spillway elevation at 436.8. For all other scenarios, the starting water surface elevation is set at the normal pool elevation of 415.8.

The 6-Hour, 12-Hour, and 24-Hour PMF storm events were modeled in HEC-HMS (See Appendix F) and the peak flow values were determined to be as follows:

6-Hour PMF: $Q_{\text{peak}} = 31,275$ CFS
12-Hour PMF: $Q_{\text{peak}} = 31,149$ CFS
24-Hour PMF: $Q_{\text{peak}} = 26,860$ CFS

These storm events were then routed through the dam using HEC-HMS (see Appendix F) and the peak water surface elevation at the dam was determined for each storm as follows:

6-Hour PMF water surface elevation at dam: 446.4
12-Hour PMF water surface elevation at dam: 446.4
24-Hour PMF water surface elevation at dam: 445.8

The 6-Hour PMF event has the highest peak flow and water surface elevation at the dam and was selected as the critical storm event for the dam breach analysis.

DAM BREACH ANALYSIS

The 6-Hour PMF outflow hydrograph developed in HEC-HMS, as described above, was used as the inflow hydrograph to the reservoir. HEC-HMS was used to model the reservoir (using a stage storage curve), dam, and breaching of the dam (Appendices K through P on disk).

In HEC-RAS, the river is represented by a series of cross sections which were cut from the topographic mapping (VGIN) of the area at locations and at an interval sufficient to represent the river. During low flow conditions at the bridges, both the energy and momentum methods were computed and the solution with the highest energy answer was selected. In all cases, the energy method resulted in the highest energy solution. During high flow conditions, the energy method was used, as the bridge decks represented a small obstruction to flow relative to the overall cross sections and none of the bridge openings were acting as a pressurized orifice.

To increase stability of the model, an initial flow of 1,000 CFS was set to flood all of the cross sections. A minimum flow volume of 1,000 CFS was set to improve the stability of the model. At lower flows, the model became unstable. However, the purpose of this work is to determine the peak water surface elevation from PMF flows and during breach conditions. Therefore, little effort was spent to stabilize the model at low flows. The peak inflow from the PMF was 31,275CFS, and during the breach the peak flow was 71,883 CFS. During the Sunny Day (Piping Breach) Breach the peak flow was 24,557 CFS.

The dam breach parameters were selected based on the existing dam geometry, topography, and iteration within the Corps of Engineer (COE) guidelines to determine the worst case scenario. The bottom width was selected based on the topography at the toe of the dam. In order to produce the worst case flooding, the breach side slopes were set as the largest value and the breach formation time set for the shortest duration recommended by the COE guidelines. These breach parameters used are within the guidelines of USACE-HEC Research Document-13.

Breach Parameters from USACE-HEC Research Document-13

- Breach Bottom Width: ½ to 3 dam heights
- Side Slope of Breach: 0:1 to 1:1
- Breach Formation Time: 0.5 – 4 hours

BREACH ANALYSIS OF 6-HOUR PMF

Dam Breach Parameters (Overtopping)

- Breach Bottom Width: 43 feet
- Side Slope of Breach: 1:1
- Breach Formation Time: 0.75 Hour
- Trigger Elevation: 444.6 (0.5 feet above crest)

Analysis of the 6-Hour PMF with and with out failure of the dam due to overtopping (See Appendices L and M), revealed the following:

Site	Elevation (ft)	Cross Section	6 Hour - PMF Without Breach	
			Max Water Surface Elev. (ft)	Depth at Structure (ft)
Dam	444.1		446.4	2.3
Dam Toe Slope	400.9	127000	411.99	11.09
Route 47	377.3	112900	386.10	8.8
Route 642	351.8	97800	358.98	7.18
Route 612	339.02	82000	339.62	0.6
Route 607	333.59	64800	338.20	4.61

Site	Elevation (ft)	Cross Section	6 Hour - PMF With Breach	
			Max Water Surface Elev. (ft)	Depth at Structure (ft)
Dam	444.1		446.4	2.3
Dam Toe Slope	400.9	127000	417.11	16.21
Route 47	377.3	112900	391.83	14.53
Route 642	351.8	97800	361.39	9.59
Route 612	339.02	82000	341.97	2.95
Route 607	333.59	64800	340.19	6.6

There are multiple roads and structures within the inundation zone caused by a dam breach during the 6-Hour PMF.

SUNNY DAY (PIPING) BREACH ANALYSIS

Dam Breach Parameters (Overtopping)

Breach Bottom Width: 43 feet
 Breach Formation Time: 0.75 Hour
 Side Slope of Breach: 1:1
 Trigger Time: 04:00

Analysis of a breach of the dam with the starting water surface at the emergency spillway and with minimal inflow (See Appendix K), revealed the following:

Site	Elevation (ft)	Cross Section	Sunny Day With Breach	
			Max Water Surface Elev. (ft)	Depth at Structure (ft)
Dam	444.1		415.9	-28.2
Dam Toe Slope	400.9	127000	410.81	9.91
Route 47	377.3	112900	383.65	6.35
Route 642	351.8	97800	354.90	3.1
Route 612	339.02	82000	333.65	-5.37
Route 607	333.59	64800	323.74	-9.85

There are multiple roads and structures within the inundation zone caused by a dam breach during the Sunny Day scenario.

6. HAZARD CLASSIFICATION RECOMMENDATION AND INCREMENTAL DAMAGE ANALYSIS

In The Virginia Impounding Structure Regulations section 4VAC50-20-40, High Hazard Potential is defined as where an impounding structure failure will cause probable loss of life or serious economic damage. Probable loss of life is further clarified in the

regulations to mean impacts which will occur that are likely to cause loss of human life, including but not limited to impacts to residences, businesses, other occupied structures, or major roadways.

The water depth at primary roads, secondary roads, and other structures in the inundation zone predicted in the above models “will cause loss of life” if people are present during the inundation. Therefore, this dam is recommended to be classified as High Hazard Potential.

Spillway Design Flood Recommendation

The Impounding Structure Regulations establish that the Spillway Design Flood for an existing High Hazard Dam is 90% of the PMF, as shown on the following table from 4VAC50-20-50.

Table – Performance Standards for Impounding Structures

Hazard Potential Class of Dam	Spillway Design Flood (SDF) ^B for Existing Impounding Structures ^F	Spillway Design Flood (SDF) ^B for Existing Impounding Structures ^{F,G}	Minimum Threshold for Incremental Damage Analysis
High	PMF ^C	0.9 PMP ^H	100-YR ^D
Significant	.50 PMF	.50 PMF	100-YR ^D
Low	100-YR ^D	100-YR ^D	50-YR ^E

Based on data from HEC-HMS modeling, the Roanoke Creek Dam #72A is capable of passing the 70% PMF without overtopping.

Top of Dam	Elevation 444.1 feet
Auxiliary Spillway	Elevation 436.8 feet
100 % PMF	Elevation 445.5 feet
90% PMF	Elevation 445.3 feet
80% PMF	Elevation 444.8 feet
70% PMF	Elevation 444.1 feet

Under the Virginia Impounding Structure Regulations (Dated 12/22/2010), the Spillway Design Storm (SDF) for a dam was established by the Hazard Classification of the dam. The SDF can be reduced through an Incremental Damage Analysis (IDA) in accordance with 4VAC50-20-50.

Using ACER 11 and the IDA, Hurt & Proffitt has analyzed incremental flooding events with and without breach of the Roanoke Creek Dam #72A. Based on the results of this analysis the minimum allowable SDF for this dam would be the 90% Probable Maximum Flood (PMF). Below is a summary of reasoning for this determination.

Structures within Inundation Zone

There are thirty-one impacted structures within the Inundation Zone created by a breach

of the dam during a full PMF event, or in close proximity to it. Table 1 below lists the structures. Elevations for bridges listed are the lowest elevation on the bridge deck.

Table 1 – Structures Evaluated for Breach Impacts

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	6 Hour - PMF With Breach			Meets (1) 2' Rule and 7' Rule
				Max W.S. Surface Elev. (ft)	Depth at Structure (ft)	Velocity ft/s	
3-1	House	377	114000	392.18	15.1	0.89	NO
3-2	House	382	113000	391.83	9.83	1.18	NO
3-3	House	391	113000	391.83	0.83	1.18	YES
3-4	House	389	113000	391.83	2.83	1.18	NO
3-5	Business	378	113000	391.83	13.83	1.18	NO
3-6	Business	377	113000	391.83	14.83	1.18	NO
3-7	House	376	113000	391.83	15.83	1.18	NO
3-8	Business	374	113000	391.83	17.83	1.18	NO
3-9	Business	375	113000	391.83	16.83	1.18	NO
3-10	House	374	113000	391.83	17.83	1.18	NO
3-11	Shed	370	113000	391.83	21.83	1.18	NO
3-12	Bridge (Rte. 47)	379	113000	391.83	12.83	2.32	NO
3-13	Pavillion	377	113000	391.83	14.83	1.27	NO
3-14	Business	372	113000	391.83	19.83	1.27	NO
3-15	Business	376	113000	391.83	15.83	1.27	NO
3-16	Business	376	113000	391.83	15.83	1.27	NO
3-17	Business	375	113000	391.83	16.83	1.27	NO
3-18	Business	377	113000	391.83	14.83	1.27	NO
3-19	Business	378	113000	391.83	13.83	1.27	NO
3-20	Business	376	113000	391.83	15.83	1.27	NO
3-21	Business	377	113000	391.83	14.83	1.27	NO
3-22	Business	376	113000	391.83	15.83	1.27	NO
3-23	Business	378	113000	391.83	13.83	1.27	NO
3-24	Business	377	113000	391.83	14.83	1.27	NO
3-25	Business	380	113000	391.83	11.83	1.27	NO
3-26	Business	377	113000	391.83	14.83	1.27	NO
3-27	Business	378	113000	391.83	13.83	1.27	NO
3-28	Business	379	113000	391.83	12.83	1.27	NO
3-29	Business	383	113000	391.83	8.83	1.27	NO
3-30	Business	384	113000	391.83	7.83	1.27	NO
3-31	House	372	113000	391.83	19.83	1.18	NO
3-32	House	374	113000	391.83	17.83	1.18	NO
3-33	House	370	113000	391.83	21.83	1.18	NO
3-34	Bridge (R.R)	400	113000	391.83	-8.17	1.18	NO

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	Max W.S. Surface Elev. (ft)	Depth at Structure (ft)	Velocity ft/s	Meets (1) 2' Rule and 7' Rule
5-1	Bridge (Rt.642)	349.8	98000	361.39	11.59	9.06	NO
6-1	House	344	83000	342.35	-1.65	1.6	YES
6-2	House	340	83000	342.35	2.35	1.6	NO
6-3	House	340	83000	342.35	2.35	1.6	NO
7-1	Business	336	82000	341.97	5.97	3.73	NO
7-2	House	335	82000	341.97	6.97	3.73	NO
7-3	House	334	82000	341.97	7.97	3.73	NO
7-4	Business	338	82000	341.97	3.97	0.59	NO
7-5	Bridge (Rte. 612)	339.66	82000	341.97	2.31	0.59	NO
7-6	Business	336	82000	341.97	5.97	3.73	NO
7-7	House	334	82000	341.97	7.97	3.73	NO
7-8	House	333	82000	341.97	8.97	3.73	NO
7-9	House	333	82000	341.97	8.97	3.73	NO
9-1	Business	334	65000	340.19	6.19	0.45	NO
9-2	Business	335	65000	340.19	5.19	0.45	NO
9-3	House	332	65000	340.19	8.19	0.45	NO
9-4	Bridge (Rte. 607)	332.99	64800	340.19	7.2	5.41	NO

Note 1 – Depth less than 2 feet and Depth * Velocity less than 7

Incipient Danger Flood

The Incipient Danger Flood defined by ACER 11 is the flood which just touches the foundation of a structure or begins to overtop a road. The structures from Table 1 meeting the 2' Rule and the Rule of 7 have not been considered. In addition, the barns and sheds have not been considered since they are unoccupied structures with an insignificant economic impact. Table 2 below lists the approximate Incipient Danger Flood relevant to this analysis.

Table 2 – Structures Evaluated in Incremental Damage Analysis

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	Incipient Flood	Max Water Surface Elev. (ft)	Depth at Structure (ft)	Water Velocity at Structure (ft/s)
3-1	House	377	114000	50%PMF	377.06	0.06	0.32
				Breach	382.20	5.2	0.37
3-2	House	382	113000	64% PMF	382.19	0.19	0.51
				Breach	383.50	1.50	0.66

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	Incipient Flood	Max Water Surface Elev. (ft)	Depth at Structure (ft)	Water Velocity at Structure (ft/s)
3-3	House	391	113000	100% PMF	386.10	-4.9	0.93
				Breach	391.83	0.83	1.18
3-4	House	389	113000	100% PMF	386.10	-2.9	0.93
				Breach	391.83	2.83	1.18
3-5	Business	378	113000	55% PMF	379.05	1.05	0.34
				Breach	382.72	4.72	4.54
3-6	Business	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42
3-7	House	376	113000	50% PMF	376.74	0.74	0.35
				Breach	382.01	6.01	0.42
3-8	Business	374	113000	45% PMF	374.40	0.4	0.12
				Breach	380.84	6.84	0.43
3-9	Business	375	113000	45% PMF	374.40	-0.6	0.12
				Breach	380.84	5.84	0.43
3-10	House	374	113000	50% PMF	374.40	0.4	0.12
				Breach	380.84	6.84	0.43
3-11	Shed	370	113000	40% PMF	371.83	1.83	NA
				Breach	379.53	9.53	0.35
3-12	Bridge (Rte 47)	379	113000	55% PMF	379.05	0.05	0.34
				Breach	382.72	3.72	4.54
3-13	Pavillion	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42
3-14	Business	372	113000	40% PMF	371.83	-0.17	NA
				Breach	379.53	7.53	0.35
3-15	Business	376	113000	50% PMF	376.74	0.74	0.35
				Breach	382.01	6.01	0.42
3-16	Business	376	113000	50% PMF	376.74	0.74	0.35
				Breach	382.01	6.01	0.42
3-17	Business	375	113000	45% PMF	374.40	-0.6	0.12
				Breach	380.84	5.84	0.43
3-18	Business	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42
3-19	Business	378	113000	50% PMF	376.74	-1.26	0.35
				Breach	382.01	4.01	0.42
3-20	Business	376	113000	50% PMF	376.74	0.74	0.35
				Breach	382.01	6.01	0.42
3-21	Business	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	Incipient Flood	Max Water Surface Elev. (ft)	Depth at Structure (ft)	Water Velocity at Structure (ft/s)
3-22	Business	376	113000	50% PMF	376.74	0.74	0.35
				Breach	382.01	6.01	0.42
3-23	Business	378	113000	55% PMF	379.05	1.05	0.40
				Breach	382.72	4.72	0.48
3-24	Business	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42
3-25	Business	380	113000	60% PMF	380.74	0.74	0.43
				Breach	381.09	1.09	0.44
3-26	Business	377	113000	50% PMF	376.74	-0.26	0.35
				Breach	382.01	5.01	0.42
3-27	Business	378	113000	55% PMF	379.05	1.05	0.40
				Breach	382.72	4.72	0.48
3-28	Business	379	113000	64% PMF	382.19	3.19	0.51
				Breach	383.50	4.5	0.66
3-29	Business	383	113000	70% PMF	383.06	0.06	0.60
				Breach	384.02	1.02	0.72
3-30	Business	384	113000	70% PMF	383.06	-0.94	0.60
				Breach	384.02	0.02	0.72
3-31	House	372	113000	40% PMF	371.83	-0.17	NA
				Breach	379.30	7.30	0.35
3-32	House	374	113000	50% PMF	374.40	0.4	0.12
				Breach	380.84	6.84	0.43
3-33	House	370	113000	40% PMF	371.83	1.83	NA
				Breach	379.30	9.30	0.35
3-34	House	400	113000	100% PMF	386.10	-13.90	0.88
				Breach	391.83	-8.17	1.27
5-1	Bridge (Rte 642)	349.8	98000	45% PMF	351.48	1.68	1.59
				Breach	355.75	5.95	4.17
6-1	House	344	83000	100% PMF	339.98	-4.02	1.27
				Breach	342.35	-1.65	1.60
6-2	House	340	83000	90% PMF	339.10	-0.90	1.22
				Breach	341.72	1.72	1.42
6-3	House	340	83000	90% PMF	339.10	-0.90	1.22
				Breach	341.72	1.72	1.42
7-1	Business	336	82000	68% PMF	334.72	-1.28	1.12
				Breach	338.27	2.27	0.39
7-2	House	335	82000	68% PMF	334.72	-0.28	1.12
				Breach	338.27	3.27	0.39

Structure No.	Structure Type	Structure Elevation (ft)	Cross Section	Incipient Flood	Max Water Surface Elev. (ft)	Depth at Structure (ft)	Water Velocity at Structure (ft/s)
7-3	House	334	82000	64% PMF	334.09	0.09	0.45
				Breach	336.43	2.43	0.49
7-4	Business	338	82000	80% PMF	337.83	-0.17	0.38
				Breach	340.66	2.66	0.48
7-5	Bridge (Rte 612)	339.66	82000	100% PMF	339.62	-0.04	0.44
				Breach	341.97	2.31	0.59
7-6	Business	336	82000	70% PMF	336.95	0.95	0.34
				Breach	338.46	2.46	0.40
7-7	House	334	82000	64% PMF	334.09	0.09	0.45
				Breach	336.43	2.43	0.49
7-8	House	333	82000	45% PMF	333.29	0.29	0.09
				Breach	334.75	1.75	0.23
7-9	House	333	82000	45% PMF	333.29	0.29	0.09
				Breach	334.75	1.75	0.23
9-1	Business	334	65000	70% PMF	335.29	1.29	0.21
				Breach	336.94	2.94	0.27
9-2	Business	335	65000	70% PMF	335.29	0.29	0.21
				Breach	336.94	1.94	0.27
9-3	House	332	65000	45% PMF	331.63	-0.37	0.36
				Breach	334.58	2.58	0.24
9-4	Bridge (Rte 607)	332.99	64800	50% PMF	333.51	0.52	3.88
				Breach	335.06	2.07	4.15

Recommended Spillway Design Flood

Based on the analysis above, the recommended Spillway Design Flood for this dam is the 90% PMF based on Structure 6-2.

7. INUNDATION ZONE MAPPING

Appendix I contains maps of the inundation zones for the PMF, Spillway Design Flood, and Sunny Day conditions. The water surface elevation profiles can be found in Appendices K-P.

Base mapping was developed from Virginia Geographic Information Network (VGIN) 2011 aerial mapping data set. Field survey of areas at dams and road crossings was done by Hurt and Proffitt, Inc.

The Virginia Impounding Structure Regulations section 4VAC50-20-54 require that inundation zone mapping be developed from the dam to a point at which the water surface elevation of a dam breach during the SDF and the water surface elevation from

the SDF without a dam breach converge to within one foot. As seen in Appendix P, approximately 11.8 miles below the dam, at section 64500, the SDF models converge to within one foot.

Appendix B

Plans for Training, Exercising, Updating and Posting EAP

APPENDIX B - Plans for Training, Exercising, Updating, and Posting the EAP

A. Reviewing and Updating

Annually the EAP Coordinator verbally reviews the plan with the key EAP participants to explain the procedure to follow in the event of an emergency, address any changes that need to be made in the plan, answer questions regarding the procedure, and test their understanding of the plan. The key EAP participants review the plan for possible changes including:

- Change in personnel.
- Change in telephone numbers.
- New conditions that would affect flood flow or the extent of damage due to a dam failure.

The EAP Coordinator promptly makes the needed changes in the EAP and distributes, electronically, a revised plan to all participants listed below via their consulting engineer. If changes are made in the EAP at any other time, the EAP Coordinator also verbally reviews these changes with the participants and distributes a revised plan.

B. Testing

The EAP Coordinator is responsible for conducting a test (table top exercise) simulating a dam failure at least once, at a minimum, every 2 years. These table top exercises are to include both the dam owner and local emergency management officials. The purpose of these exercises is to familiarize the key EAP participants with the plan, helps estimate the time needed for notification, and helps reveal any plan deficiencies. The EAP Coordinator initiates the test and the key EAP participants must call all participants on the notification flowchart as if in a real emergency. When executing the test, each participant states their name and position and indicates that this is only a test. Drills should also be conducted each year by the owner unless an EAP test (table top exercise) is scheduled. During a drill, participants will perform an in-house exercise that tests, develops, or maintains skills in an emergency response situation. Participants will also verify telephone numbers and other necessary contact information.

The key EAP participants are the following:

- Charlotte County Administrator
- Dam Operator/Observer
- Charlotte County Emergency Communication Center
- Charlotte County Sheriff's Department
- Virginia Department of Transportation (VDOT)
- Department of Conservation and Recreation (DCR), Division of Dam Safety
- Hurt & Proffitt Engineer (Virginia Professional Engineer)

To determine the degree of success of the test, each participant comments about the execution of the notification procedure, discusses any problems encountered, and suggest any changes that would improve the EAP. The EAP Coordinator will keep this information on file for comparison with future test and revise the EAP as needed.

C. Posting

The EAP will become part of the overall Emergency Action Plan for Charlotte County and be posted with that plan.

The flowchart should be posted at each phone and radio transmitter at the main administrator's office. The dam operator shall have the flowchart posted in their office as well.

A copy of the complete, up-to-date EAP shall be sent to all the key EAP participants previously listed. The EAP should be kept on file in a location easily accessible for use during an emergency.

Appendix C

Site Specific Concerns

APPENDIX C - Site-Specific Concerns

The following are site specific concerns that need to be addressed during an emergency:

- Currently there are multiple residential and business structures impacted by this dam during a failure event. Please see the main narrative portion of the EAP for a list of impacts (mapping and table).
- An existing **abandoned** railroad bed is located within the defined inundation limits for the dam in question (see Appendix A). At one time it was a functioning railroad line but is now non-functioning (abandoned). As of June 2020, there are no downstream railroad impacts during any of the analyzed storm events for Roanoke Creek Dam #72A.
- An existing bridge crossing along Main Street (Route 47) at approximately 36° 59' 33" N & 78° 36' 02" W.
- An existing bridge crossing along Mousing Ford Road (Route 642) at approximately 36° 57' 36.30" N & 78° 37' 54.28" W.
- An existing bridge crossing along Hermon Road (Route 612) at approximately 36° 55' 50" N & 78° 39' 53.85" W.
- An existing bridge crossing along River Road (Route 607) at approximately 36° 53' 35.68" N & 78° 41' 49.42" W.
- Currently there is no existing staff gauge located at the dam in question. It is the responsibility of the Dam Operator / Staff Gauge Observer to be able to accurately read the flow depths within the existing emergency spillway for EAP stage trigger purposes. Prior to a Stage II emergency, the Dam Owner will be responsible for installing a device or identifying a way to accurately read water depths within the existing emergency spillway for EAP stage level purposes.
- During a dam failure or flood event, bridges and culverts may be adversely impacted. The roads should be closed off to ensure that no one is harmed during a culvert/bridge failure. Prior to reopening the road, VDOT should be contacted to inspect the bridges and roads.
- No unauthorized personnel shall be allowed on site. Also, prior to accessing the site all emergency personnel shall verify the procedure for accessing the site with the director.

Appendix D

Emergency Contractor List

Appendix E
EAP Review & Testing Documentation

Roanoke Creek Dam #72A
DCR Inventory #VA037002

Emergency Action Plan Schedule

Year	EAP Review & Update	EAP Tabletop Exercise (Annually)	VA DCR Dam Safety O&M Application	Comments
2020		EAP TTE	Conditional Certificate	EAP Submitted June / July 2020
2021		EAP TTE Nov. 18, 2021	Regular Certificate Expires 10/26/26	EAP TTE required each year due to 2/3 SDF Rule (see Regulations)
2022	1/6/2022	EAP TTE	Regular Certificate Expires 10/26/26	
2023	1/6/2023	EAP TTE Nov. 14, 2023	Regular Certificate Expires 10/26/26	
2024	1/12/2024	EAP TTE	Regular Certificate Expires 10/26/26	
2025	1/15/2025	EAP TTE	Regular Certificate Expires 10/26/26	
2026	EAP Expires: July 31	EAP TTE	Regular Certificate Expires 10/26/26	
2027		EAP TTE		
2028		EAP TTE		
2029		EAP TTE		
2030		EAP TTE		
2031		EAP TTE		
2032	EAP Expires: July 31	EAP TTE		

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