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Big Canoe® POA

LAKE PETIT DAM

Pickens County, Georgia

State ID No. 112-009-00462

NID No. GA00685

Emergency Action Plan

Prepared for:

Big Canoe® Property Owners Association, Inc.
10586 Big Canoe
Jasper, GA 30143
Pickens County

Prepared by:

Geosyntec Consultants, Inc.
835 Georgia Avenue, Suite 500
Chattanooga, TN 37402

Project No: TN8667

Document No. GA220320

December 2022

REVISION LOG

Revision No.	Effective Date	Affected Page Numbers	Description of Revision/Change	Performed By
0	September 1998	All	Original Issue	Jordan, Jones, and Goulding, Inc.
1	April 2007	-	Contact Information Update	Jordan, Jones, and Goulding, Inc.
2	June 2017	-	Contact Information Update; Added Condition C; and Updated Appendices	Geosyntec Consultants, Inc.
3	May 2018	-	Update Condition Identifications; Added (formerly known as Dam Failure Notification of Properties Downstream of Big Canoe) former Table 3	Geosyntec Consultants, Inc.
4	December 2022	All	Complete EAP Revision; Updated inundation mapping	Geosyntec Consultants, Inc.

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1. INTRODUCTION

This Emergency Action Plan (EAP or document) was prepared by Geosyntec Consultants, Inc. (Geosyntec) of Chattanooga, Tennessee on behalf of the Big Canoe® Property Owners Association, Inc. (POA or Owner), Jasper, Georgia in accordance with the Rule for Dam Safety of Georgia (GA) Safe Dams Act of 1978.

The purpose of this EAP is to prescribe procedures to be followed in the event of an emergency associated with the Lake Petit Dam (Dam), which may be caused by an unusually large flood, earthquake, a malfunction (hydraulic or structural) of the spillway, malicious human activity such as sabotage, vandalism, or terrorism, or failure of the Dam.

This document establishes procedures for warning, evacuating, and protecting the public, and to protect property, which would be endangered in the event of a failure of the Dam; as well as taking timely action to notify the appropriate emergency management agency (EMA), law enforcement bodies, and/or governing officials of unusual, potential, or imminent events that might lead to failure of the Dam.

1.1 Ownership Information

Contact information for the Owner, Primary Operator of the Dam, and Dam Owner's Technical Representative is provided in this Section of the EAP. For emergency purposes, refer to the appropriate Notification Flowchart presented in Section 4 of this document.

Owner Information

Owner and Primary Operator: Big Canoe Property Owners Association, Inc.
Address: 10586 Big Canoe, Jasper, Georgia 30143
Daytime Phone #: (706) 268-3346
Emergency Phone #: Refer to the Dam Owner's Representative Emergency Phone.

Dam Owner's Representative

Dam Owner's Representative: Scott Auer
Address: 10586 Big Canoe, Jasper, Georgia 30143
Daytime Phone #: (706) 268-2400
Emergency Phone #: (770) 596-9003

Additional Contacts

Dam Owner's Technical Representative: Wesley MacDonald, P.E. GA, AL, KY, TN, and WA
Address: 835 Georgia Avenue, Suite 500, Chattanooga, Tennessee 37402
Daytime Phone #: (423) 385-2312
Emergency Phone #: (615) 830-5139

1.2 Dam Data Sheet

In this section of the EAP, high-level categorical data with regards to the Dam is provided in the table below (Table 1). For location and descriptions of pertinent dam features refer to the Lake Petit Dam Operations & Maintenance (O&M) Plan (Geosyntec, 2022).

Table 1 – Dam Data

Dam Name:	Lake Petit Dam	
State ID:	No. 112-009-00462	
NID:	GA00685	
Dam Owner/Operator:	Big Canoe POA	
Classification:	Category I	
Purpose of Dam:	Recreation and Water Supply	
Drainage Area:	1.53 square miles	
Height:	126 feet	
Year Constructed:	1972	
Year(s) Modified:	1974, 1976, 1997, 1998, 2008, 2009, and 2022	
Design Engineer/Firm:	Baldwin & Cranston Associates (1971)	
GPS Location:	34.4625 (North)	-84.2903 (West)
County:	Pickens	
Access to Dam:	The Dam is located within the private development owned and operated by Big Canoe Property Owner Associates, Inc., which is a gated, private residential community. The Dam can be accessed from the crest via Wilderness Parkway and from the toe via Wolfscratch Drive.	

1.3 Project Description

The Dam was constructed in 1972 as a zoned earth embankment consisting of a central clayey silt core and predominantly silty sand embankment shells. The Dam was constructed to supply water and provide recreation for the Big Canoe development and is permitted as a Category I Dam under

Chapter 391-3-8 of the GA State Code Rules for Dam Safety. The Dam is owned, operated, and maintained by the Big Canoe POA. The original design drawings for the Dam were prepared by Baldwin & Cranston Associates (Baldwin & Cranston Associates, 1971).

The Dam is located within the Big Canoe development on Petit Creek approximately 5.8 miles upstream of Marble Hill, in Pickens County, north-central Georgia. The reservoir formed by the Dam has a surface area of 107 acres at a normal pool elevation of 1635.5 and extends up Petit Creek approximately 0.7 miles. The revised maximum water storage for the reservoir approved by the Georgia Safe Dams Program (GSDP) is 5,635 acre-feet (ac-ft). Table 1 presents additional dam data. The topography around the Dam consists of very steep, wooded, mountainous foothills.

The dam has a 15-foot-wide concrete cascading channel spillway on the east side of the earth dam's abutment. The spillway discharge is controlled by a concrete crest underneath a bridge located on the roadway (i.e., Wilderness Parkway) running along the crest of the Dam. The Dam has a 36-inch low-level discharge conduit which is the only permanent means of lowering the reservoir level beneath the spillway crest, short of structural excavations or the use of temporary pumps or siphons. The low-level discharge conduit is operated via a lift system used to operate the heavy-duty sluice gate, which is located under the hatch cover of the low-level discharge conduit gate operator vault.

Lake Sconti, owned by Big Canoe, is located approximately 1.0 mile downstream of Lake Petit. Lake Disharoon, owned by Big Canoe, is located approximately 0.1 mile upstream of Lake Sconti. Lake Petit does not directly recharge the reservoir at Lake Disharoon, however, in the event of an inundation, Lake Disharoon is in the inundation area of Lake Petit. Cox Lake Dam is located approximately 3.5 miles downstream from Lake Petit Dam, south of Cove Road, and is not owned or operated by Big Canoe.

1.4 Site and Pertinent Structure Access

Big Canoe has two permanent roadway access points, both of which have a guard shack with gate access: (1) the main entrance off Steve Tate Highway is Wilderness Parkway, which crosses Petit Creek approximately 2.3 miles downstream of Lake Petit Dam, and (2) the secondary (northern) entrance off Steve Tate Highway (also Wilderness Parkway) which crosses over the top of Lake Petit Dam (only staffed during the day). Access to the toe is via Wolfscratch Drive, a connector road that both starts and ends at different portions of Wilderness Parkway. A third access route to Big Canoe is through an unmanned, locked gate at the Big Canoe Golf Maintenance Area. These three (3) connections are the only exit points from Big Canoe to Steve Tate Highway. The use of these evacuation routes will be controlled by the Big Canoe Department of Public Safety to prevent the endangerment of evacuees in case of an imminent failure. To assist with access to the Dam, directions from Downtown Atlanta, Georgia to the Dam were sourced from Google Maps (Google, 2021) and are presented in Appendix A – Directions from Atlanta GA, to the Dam.

For emergency conditions that require the operation of the low-level discharge conduit, the gate operator vault for the low-level discharge conduit is located on the upstream face, near the center of the Dam at Station (STA) 4+70. This is just north of the present-day flagpole. A 30-inch (in.) x 30-in. heavy-duty sluice gate (inlet) was designed (Baldwin & Cranston, 1971) to be mounted on the low-level inlet structure that connects the low-level discharge conduit to the reservoir. The

low-level discharge conduit, and associated structures, are the only permanent means of lowering the reservoir level beneath a few feet below the sill of the spillway, short of structural excavations or the use of temporary pumps or siphons. The lift used to operate the heavy-duty sluice gate is located under the hatch cover of the low-level discharge conduit gate operator vault. The handle to operate the low-level discharge conduit lift is not kept on the structure. For access to the handle, please contact the Dam Owner's Representative. An alternative handle may be located on a similar lift on the intake structure of Lake Disharoon Dam. Descriptions and locations of all other pertinent Dam features are discussed and presented in the O&M Plan (Geosyntec, 2022).

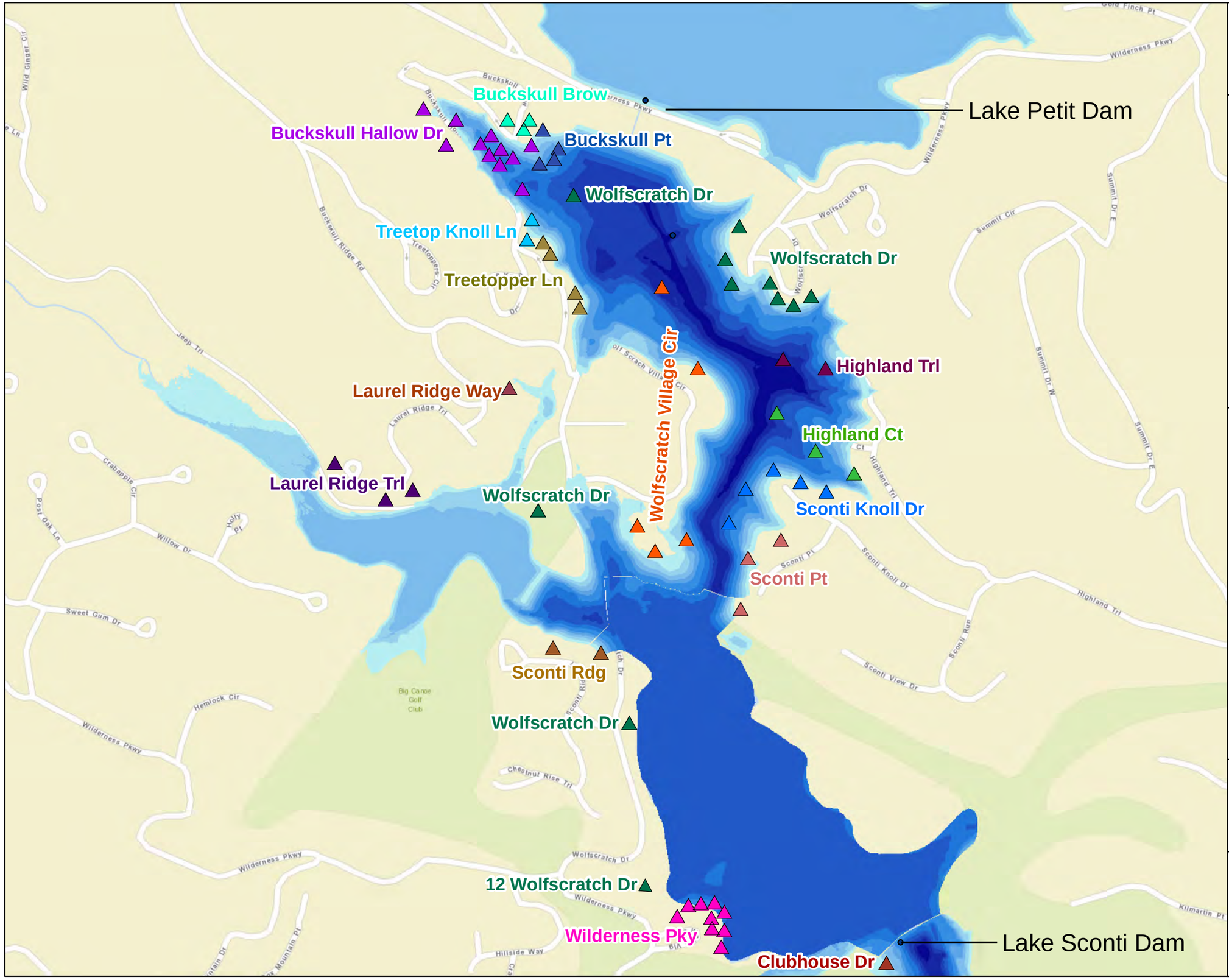
1.5 Document History

The EAP for the Dam was originally created and revised by Jordan, Jones, and Goulding, Inc. in 1998 and 2007, respectively. Geosyntec revised the EAP in 2017 and 2018 based on guidance from the GSDP Document Engineer Guidelines (Georgia Environmental Protection Division, 2015), and templates referred to in Engineer Guidelines created by the North Carolina Department of Environmental Quality and the Association of State Dam Safety Officials. A summary of known dates of revision of this EAP is provided in the Revision Log where future revisions and modifications to the EAP should be documented. Concurrences, Records of Holders of Control Copies, documentation from EAP reviews, and periodic tests of this EAP should be documented in the forms provided in Appendix B.

Geosyntec revised this EAP based on guidance from the GSDP template Emergency Action Plan Template (Georgia Environmental Protection Division, 2021); as well as guidelines prepared by the Federal Emergency Management Agency (FEMA) titled Federal Guidelines for Dam Safety (Federal Emergency Management Agency, 2013). The inundation mapping and calculations provided in Appendix C – Inundation Mapping were prepared in 2022 with more recent survey data, updated lake volume, and the updated requirements from the Engineer Guidelines (GA EPD, 2015). The property structures and addresses for properties downstream of the Dam were provided by the Pickens County EMA. Updated evacuation maps were prepared using the inundation calculations from the Inundation Mapping analysis. The evacuation maps are split into a series of five figures to display the inundated structures in the area downstream and clearly identify respective roads for locating structures during an evacuation: (i) Figure 1 – Evacuation Map Upstream of Lake Sconti; (ii) Figure 2 – Evacuation Map Downstream of Lake Sconti; (iii) Figure 3 – Evacuation Map Downstream of Wilderness Parkway; (iv) Figure 4 – Evacuation Map Downstream of Cove Road; and (v) Figure 5 – Evacuation Map Downstream of McArthur Road.

A list of terms frequently used when discussing dam-related topics and features are presented in Appendix D – Definitions.

Figure 1 - Lake Petit Dam Evacuation Map Upstream of Lake Sconti



LOCATION MAP

LEGEND

- △ Inundated Structures
- ● Inundated Bridge/Dam

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

NOTE: The list of inundated structure were provided by Pickens County and included structures within a 100 ft buffer outside of the extent of the mapped inundation zone.

See Table 4 of EAP for list of complete Street Addresses.

The method used to develop inundation zones are approximate. Actual areas inundated will depend on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

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08-Dec-2022

Feet
0 250 500 1,000

Meters
0 75 150 300

Figure 2 - Lake Petit Dam Evacuation Map Downstream of Lake Sconti

Wilderness Pky

Clubhouse Dr

Lake Sconti Dam

Choctaw Pass

Isuba Trl

Golf Course Road

OSI Way

Sinti Trl

Nashoba Trl

Steve Tate Rd

Twin Creeks Dr

Shetland Trce

Wilderness Parkway

Hunters Trce

LOCATION MAP

LEGEND

- △ Inundated Structures
- ● Inundated Bridge/Dam

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

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07-Oct-2022

Feet

0 250 500 1,000

Meters

0 75 150 300

N

Figure 3 - Lake Petit Dam Evacuation Map Downstream of Wilderness Parkway

Shetland Trce

Wilderness Parkway

Hunters Trce

Trotters Ln

Trotters Ln

Blackwell Creek Way

Cove Road

Cove Lake Dr

LOCATION MAP

LEGEND

- Inundated Structures
- Inundated Bridge/Dam

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

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07-Oct-2022

Feet

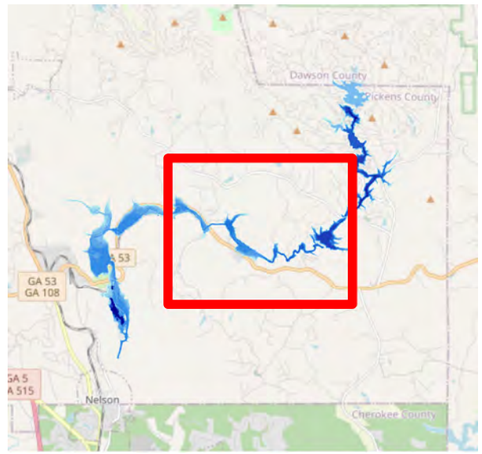
0 250 500 1,000

Meters

0 75 150 300

Figure 4 - Lake Petit Dam Evacuation Map Downstream of Cove Road

LOCATION MAP



LEGEND

- Inundated Structures
- Inundated Bridge/Dam

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

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07-Oct-2022

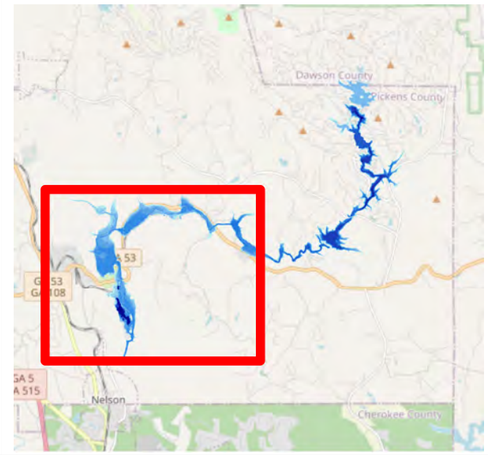
Feet
0 750 1,500 3,000

Meters
0 250 500 1,000

Old Harbin Rd
Limestone Ln
Highway 53 E
Highway 53 E
Pulltight Rd
Highway 53 E
Marble Hill Church Rd
Highway 53 E
Harrington Rd
State Route 53 (Near Harrington Road)
Imery's Entrance Drive
McArthur Road
E Branch Ln
E Branch Rd
Marblehead Ln
Mcarthur Rd
Highway 53 E
Old Mill White Road (Downstream)
Old Mill White Rd
Justice Way
Dell Moore Rd
Old Mill White Rd
Old Mill White Road (Upstream)
Trotters Ln
Cove Road
Cove Lake Dr
Cameron Ct
Timber Creek
Lake Cox Dam
Pendley Woods Road
Cove Rd
Marble City Rd
Marble Hill Church Rd
Old Mill White Rd Ext
Mountain Oak Rd
Holly Hill Rd
Station Camp Creek Rd
Amicalola Ln
Hawk Nest Cir
Morgan Walk
Yearling Ln
Hunters Trce
Red Coat Pass
Harrington Rd
Andiron Way
Farmhouse Rd
Harrington Rd
Lee Ct
Duckett Ln
Clint Ct
Sparkling Springs Rd
Pea Ridge Rd
Splitrock Ln
Four Mile Church Rd
Wilkie Rd
McCoy Ln
Cloudland Dr
Pendley Woods Rd
Timber Creek Dr
Chastain Cir
Dell Moore Rd
McKenzie Ln
Alyson Way
GA-53 E
53

Figure 5 - Lake Petit Dam Evacuation Map Downstream of McArthur Road

LOCATION MAP



LEGEND

- Inundated Structures
- Inundated Bridge/Dam

Maximum Depth (feet)

- < 5
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- 40 - 50
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NOTE: The list of inundated structure were provided by Pickens County and included structures within a 100 ft buffer outside of the extent of the mapped inundation zone.

See Table 4 of EAP for list of complete Street Addresses.

The method used to develop inundation zones are approximate. Actual areas inundated will depend on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

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07-Oct-2022

Feet

0 750 1,500 3,000

Meters

0 250 500 1,000

State Route 53 (Near Sandy Bottom Road)

Old Harbin Rd

Limestone Ln

Highway 53 E

Highway 53 E

Highway 53 E

Pulltight Rd

Highway 53 E

McArthur Road

E Branch Ln

E Branch Rd

Marblehead Ln

Marble Hill Church Rd

Mcarthur Rd

Highway 53 E

Harrington Rd

Highway 53 E

Sandy Bottom Rd

Imery's Entrance Drive

Sandy Bottom Rd E

Sandy Bottom Rd

Marbleblock Dr

Highway 53 E

State Route 53 (Near Marbleblock Lane)

Georgia Marble Ln

Long Swamp Creek

Tate

Andiron Way

Harrington Rd

Fourmile Creek

2. SUMMARY OF EAP PROCESS

In the state of Georgia, dam owners and operators shall develop, and submit to GSDP an EAP for each Category I dam owned. The EAP contains actions designed to prevent a failure to dam structures or to minimize the impact of a dam failure on life and property. It establishes and documents procedures for notifying state and local EMA, law enforcement bodies, and downstream residents affected by a dam failure.

2.1 Summary of the EAP Process

There are four steps that must be followed anytime an unusual or emergency event is detected at the Dam. The steps are described in the following sections. An EAP Process Overview Flowchart outlining the following steps is provided in Figure 6 – EAP Process Overview Flowchart. The forms that should be used to document unusual or emergency events are provided in Appendix E (E-1:Contact Checklist; E-2: Condition B (Level 2) or C (Level 3) Event Log; and E-3: Dam Emergency Situation Report forms).

Step 1 – Event Detection, and Emergency Level Determination and Index

During the initial step, an unusual event or emergency event is detected at the Dam and classified by the Dam Owner's Representative or designee. The Emergency Classifications are presented briefly subsequently and discussed in further detail in Section 3.1 of this document.

- Condition A (Level 1), GREEN: Unusual Event, slowly developing
- Condition B (Level 2), YELLOW: Emergency Event, potential dam failure situation, rapidly developing
- Condition C (Level 3), RED: Urgent! Emergency Event, Dam failure imminent or is in progress

Step 2 – Notification and Communication

After the event level has been determined, notifications are made in accordance with the appropriate Notification Flowchart provided in Section 4 of this document.

Step 3 – Remedial Actions

After the initial notifications are made, the EAP Coordinator should confer with the Dam Owner's Technical Representative, Dam Owner's Representative, and the GSDP to develop and execute appropriate preventative actions. During this step of the EAP, there is a continuous process of taking actions, assessing the status of the situation, and keeping others informed through the communication channels established during the initial notifications. The EAP may go through multiple event levels during Steps 2 and 3 as the situation either improves or worsens.

Step 4 – Termination and Follow-up

Once the event has ended or been resolved, termination and follow-up procedures should be followed as outlined in Section 6 of this document. EAP operations can only be terminated after completing operations under Condition C (Level 3) or A (Level 1). If Condition B (Level 2) is declared, the operations must be reclassified to Condition A (Level 1) or C (Level 3) before terminating the EAP operations.

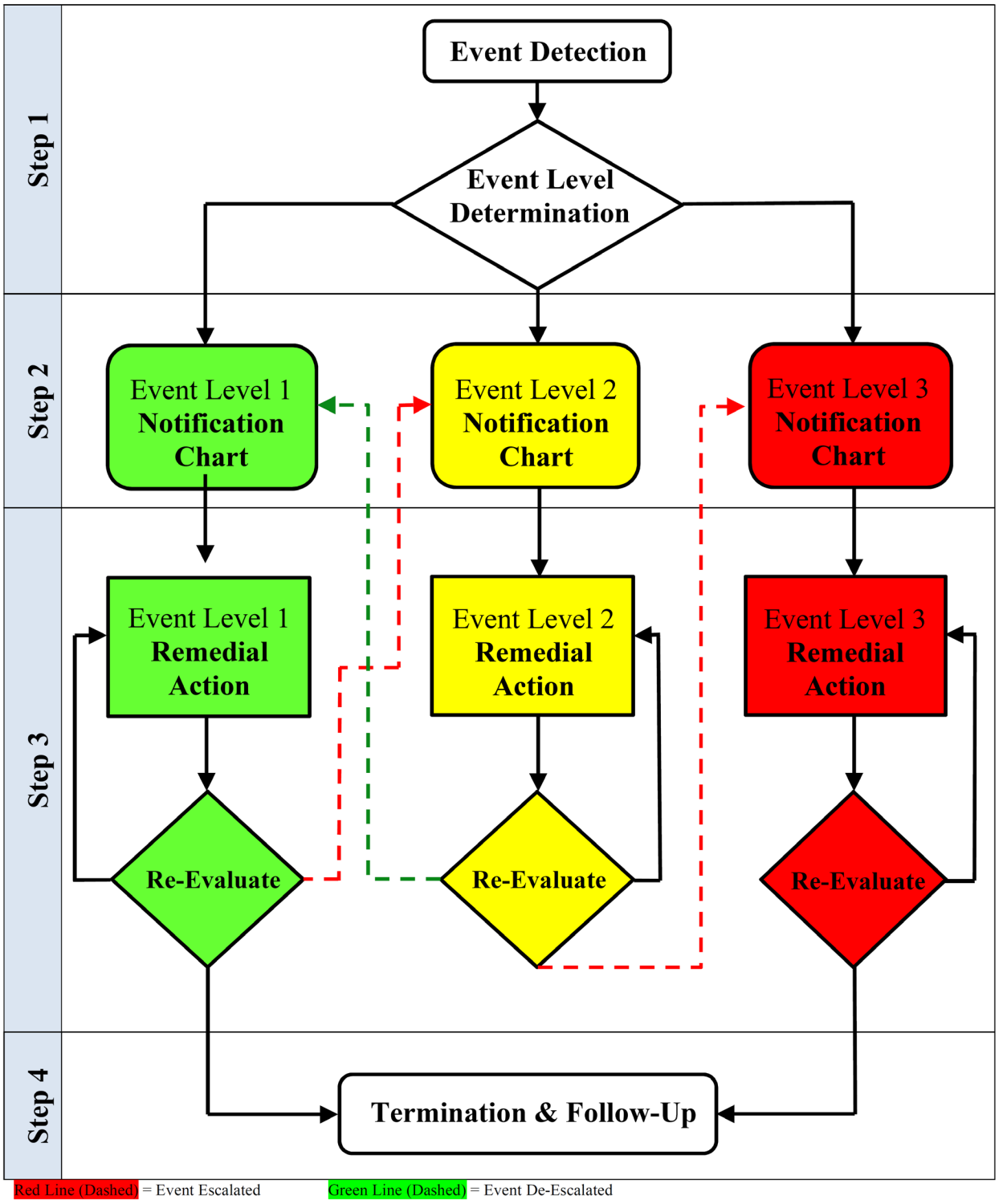

Figure 6 – EAP Process Overview Flowchart

3. STEP 1 – EMERGENCY LEVEL DETERMINATION AND INDEX

3.1 Emergency Classification

Dam Failure Emergencies will be classified according to their severity and urgency. For the purposes of this EAP, three emergency classifications are provided. Conditions A, B, and C are consistent with other Big Canoe action plans, while Levels 1, 2, and 3 are consistent with GSDP. To assist the Dam Owner's Representative with the determination of the emergency classification, events and the dam failure mechanism derived from the events are presented in Table 2 – Emergency Level Determination and Emergency Level Index of this document.

To assist the EMA in selecting their appropriate course of action and to provide a proper transition from Condition A (Level 1) to Condition B (Level 2) or Condition B (Level 2) to Condition C (Level 3) the Big Canoe Public Safety Director will clearly communicate the situation to the EMA. For Conditions C (Level 3) and B (Level 2) situations, the Big Canoe Public Safety Director will place the first series of notifications on initial alert, and provide periodic updates on the situation as it develops so that the EMA can assess when they should implement their evacuation procedures. For example, the Dam Owner's Representative will issue an initial warning and periodic updates on the lake level as it rises during flooding conditions and eventually overtops the Dam. As the lake rises, a "potential failure situation is developing" warning should be issued with periodic updates on how much time is available before overtopping occurs. Once the Dam overtops, a "failure is imminent or has occurred" warning should be issued, as suggested in Section 4.3.2 of this document.

3.1.1 Condition A (Level 1) – Unusual Event

This is a condition where a situation is developing but has not yet threatened the operation or the structural integrity of the Dam. The Dam Owner's Technical Representative, and if applicable, GSDP should be contacted to investigate the situation and recommend remedial actions. The condition of the Dam should be closely monitored, especially during storm events, to detect any development of a potential or imminent dam failure situation. The Dam Owner's Representative will assess the situation and determine a path forward approach. Warnings shall not be issued unless the situation develops into a Condition B (Level 2) situation.

3.1.2 Condition B (Level 2) – Potential Failure Event

This is a condition where a failure may eventually occur, but preplanned actions taken during certain events (such as major floods, earthquakes, evidence of piping, etc.) may alleviate dam failure. Generally, for Condition B (Level 2) there is more time available than in a Condition C (Level 3) to issue warnings and/or take preparedness actions. Even if failure is inevitable, for a Condition B (Level 2) Event there should be a reasonable amount of time available for analysis before deciding on the evacuation of downstream residents. Preplanned actions will be initiated once a Condition B (Level 2) Emergency has been declared and the initial notifications have been completed. The preplanned actions that should be undertaken are shown in Section 5 of this document (Step 3 – Remedial Actions).

If time permits, the Dam Owner's Technical Representative, and if applicable GSDP, should be contacted to investigate the situation and recommend additional remedial actions after preplanned

actions were implemented to prevent the progression of the Dam's condition to Condition C (Level 3).

When a dam safety condition is observed that may lead to a failure if left unattended, but there is no immediate danger, the Dam Owner's Representative will issue a warning that a "potential failure situation is developing". The Dam Owner's Representative will assess the situation and determine the urgency of the emergency situation. Based on the Dam Owner's Representative's assessment, the first series of notifications should be made, and it is up to the EMA officials to determine the subsequent course of action to follow.

3.1.3 Condition C (Level 3) – Imminent Failure Event

This is an urgent condition where a failure either has occurred, is occurring, or is about to occur and likely cannot be prevented. Modeling of multiple failure and breach scenarios was not completed as part of his work, and each failure and breach scenario may be different. Therefore, once the Dam Owner's Representative determines that there is no longer time available to implement preplanned actions to prevent dam failure, the "failure is imminent or has occurred" warning, as suggested in Section 4.3, should be issued. EMA officials shall interpret the phrase "failure is imminent" to mean that the dam is failing and order an evacuation of residents in potential inundation areas. For evacuation purposes, "failure is imminent" and "failure has occurred" shall be interpreted as the same condition.

3.2 Event Detection and Level Index

Routine surveillance, observation, and/or instrumentation readings at the site will be the normal methods of detecting potential emergency situations. Unusual or emergency events may be detected by:

- Observations at or near the dam, including reservoir level;
- Evaluation of instrumentation data;
- Earthquakes felt or reported in the vicinity of the Dam; and
- Forewarning of conditions that may cause an unusual event or emergency event at the dam (e.g., a severe weather or flash flood forecast).

Table 2 – Emergency Level Determination and Emergency Level Index

Event	Dam Failure Mechanism	Evaluation of Failure	Condition (Level)[1]
Unexpected Failure	• Unknown	Dam unexpectedly and without warning begins to fail	Condition C (Level 3)
Major Flood/ Embankment Overtopping	• Overtopping of dam	Erosion and removal of the road and embankment occurring	Condition C (Level 3)
		Flood pool rapidly approaching top of dam and embankment still intact	Condition B (Level 2)
Global Earthquake or Seismic Activity	• Settlement of dam crest • Slope movement • Evidence of seepage or piping • Damage to dam appurtenances	Settlement of more than a few inches	Condition C (Level 3)
		Slope movement larger than the size of a car	
		Flowing water from downstream face of dam	
		Settlement of less than a few inches	Condition B (Level 2)
		Slope movement of less than the size of a car	
		Wet areas on downstream face of dam that continue to increase in size and intensity of flow	
		Measurable earthquake felt or reported near the dam and dam appears to be stable.	Condition A (Level 1)
Embankment Movement	• Settlement of dam crest • Slope movement	Settlement of more than a few inches	Condition C (Level 3)
		Slope movement larger than the size of a car	
		Settlement of less than a few inches	Condition B (Level 2)
		Slope movement of less than the size of a car	
		New cracks in the embankment greater than 1/4-inch wide without seepage	Condition A (Level 1)
Embankment Seepage	• Evidence of seepage or piping	Seepage with a notable increase in flow (minimum a 25 % increase) and cloudiness from either weir on Bench No. 1, or the internal toe drains	Condition C (Level 3)
		Wet areas with cloudy discharge on downstream face of dam that continue to increase in size and intensity of flow	Condition B (Level 2)
		New seepage areas in or near the dam, water flowing clear	Condition A (Level 1)
Spillway Flow	• Spillway overflow • Spillway erosion	Spillway overflowing with an advancing head cut that is threatening the control section or that is already flooding people downstream	Condition C (Level 3)
		Spillway overflowing with active gully erosion	Condition B (Level 2)
		Spillway overflowing with no active erosion	Condition A (Level 1)
		Normal flow with erosion under, beneath, or at edges of the spillway	Condition A (Level 1)

Table 2 – Emergency Level Determination and Emergency Level Index (Continued)

Event	Dam Failure Mechanism	Evaluation of Failure	Condition (Level)[1]
Sinkholes	• Observed sinkhole	Rapidly enlarging sinkhole on dam or appurtenances	Condition C (Level 3)
		Observation of new sinkhole in reservoir area or on embankment	Condition B (Level 2)
		Observation of sinkhole downgradient of the dam	Condition A (Level 1)
Routine Instrument. Readings	• Significant change in piezometer readings • Rapid decrease in lake level	Increase in piezometer readings of more than 10 feet and flowing water from downstream face of dam	Condition C (Level 3)
		Rapid decrease in lake level and flowing water from downstream face of dam	
		Increase in piezometer readings of more than 10 feet and no flowing water from downstream face of dam	Condition B (Level 2)
		Rapid decrease in lake level with no apparent reason and no flowing water from downstream face of dam	
		Piezometer readings vary beyond predetermined values and no flowing water from downstream face of dam	Condition A (Level 1)
Security Threat	• Bomb threat	Detonated bomb that has results in damage to the dam or appurtenances	Condition C (Level 3)
		Verified bomb threat that, if carried out, could result in damage to the dam or appurtenances with no impacts to the functioning of the dam	Condition B (Level 2)
		Reported bomb threat, unverified	Condition A (Level 1
Sabotage/ Vandalism	• Damage to dam or appurtenances	Damage or modification to the dam or appurtenances with no impacts to the function of the dam	Condition A (Level 1)
		Damage to dam or appurtenances that has resulted in seepage flow	Condition B (Level 2)
		Damage to dam or appurtenances that has resulted in uncontrolled water release	Condition C (Level 3)
Blocked culverts	• Blockage	Debris is blocking a spillway pipe, causing lake level to rise	Condition C (Level 3)

Note: (1) Conditions A, B, and C are consistent with other Big Canoe action plans while Levels 1, 2, and 3 are consistent with Georgia Department of Natural Resources (GA DNR) Safe Dams Program. For clarity, both nomenclatures are provided

4. STEP 2 – NOTIFICATIONS AND COMMUNICATIONS

After the appropriate Emergency Level has been determined by the Dam Owner's Representative or designee, the appropriate contacts listed in the Notification Flowcharts in this section of the document should be contacted and notified immediately.

4.1 Notification Flowchart

The Notification Flowcharts (Figures 7 and 8) summarize the following information which is applicable during an impending or imminent failure of the Dam:

- Who is responsible for notifying Big Canoe or the Dam Owner Representative and/or EMA officials;
- Who is to be notified; and
- What is the priority order in which individuals are to be notified.

All residents and employees of Big Canoe can and should be observers of unusual events at the Dam. This observer group will be educated through the local newsletter regarding what are symptoms of impending or imminent failure, and who at the POA should be contacted to initiate the Notification Process.

The Dam Owner's Representative or his/her designee is responsible for initiating the Notification Process. The Dam Owner's Representative or his designee will verify the condition of Lake Petit Dam which the observer has identified and initiate the notification. The Dam Failure Notification Flow Charts and Tables (Figures 7 and 8, and Table 3) identify the critical structures, EMA, government agencies, and Big Canoe Property Owners Association employees that should be contacted immediately and in what order. Subsequent contacts by each of these individuals are shown in priority order.

The inundated structures and addresses downstream of the Dam in the inundated areas were provided by the Pickens County EMA and are presented in Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam. The addresses were identified by Pickens County EMA based on the inundation zone determined in the Inundation Calculation presented in Appendix C plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

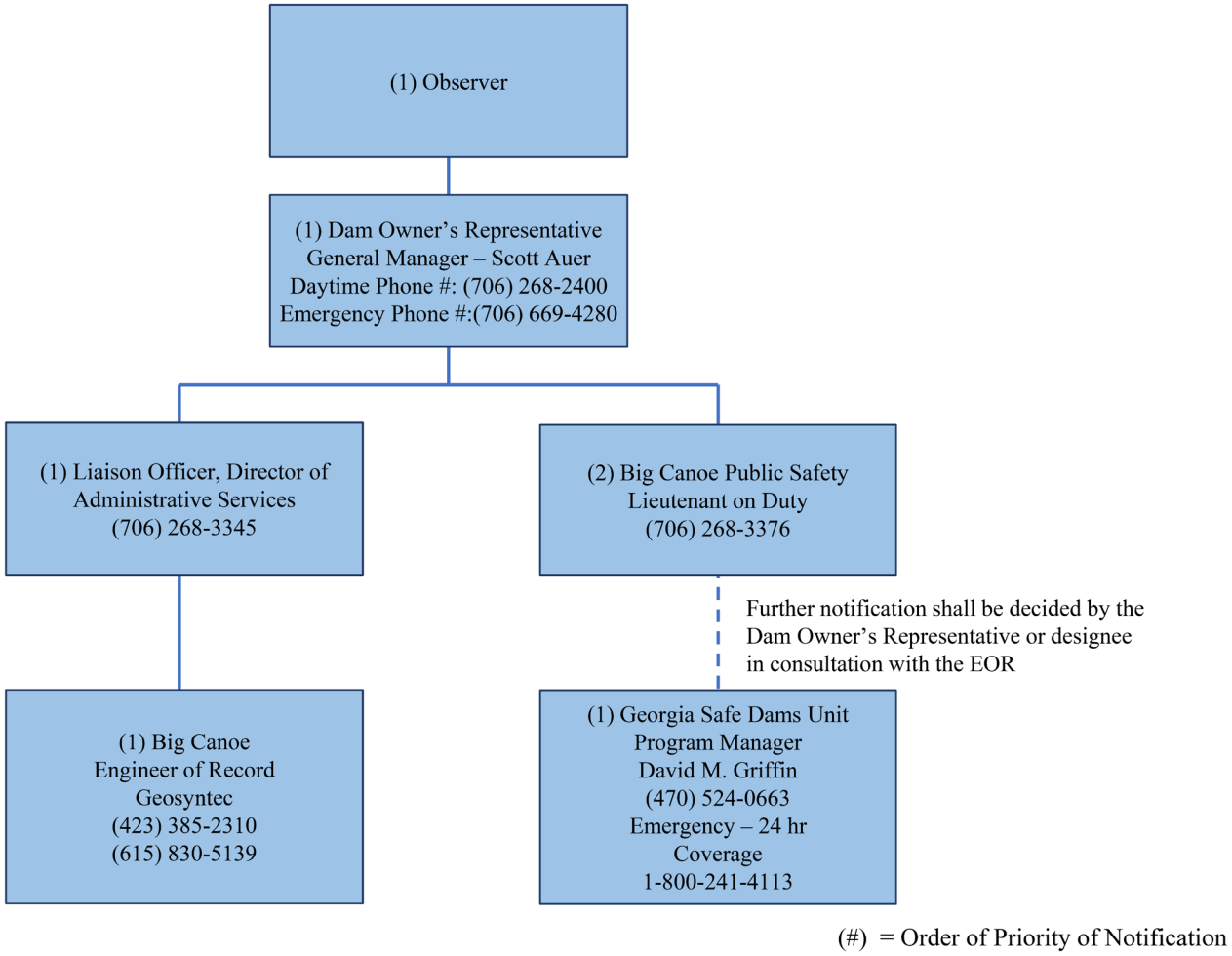

Figure 7 – Dam Failure Notification Flowchart for Condition A (Level 1) Emergencies

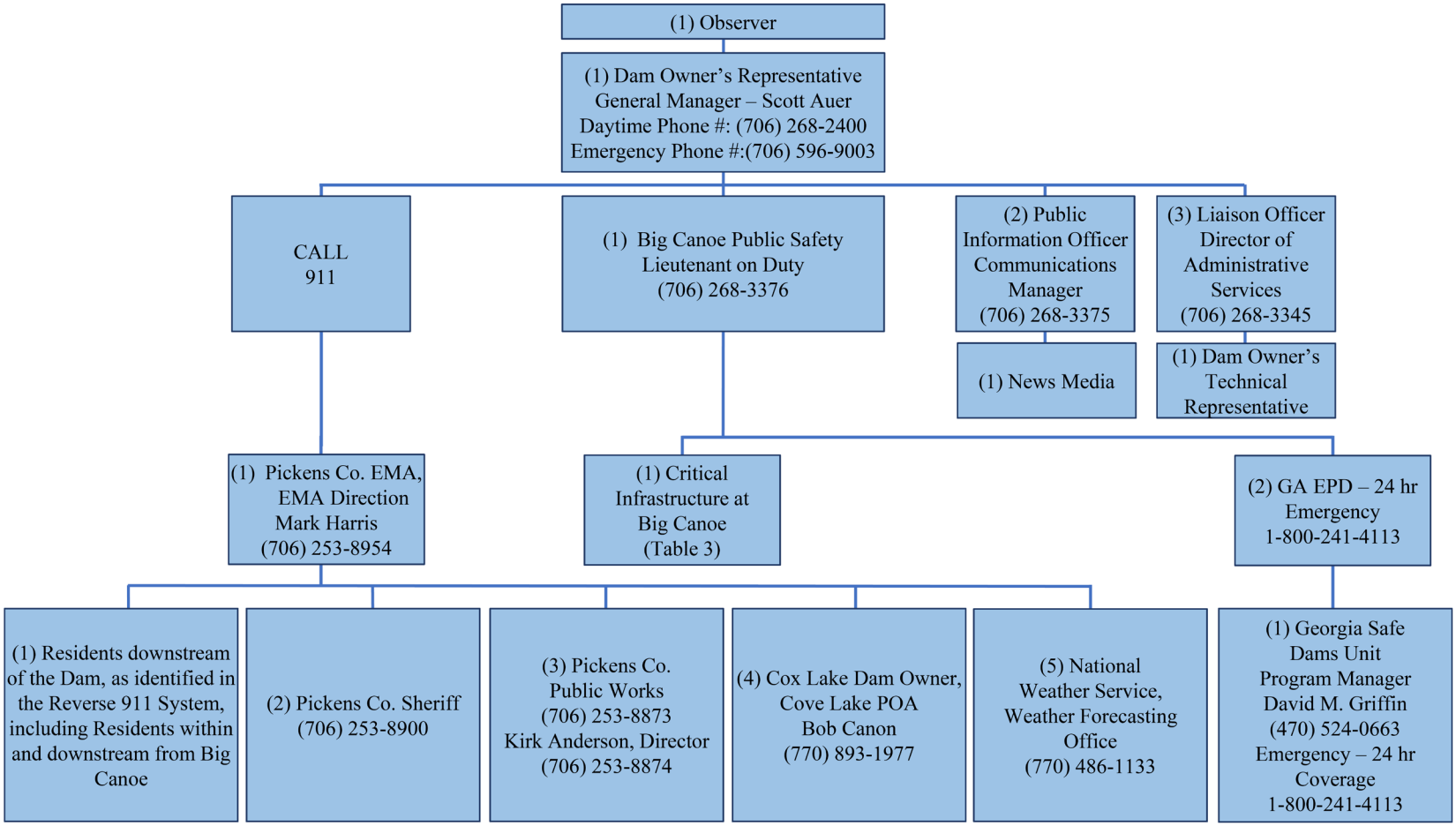

Figure 8: Dam Failure Notification Flowchart for Conditions B (Level 2) & C (Level 3) Emergencies

Table 3 – Dam Failure Notification of Big Canoe Critical Infrastructure Downstream of Dam

Facility	Big Canoe Street	Phone Number
Utilities Office	Highland Trail/Wolfscratch Drive	(706) 268-3400
Beach Club	Wolfscratch Drive	(706) 268-3317
Wellness Center	Wolfscratch Drive	(706) 268-3441
POA Lodge	Wolfscratch Drive	(706) 268-3346
Chapel	Wolfscratch Circle	(706) 268-3203
Racquet Club	Wolfscratch Circle	(706) 268-3367
Package Porch	Wolfscratch Circle	(706) 268-3376
Lakewatch Village	Wilderness Parkway	(706) 268-3376
Clubhouse	Clubhouse Drive	(706) 268-1253
Fire Station #3	Wolfscratch Drive	(706) 268-1792
Duffers	Clubhouse Drive	(706) 268-3273
Golf Shop	Clubhouse Drive	(706) 268-3323
Cart Barn	Clubhouse Drive	(706) 268-3323

Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam

Street Number	Street Name
255	Blackwell Creek Way
270	Blackwell Creek Way
295	Blackwell Creek Way
10	Buckskull Brow
11	Buckskull Brow
26	Buckskull Brow
11	Buckskull Hollow Dr
32	Buckskull Hollow Dr
41	Buckskull Hollow Dr
57	Buckskull Hollow Dr
75	Buckskull Hollow Dr
202	Buckskull Hollow Dr
229	Buckskull Hollow Dr
242	Buckskull Hollow Dr
293	Buckskull Hollow Dr
301	Buckskull Hollow Dr
309	Buckskull Hollow Dr
22	Buckskull Pt
26	Buckskull Pt
28	Buckskull Pt
30	Buckskull Pt
400	Cameron Ct
315	Choctaw Pass
333	Choctaw Pass
298	Clubhouse Dr
391	Cove Lake Dr
833	Cove Lake Dr
835	Cove Lake Dr
475	Dell Moore Rd
14	E Branch Ln
30	E Branch Ln
80	E Branch Rd

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam (Continued)

Street Number	Street Name
200	Georgia Marble Ln
9	Harrington Rd
15	Highland Ct
57	Highland Ct
110	Highland Ct
38	Highland Trl
84	Highland Trl
6361	Highway 53 E
8100	Highway 53 E
8200	Highway 53 E
8817	Highway 53 E
8839	Highway 53 E
9037	Highway 53 E
9077	Highway 53 E
9399	Highway 53 E
9502	Highway 53 E
9679	Highway 53 E
10322	Highway 53 E
61	Hunters Trce
100	Hunters Trce
11	Isuba Trl
30	Justice Way
261	Laurel Ridge Trl
279	Laurel Ridge Trl
327	Laurel Ridge Trl
17	Laurel Ridge Way
34	Limestone Ln
414	Marble Hill Church Rd
66	Marbleblock Dr
482	Marblehead Ln
393	Mcarthur Rd
427	Mcarthur Rd

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam (Continued)

Street Number	Street Name
52	Nashoba Trl
154	Old Harbin Rd
280	Old Harbin Rd
356	Old Harbin Rd
454	Old Harbin Rd
1543	Old Mill White Rd
1985	Old Mill White Rd
2192	Old Mill White Rd
42	Osi Way
43	Osi Way
48	Osi Way
112	Overlook Ct
25	Pulltight Rd
1138	Sandy Bottom Rd
1511	Sandy Bottom Rd
1150	Sandy Bottom Rd E
186	Sconti Knoll Dr
191	Sconti Knoll Dr
193	Sconti Knoll Dr
196	Sconti Knoll Dr
200	Sconti Knoll Dr
60	Sconti Pt
86	Sconti Pt
111	Sconti Pt
48	Sconti Rdg
86	Sconti Rdg
10	Shetland Trce
126	Sinti Trl
140	Sinti Trl
180	Sinti Trl
204	Sinti Trl
220	Sinti Trl

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam (Continued)

Street Number	Street Name
250	Sinti Trl
2191	Steve Tate Rd
2193	Steve Tate Rd
2195	Steve Tate Rd
189	Timber Creek Dr
35	Treetop Knoll Dr
95	Treetop Knoll Dr
40	Treetop Ln
52	Treetopper Ln
92	Treetopper Ln
104	Treetopper Ln
87	Trotters Ln
125	Trotters Ln
101	Twin Creeks Dr
104	Twin Creeks Dr
112	Twin Creeks Dr
115	Twin Creeks Dr
131	Twin Creeks Dr
151	Twin Creeks Dr
165	Twin Creeks Dr
185	Twin Creeks Dr
194	Twin Creeks Dr
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
1944	Wilderness Pky
244	Wolfscratch Dr

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

Table 4 – Dam Failure Notification of Inundated Structures Downstream of Lake Petit Dam (Continued)

Street Number	Street Name
461	Wolfscratch Dr
800	Wolfscratch Dr
1125	Wolfscratch Dr
1127	Wolfscratch Dr
1136	Wolfscratch Dr
1136	Wolfscratch Dr
1136	Wolfscratch Dr
1136	Wolfscratch Dr
1175	Wolfscratch Dr
12	Wolfscratch Dr*
50	Wolfscratch Village Cir
84	Wolfscratch Village Cir
100	Wolfscratch Village Cir
226	Wolfscratch Village Cir
350	Wolfscratch Village Cir

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.
*12 Wolfscratch Drive was not provided by Pickens County EMA, however was added due to its importance for the Dam Owner's response during an emergency.

4.2 Communication – Emergency Condition A (Level 1)

For a Condition A (Level 1) emergency, the Dam Owner's Representative or designee, is responsible for contacting the Public Safety Director at Big Canoe and the Liaison Officer, Director of Administrative Services.

The Liaison Officer, Director of Administrative Services is responsible for contacting the Dam Owner's Technical Representative. The Public Safety Director at Big Canoe is responsible for contacting the GSDP, if required by the Dam Owner's Representative.

Note that a warning message shall not be issued for a Condition A (Level 1) emergency.

4.3 Communication – Emergency Condition B (Level 2) and C (Level 3)

For a Condition B (Level 2) or Condition C (Level 3) emergency, the Dam Owner's Representative or designee, is responsible for contacting the Public Safety Director at Big Canoe, the Public Information Officer Communications Manager, and the Liaison Officer, Director of Administrative Services.

The Public Safety Director at Big Canoe is responsible for notifying Pickens County EMA, Critical Infrastructure at Big Canoe, Dawson County 911 Services, and the GA EPD 24-Hour Emergency Contact in the event of an emergency. If time allows, they should seek advice and assistance.

The Public Information Officer, Communications Manager is responsible for notifying the News Media (including radio and television media). The Liaison Officer, Director of Administrative Services is responsible for notifying Dam Owner's Technical Representative.

The Pickens County EMA is responsible for notification of the residents below the Dam as identified in the Reverse 911 System, including: (i) Big Canoe residents and residents downstream from Big Canoe; (ii) Pickens County Sheriff's Department; (iii) Pickens County Public Works; (iv) the Cox Lake Dam Owner (Cove Lake Property Owner's Association, Inc.); and the (v) National Weather Service Weather Forecasting Office.

The GA EPD 24 Hour Emergency Contact is responsible for notification of the GSDP.

4.3.1 Emergency Condition B (Level 2) Warning Message

All warning messages for an Emergency Condition B (Level 2) should be brief and to the point. The following message may be used to help describe the emergency situation to the emergency management personnel:

> *"This is **(Big Canoe Public Safety Director or Lieutenant on Duty)**. We have an emergency condition at Lake Petit Dam, located about 5.7 miles upstream of Marble Hill in Pickens County, Georgia. We have activated the Emergency Action Plan for this dam and are currently under Emergency Condition B (Level 2). We are implementing predetermined actions to respond to a rapidly developing situation that could result in dam failure. Please prepare to evacuate the areas downstream of the Dam based on the inundation mapping. Reference the evacuation map in your copy of the Emergency Action Plan. We will advise you when the situation is resolved or if the situation gets worse.*
>
> *I can be contacted at the following number **(Big Canoe Public Safety Director's or Lieutenant's on Duty phone number to be contacted)**. If you cannot reach me, please call the following alternative telephone number **(Big Canoe Public Safety Director's or Lieutenant's on Duty alternative phone number to be contacted at)**."*

4.3.2 Emergency Condition C (Level 3) Warning Message

All warning messages for an Emergency Condition C (Level 3) should be brief and to the point. The EMA should be contacted immediately and the area evacuated. The following actions should be taken:

- Call 911. Be sure to say, "*This is an emergency.*" They will call other authorities and begin the evacuation. The following message may be used to help describe the emergency situation to the Pickens County Sheriff's Department, or Pickens County EMA:

  "This is an emergency. This is **(Big Canoe Public Safety Director or Lieutenant on Duty**). Lake Petit Dam, located about 5.7 miles upstream of Marble Hill in Pickens County, Georgia is failing. The downstream area must be evacuated immediately based on the inundation mapping. Repeat, Lake Petit Dam, is failing; evacuate the downstream

area. We have activated the Emergency Action Plan for this dam and are currently under Emergency Condition C (Level 3). Reference the evacuation map in your copy of the Emergency Action Plan.

I can be contacted at the following number (Big Canoe Public Safety Director's or Lieutenant's on Duty phone number to be contacted). If you cannot reach me, please call the following alternative telephone number (Big Canoe Public Safety Director's or Lieutenant's on Duty alternative phone number to be contacted at)."

- Do whatever is necessary to bring anyone in immediate danger (anyone on the Dam, downstream from the Dam, boating on the reservoir, or evacuees) to safety if directed by the EMA.
- Keep in frequent contact with the EMA and emergency services to keep them up to date on the condition of the Dam.
- If all means of communication are lost: (1) try to find out why, (2) try to get to another radio or telephone that works, or (3) get someone else to try to re-establish communications. If these means fail, handle the immediate problems that can be resolved, and periodically try to re-establish contact with the local police department and emergency services.

The following pre-scripted message may be used as a guide for the local law enforcement or the emergency services personnel to communicate the status of the emergency with the public:

"Attention: This is an emergency message from the Pickens County Emergency Management Agency. Listen carefully. Your life may depend on immediate action. Lake Petit Dam, located 5.7 miles upstream of Marble Hill, is failing. The downstream area must be evacuated immediately. Repeat, Lake Petit Dam, is failing. If you are in or near this area, proceed immediately to high ground away from the flood wave. Do not travel on Wilderness Parkway or Wolfscratch Drive in Big Canoe, on State Route 53 or along other streams or roads crossing East Branch Long Swamp Creek. Additionally, Cove Road one mile west of Steve Tate Road may be impassible. Do not return to your home to recover your possessions. You cannot outrun or drive away from the flood wave. Proceed immediately to high ground."

Repeat message.

5. STEP 3 – REMEDIAL ACTIONS

After the initial notifications are made, the Dam Owner's Representative or designee should confer with the Dam Owner's Technical Representative, and the GSDP, to develop and execute appropriate preventative actions. Some suggested preplanned actions that should be undertaken are shown in Table 5 – Preplanned Actions for Emergency Condition B (Level 2). Refer to the list of locally available resources that could be used in the event of an emergency in Appendix F – Locally Available Resources. These businesses can supply pumps, power generators, divers for inspections, and materials for a temporary repair, depending on the emergency. Also, the Pickens County EMA has provided a list of equipment that may be available during a dam failure. During this step of the EAP, there is a continuous process of taking actions, assessing the status of the situation, and keeping others informed through communication channels established during the initial notifications. The EAP may go through multiple event levels during Steps 2 and 3 as the situation either improves or worsens.

Table 5 – Preplanned Actions for Emergency Condition B (Level 2)

Event	Impending Dam Failure Mechanism	Preplanned Actions in Priority Order
Major Flood/Embankment Overtopping	Overtopping of the Dam	1) Ensure concrete chute spillway is unblocked, remove any debris.*
		2) Make a reasonable attempt to open the sluice gate on the low-level drain or bring in pumps and discharge outflow to spillway or directly into Petit Creek, to lower level of lake.*
		3) Open the bypass valve on the water supply line to the water treatment plant.*
		4) If lake levels continue to rise dangerously close to top of the dam crest, excavate emergency channel in abutment area adjacent to concrete chute spillway. Also bring in emergency pumps and discharge outflow to spillway or directly into Petit Creek.*
		Do not excavate channel on top of dam, or discharge pump outflow on face of dam
Earthquake or Seismic Activity	Slope Failure	1) Make a reasonable attempt to open the sluice gate on the low-level drain or bring in pumps and discharge outflow to spillway or directly into Petit Creek, to lower level of lake.*
		2) Open the bypass valve on the water supply line to the water treatment plant.*
		3) Monitor piezometer readings daily and plot readings to identify significant changes in readings. Also record lake levels.
		4) Survey elevation along top of dam daily at 50' intervals. Plot elevations of each point to identify significant changes in readings.
		5) Obtain input from Georgia Safe Dams Program and Owner's Engineer as to emergency repairs to be constructed (if any).
Embankment Movement	Slope Failure	1) Open the bypass valve on the water supply line to the water treatment plant.*
		2) Monitor piezometer readings daily and plot readings to identify significant changes in readings. Also record lake levels.
		3) Survey elevation along top of dam daily at 50' intervals. Plot elevations of each point to identify significant changes in readings.
		4) Obtain input from Georgia Safe Dams Program and Owner's Engineer as to emergency repairs to be constructed (if any).

*Action should be undertaken only if it is safe to do so.

Table 5 – Preplanned Actions for Emergency Condition B (Level 2) (Continued)

Event	Impending Dam Failure Mechanism	Preplanned Operations in Priority Order
Embankment Seepage, Spillway Flow, or Sinkhole	Internal Erosion Failure	1) Make a reasonable attempt to open the sluice gate on the low-level drain or bring in pumps and discharge outflow to spillway or directly into Petit Creek, to lower level of lake.*
		2) Open the bypass valve on the water supply line to the water treatment plant.*
		3) Monitor piezometer readings daily and plot readings to identify significant changes in readings. Also record lake levels.
		4) Monitor weirs and internal drain pipes daily for changes in flow quantity and quality, looking for muddy discharge, and plot readings to identify changes in readings.
		5) Obtain input from Georgia Safe Dams Program and Owner's Engineer as to emergency repairs to be constructed (if any).
Routine Instrumentation	Slope Failure	1) Make a reasonable attempt to open the sluice gate on the low-level drain or bring in pumps and discharge outflow to spillway or directly into Petit Creek, to lower level of lake.*
		2) Open the bypass valve on the water supply line to the water treatment plant.*
		3) Monitor piezometer readings daily and plot reading to identify significant changes in readings. Also record lake levels.
		4) Survey elevation along top of dam daily at 50' intervals. Plot elevations of each point to identify significant changes in readings.
		5) Obtain input from Georgia Safe Dams program or Owner's Engineer as to emergency repairs to be constructed (if any).
Security Threat or Sabotage	Slope Failure	1) Make a reasonable attempt to open the sluice gate on the low-level drain or bring in pumps and discharge outflow to spillway or directly into Petit Creek, to lower level of lake.*
		2) Open the bypass valve on the water supply line to the water treatment plant.*
		3) Notify appropriate authorities and secure access to the dam.

*Action should be undertaken only if it is safe to do so.

6. STEP 4 – TERMINATION AND FOLLOW-UP

Pickens County EMA in coordination with the GSDP and the Dam Owner's Representative or designee, is responsible for terminating the EAP operations and relaying this decision to all parties active in EAP operations. It is then the responsibility of each person to notify the same group of contacts that were notified during the original event notification process and inform them that the event has been terminated.

Prior to termination of an Emergency Condition C (Level 3) event that has not caused actual dam failure, the Dam Owner's Technical Representative will inspect the dam and assess whether any damage has occurred to the Dam that could potentially result in loss of life, injury, or property damage. If it is determined, in coordination with the GSDP, conditions do not pose a threat to human life or property, Pickens County EMA will be advised to terminate EAP operations as described above.

The Dam Owner's Representative or designee shall ensure that the *Dam Safety Emergency Situation Report* in Appendix E–3 is completed to document the emergency event and all actions taken. The Dam Owner's Representative or designee shall distribute copies of the completed report to the GSDP.

7. ROLES AND RESPONSIBILITIES

Dam owners, in coordination with EMA authorities, are responsible for implementing the EAP. EMA authorities with statutory obligations are responsible for warning and evacuation within affected areas. All entities involved with EAP implementation should document incident-related events. All parties responsible for implementing the EAP shall verify their responsibilities with their signature in Appendix B-1 – Concurrences of this document.

7.1 Dam Owner's Responsibilities

The person responsible for performing the tasks required under the EAP is the Dam Owner's Representative or designee, and the Public Safety Director. If the Public Safety Director is absent, the responsible person will be the Public Safety Director Lieutenant on duty at that time.

As soon as an emergency event is observed or reported, the Dam Owner's Representative and Public Safety Director under the EAP shall:

Initiate the initial assessment of the event and designate the appropriate emergency condition (i.e., also referred to by GA EPD as an emergency level):

- Condition A (Level 1);
- Condition B (Level 2); or
- Condition C (Level 3).

1) Based on the type of condition:
   a) If a Condition A (Level 1) is determined, initiate Figure 7 – Dam Failure Notification Flowchart for Condition A (Level 1) Emergencies;
   b) If a Condition B (Level 2) is determined, initiate the preplanned actions in Table 5 – Preplanned Actions for Emergency Condition B (Level 2), and Figure 8 – Dam Failure Notification Flowchart for Condition B (Level 2) & C (Level 3) Emergencies; and
   c) If a Condition C (Level 3) is determined, initiate Figure 8 – Dam Failure Notification Flowchart for Condition B (Level 2) and C (Level 3) Emergencies.
2) If a Condition B (Level 2) or Condition C (Level 3) emergency is determined, provide updates of the situation to the EMA to assist them in making timely and accurate decisions regarding warnings and evacuations.
3) Provide leadership to assure the EAP is reviewed and updated annually and copies of the revised EAP are distributed to all who received copies of the original EAP.

7.2 EAP Coordinator Responsibility

The Dam Owner's Representative or designee will be the designated EAP Coordinator who will be responsible for EAP-related activities, including preparing revisions to the EAP, establishing training activities, coordinating EAP exercises, etc. They will also be the EAP contact if any of

the involved parties have questions about the plan. The EAP will be reviewed annually with contacts, phone numbers, verified for accuracy. Revisions to the EAP should documented in the Revision Log of this document. As infrastructure and homes are built in the inundation map hazard areas, information (i.e., addresses) will be added to Tables 3 and 4, as appropriate and available.

7.3 Local Emergency Management (Pickens County EMA)

Pickens County EMA will serve as the primary contact responsible for coordination of all emergency actions. During EAP preparation they will coordinate with local responders and dispatchers to ensure each has an opportunity for input into the EAP and each has a copy and is aware of their responsibilities and participate in review and updates of the EAP.

7.3.1 Responsibility of Evacuation

Warning and evacuation planning are the responsibilities of the Pickens County EMA who have the statutory obligation. Under the EAP, the Big Canoe Public Safety Director is responsible for notifying the Pickens County EMA when a failure is imminent or has occurred (Condition C or Level 3), or a potential failure situation is developing (Condition B or Level 2). Big Canoe will not assume the responsibility of government entities for the evacuation of people. This procedure should be coordinated with the appropriate public officials prior to an emergency situation developing.

When a Condition B (Level 2) situation occurs, The Pickens County EMA will:

- Prepare response personnel for possible evacuations that may be needed if a Level 3 situation develops.
- Alert the public as appropriate.

When a Condition C (Level 3) situation develops:

- Alert the public.
- Immediately close roads and evacuate people within and possibly adjacent to the inundation area.

7.3.2 Responsibility for Duration, Security Termination, and Follow-Up

The Pickens County EMA is responsible for monitoring the situation at the Dam and keeping local authorities informed of developing conditions at the Dam from the time that an emergency starts until the emergency has been terminated. Security measures at the Dam should be implemented by the Pickens County Sheriff's Department.

The Pickens County EMA is responsible for declaring that the emergency at the Dam is terminated in coordination with the Dam Owner and the GSDP.

A follow-up evaluation after an emergency by all participants will be conducted, as outlined in Section 8.

7.4 Dam Owner's Technical Representative(s)

The Dam Owner's Technical Representative is an individual with intimate knowledge of the Dam. During an emergency condition if time permits, the Technical Representative will be contacted accordingly and will,

- Advise the Dam Owner's Representative of the emergency level determination; and
- Advise the Dam Owner's Representative of remedial actions to take if an event occurs.

7.5 Georgia Safe Dams Program

The GSDP, or the GSDP technical representative, is responsible for providing technical assistance to the EAP Coordinator as needed and as time allows.

8. MAINTENANCE, PREVENTION, AND PREPAREDNESS ACTIONS

8.1 EAP Annual Review

The Dam Owner's Representative or designee will review and, if needed, update the EAP at least once each year. The EAP annual review will include the following:

- Call all contacts in the Notification Flowcharts in this document to verify that the phone numbers and the contact personnel are current. The EAP will be revised if any of the contacts have changed.
- Contact the local law enforcement agency to verify the phone numbers and/or personnel in the specified positions. In addition, the Dam Owner's Representative or designee will ask if the person contacted knows where the EAP is kept and if responsibilities described in the EAP are understood.
- Call the locally available resources (Appendix F) to verify that the phone numbers, addresses, and services are current.
- Confirm all-hazard contact information listed in the document is correct.

8.2 EAP Revisions

The Dam Owner's Representative or designee is responsible for updating the EAP document. The EAP document held by the Big Canoe POA is the master document. When revisions occur, the Dam Owner's Representative or designee will provide the revised pages and a revised revision summary page to all the EAP document holders. The document holders are responsible for revising outdated copies of the respective document(s) whenever revisions are received. Outdated pages shall be immediately discarded to avoid any confusion with the revisions. Future revisions and modifications to the EAP should be documented in the Revision Log of this document.

8.3 EAP Periodic Tests

The Dam Owner's Representative or designee will host and facilitate a periodic test of the EAP at least once every 5 years.

The periodic test will consist of a meeting, including a tabletop exercise. Attendance should include the Dam Owner's Representative or designee, GSDP staff, and Pickens County EMA, at least one representative of the local law enforcement agency, and others with key responsibilities listed in the EAP document. At the discretion of the Dam Owner's Representative or designee, other organizations that may be involved with an unusual or emergency event at the Dam are encouraged to participate. Before the tabletop exercise begins, meeting participants will visit the Dam during the periodic test to familiarize themselves with the Dam site.

The tabletop exercise will begin with the facilitator presenting a scenario of an unusual or emergency event at the Dam. The scenario will be developed prior to the exercise. Once the scenario has been presented, the participants will discuss the responses and actions that they would take to address and resolve the scenario. The narrator will control the discussion, ensuring realistic

responses and developing the scenario throughout the exercise. The Dam Owner's Representative or designee should complete an event log as they would during an actual event.

After the tabletop exercise, the EAP will be reviewed and discussed. Mutual aid agreements and other emergency procedures can be discussed. The Dam Owner's Representative or designee will prepare a written summary of the periodic test and revise the EAP, as necessary.

8.4 Prevention and Preparedness Actions

The following prevention and preparedness actions should be taken in preparation of an emergency:

- Initiation of a dam inspection and surveillance program. The Dam should be formally inspected quarterly, at minimum, and readings from the Dam instrumentation should be taken and interpreted quarterly, at minimum.
- Preparation of a systematic warning and evacuation plan. A formal notification system should be coordinated with residents and businesses in the inundation area, and evacuation routes should be discussed/provided to those residents.
- Preparations should be made for evacuation on weekends, weekdays, and any time of day or night, including holidays. The emergency responders should have backup ways of communicating and a way to respond to the emergency in case of power outages.
- Community awareness programs for emergency response procedures. The community should be made aware of the possible emergencies and procedures associated with the possible failure of the Dam.
- Establishment of emergency flood operating procedures.
- Revisions of this EAP should be documented in the Revision Log of this document.
- Conduct emergency exercises. At minimum, an orientation meeting should be held with key people so that those playing key roles and those having responsibilities outlined in this EAP can become familiar with it. A drill or tabletop exercise can be held and coordinated with the Pickens County EMA. Documentation of reviews, and tests of this EAP should be documented in the forms provided in Appendix B.
- Organization of equipment, labor, and materials for use in emergency situations. A list of locally available resources that could be used in the event of an emergency are provided in Appendix F. These businesses can supply pumps, power generators, divers for inspections, and materials for temporary repair, depending on the emergency. Also, the Pickens County EMA has provided a list of equipment that may be available during a dam failure.

9. REFERENCES

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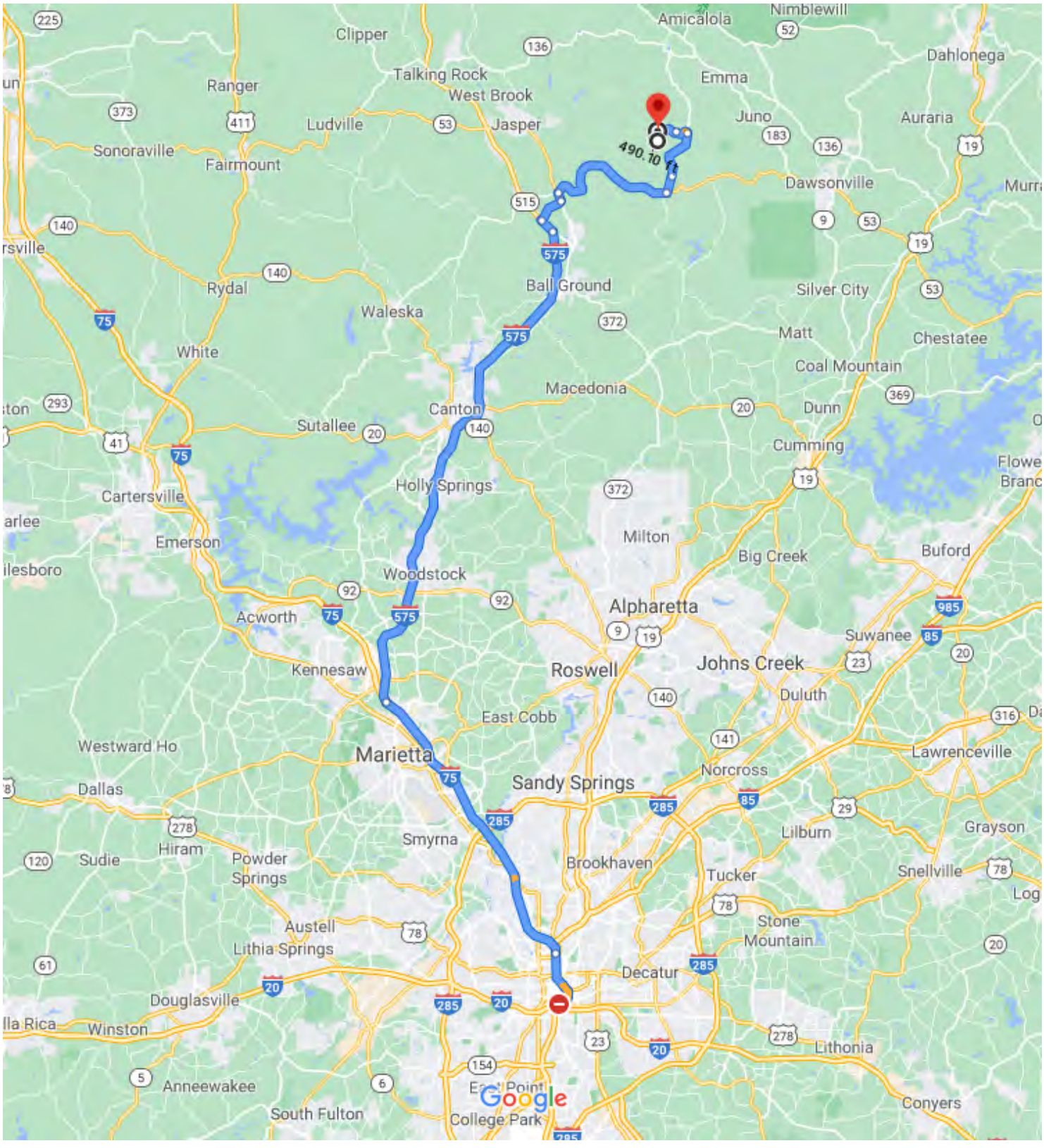
APPENDIX A
Directions from Atlanta, GA to the Dam

Google Maps Atlanta, GA to Lake Petit Dam, Jasper, GA Drive 70.0 miles, 1 hr 18 min



Map data ©2021 Google 5 mi

Measure distance
Total distance: 490.10 ft (149.38 m)

Google Maps Atlanta, GA to Lake Petit Dam, Jasper, GA Drive 70.0 miles, 1 hr 17 min

Atlanta
Georgia

Get on I-75 N/I-85 N

1 min (0.4 mi)

1. Head north on Capitol Ave SW

79 ft

2. Turn right onto M.L.K. Jr Dr SE

0.2 mi

3. Turn left to merge onto I-75 N/I-85 N

0.2 mi

Follow I-75 N and I-575 N to GA-5 N/GA-515 E in Pickens County

46 min (51.8 mi)

4. Merge onto I-75 N/I-85 N

3.1 mi

5. Keep right to continue on I-75 N

18.0 mi

6. Keep right at the fork to continue on GA-5 N/I-575 N, follow signs for Canton

30.8 mi

Take Hwy 53 E and Steve Tate Hwy to Wilderness Pkwy

28 min (17.8 mi)

7. Continue onto GA-5 N/GA-515 E

0.9 mi

8. Sharp right onto Worley Crossroads

1.7 mi

9. Turn left onto Canton Rd

0.5 mi

10. Turn right onto Hwy 53 E

8.5 mi

11. Turn left onto Steve Tate Hwy

1.0 mi

12. At the traffic circle, take the 1st exit and stay on Steve Tate Hwy

3.0 mi

13. Turn left onto Wilderness Pkwy

0.8 mi

14. Turn left to stay on Wilderness Pkwy

Destination will be on the right

1.3 mi

Lake Petit Dam

Jasper, GA 30143

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

APPENDIX B

B-1: Concurrences

B-2: Record of Holders of Control Copies

B-3: EAP Review

B-4: Periodic Tests

APPENDIX B-1 – CONCURRENCES

By my signature, I acknowledge that I, or my representative, have reviewed this plan and concur with the tasks and responsibilities assigned herein for me and my organization.

Dam Owner's Representative, Big Canoe POA

1._____
Signature *Organization* *Date*
Printed name and title: _____

Big Canoes POA's Public Safety

2._____
Signature *Organization* *Date*
Printed name and title: _____

Big Canoe POA's Lake Petit Dam Technical Representative

3._____ Geosyntec Consultants 08 December 2022
Signature *Organization* *Date*
Printed name and title: Wesley MacDonald, PE, Senior Engineer

Georgia Safe Dams Program Representative

4._____
Signature *Organization* *Date*
Printed name and title: _____

Pickens County Sheriff's Department

5._____
Signature *Organization* *Date*
Printed name and title: _____

Pickens County Emergency Management Agency

6._____
Signature *Organization* *Date*
Printed name and title: _____

Pickens County Public Works

7._____

Signature *Organization* *Date*

Printed name and title: _____

Cox Lake Dam Owner, Cove Lake Property Association

8._____

Signature *Organization* *Date*

Printed name and title: _____

EAP CONCURRENCE

By my signature, I acknowledge that I, or my representative, have reviewed this plan and concur with the tasks and responsibilities assigned herein for me and my organization.

Organization:

_____

Name:

_____

Title:

_____

Signature:

_____

Date:

_____

APPENDIX B-2 – RECORD OF HOLDERS OF CONTROL COPIES

Copy Number	Organization	Person Receiving Copy
1	Big Canoe Property Owners Association, Inc. 10586 Big Canoe Jasper, Georgia 30143	Scott Auer
2	Big Canoe POA's Public Safety Director 41 Wolfscratch Circle Marble Hill, GA 30148	Ricky Jordan
3	Engineer – Geosyntec Consultants, Inc. 835 Georgia Avenue, Suite 500 Chattanooga, Tennessee 37402	Wesley MacDonald, P.E.(TN, AL, GA, and WA)
4	Georgia Safe Dams Program 2 Martin Luther King Jr. Drive SE, Suite 1362 Atlanta, GA 30334	David M. Griffin, P.E.
5	Pickens County Sheriff's Department 2985 Camp Rd., Jasper GA 30143	Donnie Craig
6	Pickens County EMA 1266 East Church Street Jasper, Georgia 30143	Mark Harris
7	Pickens County Public Works 3043 Camp Road Jasper, Georgia 30143	Kirk Anderson
8	Cox Lake, Cove Lake Property Association	Bob Canon

APPENDIX B-3 – EAP ANNUAL REVIEW

An Annual Review of this EAP should be conducted by the Big Canoe Property Owner's Association. The annual review should be documented in this appendix.

Date	Conducted By	Notes and Observations

APPENDIX B-4 – EAP PERIODIC TEST

A periodic test of the EAP procedures is recommended every 5 years. Documentation for the test is provided in this appendix.

Date	Conducted By	Observations

APPENDIX C
Inundation Mapping

Geosyntec consultants

engineers | scientists | innovators

Big Canoe® POA

LAKE PETIT DAM

Pickens County, Georgia

State ID No. 112-009-00462

NID No. GA00685

Lake Petit Dam Breach Analysis

Prepared for:

Big Canoe® Property Owners Association, Inc.
10586 Big Canoe
Jasper, GA 30143

Prepared by:

Geosyntec Consultants, Inc.
835 Georgia Avenue, Suite 500
Chattanooga, TN 37402

Project No: TN8667

December 2022

GEOSYNTEC CONSULTANTS
COMPUTATION COVER SHEET

Dam Owner: Big Canoe Property Owners Association **Project:** Lake Petit Dam Breach Analysis **Project #:** TN7208

TITLE OF COMPUTATIONS Dam Breach and Inundation Analysis for Lake Petit

COMPUTATIONS BY:	Signature	Shailendra Singh	10/5/2022 DATE
	Printed Name and Title	Shailendra Singh, Senior Staff Professional	
ASSUMPTIONS AND PROCEDURES CHECKED BY: (Peer Reviewer)	Signature	Emily Campbell	10/5/2022 DATE
	Printed Name and Title	Emily Campbell, Project Engineer	
COMPUTATIONS CHECKED BY:	Signature	Emily Campbell	10/5/2022 DATE
	Printed Name and Title	Emily Campbell, Project Engineer	
COMPUTATIONS BACKCHECKED BY: (Originator)	Signature	Shailendra Singh	10/5/2022 DATE
	Printed Name and Title	Shailendra Singh, Senior Staff Professional	
APPROVED BY: (PM or Designate) (Senior Reviewer)	Signature	Rishab Mahajan	12/8/2022 DATE
	Printed Name and Title	Rishab Mahajan, Senior Engineer	

APPROVAL NOTES:

REVISIONS (Number and initial all revisions)

NO.	SHEET	DATE	BY	CHECKED BY	APPROVAL

TABLE OF CONTENTS

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LIST OF FIGURES

LIST OF ATTACHMENTS

EXECUTIVE SUMMARY

This dam breach analysis report has been prepared in support of revised inundation mapping of Lake Petit Dam located in Pickens County, Georgia. The most recent inundation mapping was performed in 2000 by Jordan, Jones, and Goulding utilizing DAMBRK software. The current recommendations from the State of Georgia's Safe Dam Program (SDP) require inundation mapping utilizing Hydrologic Engineering Center's River Analysis System (HEC-RAS) software. These regulations were published in the Engineer Guidelines (Version 4.0, 2015) by the SDP on July 2015.

Lake Petit Dam, constructed in 1972, is located within the Big Canoe Development on Petit Creek about 5.8 miles upstream of Marble Hill, in Pickens County, north-central Georgia.

Three other dams of interest are located downstream of the Lake Petit Dam. Two are located directly downstream. Lake Sconti is located approximately 1.0 miles downstream of Lake Petit.. Cox Lake Dam is located approximately 3.5 miles downstream from Lake Petit Dam south of Cove Road. Lake Disharoon Dam is located approximately 0.5 miles downstream but is not directly downstream of Lake Petit on Petit Creek. Rather, both Lake Petit and Lake Disharoon drain to Sconti Lake.

There are twelve (12) bridges downstream of Lake Petit that are of interest. In the hydraulic model, all downstream dams, bridges and culverts are set to breach when overtopped by two feet. All bridges and culverts were modeled assuming 50 percent obstruction. Lake Petit Dam and Lake Sconti Dam breached during the simulation. Lake Cox Dam did not breach. Lake Disharoon Dam was inundated. Modeled bridges at Wolfscratch Drive, Golf Course Road, Wilderness Parkway, Cove Road, Pendley Woods, Old Mill Road (Upstream) (also known as Justice Way), Old Mill Road (Downstream), McArthur Road, State Route 53 (Near Harrington Road), and Imerys Entrance Drive, and State Route 53 (Near Sandy Bottom Road) breached during the simulation. The modeled bridge at State Route 53 (Near Marbleblock Lane) did not breach.

The dam breach analysis described in this report evaluated the impacts of a potential embankment failure for Lake Petit Dam, and found that the Lake Petit Dam has a high hazard potential with potential for loss of life. Consequently, Lake Petit Dam is classified as Category I, Very Large Dam and also provides an updated inundation map for evacuation considerations during a breach failure.

DAM BREACH ANALYSIS

LAKE PETIT DAM

1. BACKGROUND AND PURPOSE

Geosyntec prepared this calculation package in support of revised inundation mapping of Lake Petit Dam located in Pickens County, Georgia. The most recent inundation mapping was performed in 2000 by Jordan, Jones, and Goulding utilizing DAMBRK software. The current recommendations from the State of Georgia's Safe Dam Program (SDP) require inundation mapping utilizing HEC-RAS software (Georgia DNR, 2015). These regulations were published in the Engineer Guidelines (Version 4.0, 2015) by the SDP on July 2015.

The purpose of this calculation package is to evaluate the impacts of a potential embankment failure for Lake Petit Dam, and, in particular, to evaluate the depth and velocity of potential flood waters and to identify impacted structures and roadways within the inundation extent. The dam breach analysis and inundation mapping will ensure the emergency planning and response meets the most recent State requirements.

2. SITE DESCRIPTION

Lake Petit Dam is located within the Big Canoe Development on Petit Creek about 5.8 miles upstream of Marble Hill, in Pickens County, north central Georgia. The reservoir formed by the dam has a surface area of 107 acres at a normal pool elevation of 1635.5 and extends up Petit Creek approximately 0.7 miles. The maximum storage volume for the reservoir is approximately 5,635 acre-feet (ac-ft) at maximum water storage elevation 1647.0 feet. The drainage area upstream of Big Canoe Dam is 1.53 square miles. The topography around the dam consists of very steep, wooded, mountainous foothills.

Lake Petit Dam is listed in the Georgia State Safe Dams Program and the National Inventory of Dams (NID) under the following identification numbers, respectively: 112-009-00462 and GA00685. Per the NID, the earth dam has a maximum height of 126 feet and a length of 908 feet. The dam has a 15-foot wide concrete cascading channel spillway on the east side of the earth dam's abutment. The spillway discharge is controlled by a concrete crest underneath a bridge located on the roadway (i.e. Wilderness Parkway) running along the crest of the dam.

Lake Sconti is located approximately 1.0 miles downstream of Lake Petit. Per the NID, Lake Sconti Dam has a maximum height of 45 feet and a length of 209 feet. The dam has a 10-foot wide concrete spillway on the eastern abutment. Cox Lake Dam is located approximately 3.5 miles downstream from Lake Petit Dam south of Cove Road. Per the NID, the dam has a maximum height of 85 feet. The dam has a length of 2,110 feet and a top width of 20 feet as measured on the digital elevation model (DEM).

There are twelve (12) crossings downstream of Lake Petit that are of interest. See Figure 1 for location of dams and bridges. Approximate distance of bridges from Lake Petit are presented in Attachment A.

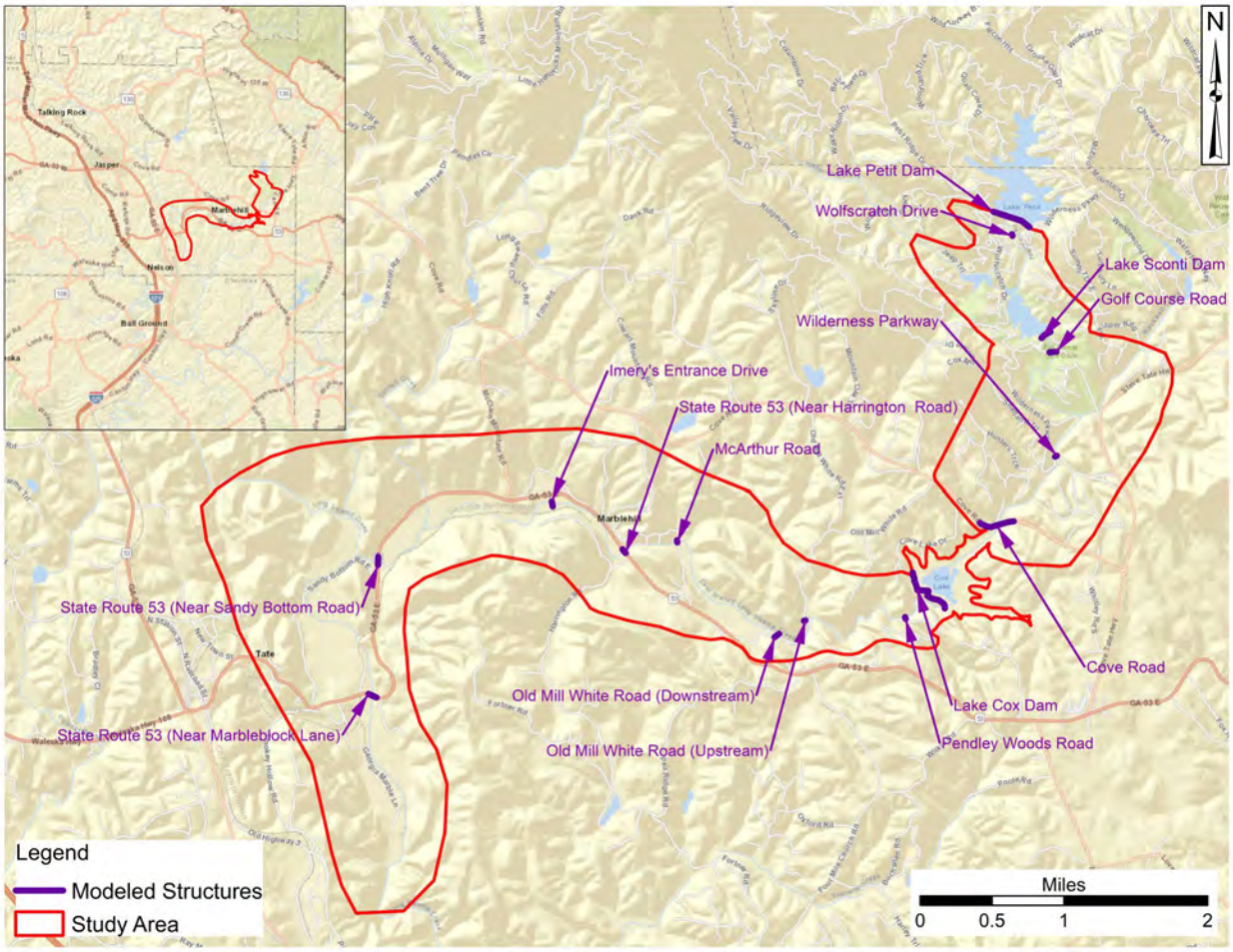

Figure 1: Site Location

3. EXISTING CONDITIONS

The HEC-RAS model used Pickens County Light Detection and Ranging (LiDAR) topography from NOAA (National Oceanic and Atmospheric Administration, 2012) and field data provided by Jordan Engineering (2021). The dates of field work were January 13 and 14, 2021. Field data included bridge and culvert crossing survey. Elevations for the lowest adjacent grades for points of interests are estimates using LiDAR elevations. The bridge survey files along with photos of points of interest are provided in Attachment A. Shapefiles and the digital elevation model are included in Attachment B.

4. EMBANKMENT BREACH DEVELOPMENT

4.1 Modes of Breach Failure

Typical dam failure modes based on FEMA (2013) area summarized in Table 1.

Table 1: Typical Dam Failure Modes, FEMA (2013)

Failure Mode	Example	Percentage of Failures[1]
Hydrologic	Overtopping	70.9%
Geologic	Piping/Seepage	14.3%
Structural	Failure of upstream/downstream face	1.8%
Seismic	Earthquake	unlisted
Human Related	Misoperation/Terrorism	0.6%

Overtopping is the most frequent failure scenario. In accordance with SDP guidance, it was assumed that a non-hydrologic failure due to overtopping occurs.

4.2 Selected Breach Scenario

In accordance with SDP guidance, a sunny day failure due to overtopping was chosen for the dam breach analysis. Geosyntec created a HEC-RAS 2D model to simulate the inundation of the downstream area due to embankment failure to evaluate the potential impact due to the directional flow of the breach.

The model was run under the following assumptions:

1. A sunny day mode of failure was assumed;
2. No infiltration losses are assumed;
3. The water surface elevation (WSEL) is 1647.0 ft NAVD 1988 Datum when the breach occurs;
4. The discharge structure is completely blocked; and
5. No losses due to evapotranspiration were considered.

A sunny day failure is appropriate for Lake Petit dam because of the large storage capacity and small inflow drainage area to the Lake. A small drainage area to the pond means that additional flows to the pond would be relatively small during a wet weather event.

All additional downstream structures: Lake Sconti Dam, Lake Cox Dam and twelve (12) crossings were modeled using a sunny day failure. The stage storage tables of Lake Petit, Lake Sconti and Lake Cox are provided in Attachment C.

Table 2 provides dam characteristics used as input in the model. Storage volume at dam failure is the storage capacity at 1,647 feet, 1,470 feet and 1,336 feet elevation for Lake Petit Dam, Lake Sconti Dam and Lake Cox Dam respectively. Lake Petit Dam was surveyed, but publicly available data was used to estimate the characteristics of Lake Sconti Dam and Lake Cox Dam. Embankment top elevation and bottom elevation are elevation as seen in the LiDAR, except for Lake Petit as noted below. Maximum depth is the difference between embankment top elevation and bottom elevation. Embankment lengths represent the length of the structures as drawn in the geometry file

[1] Based on Table 14-2 of the FEMA Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures (July 2013)

of the model. Embankments are drawn to capture length of the dams and extended further to capture any high ridges at the ends of the dam. Crest widths represent widths of the dams as seen in the LiDAR.

The height of Lake Petit Dam shown in Table 2 is the height from the upstream toe of the dam, not the regulatory height (which is measured from downstream toe). The height from the upstream toe of the dam is the "breachable height" of the dam. Because the model does not compute scour beneath the ground surface, the height is based on the upstream toe of the dam rather than the downstream toe. Elevations are in NAVD 88.

Table 2: Dam Characteristics

Estimated Permitted Area Characteristics (units)	Lake Petit	Lake Sconti	Lake Cox
Storage Volume at Failure (acre-feet)	5,635	281	4,490
Embankment Top Elevation (feet)	1,647	1,470	1,336
Bottom Elevation (feet)	1,538.3*	1,430	1,239
Maximum Depth of Water Behind Dam (feet)	108.7*	40	97
Embankment Length (feet)	1,443	398	2,110
Embankment Crest Width (feet)	35	20	20

*Measured from upstream toe of the dam

4.3 Breach Characteristics

Breach characteristics used to develop the breach hydrograph include shape, final depth, width, side slopes, breaching time, and the rate at which the breach develops. Table 3 is based on the guidelines provided by SDP (2015). This was used as an aid to determine breach characteristics.

Table 3: SDP Suggested Breach Parameters (Embankment Dams)

Failure Mode	
Minimum Average Breach Width	3x Height of dam
Side Slope (H:1V)	1
Maximum Breach Time (hour)	0.5

The Froehlich (2008) equations were used for computing the average breach widths and times of embankment dams, but with a minimum average breach width of three (3) times the height of the dam, and a maximum breach time of a half (½) hour. These equations have been found to correlate well with breach widths for actual failures for every dam size, and they are widely used and respected in the engineering community. Side slopes for the breach were modeled as a 1 horizontal to 1 vertical (1H:1V) slope based on the guidelines provided by SDP (2015). Because Cove Road is a large embankment crossing, it was modeled the same way as the embankment dams with the Froehlich (2008) equations. The other road crossings are generally much smaller and constructed of rigid materials (wood, concrete). In order to model the other (non-Cove Road) crossings, the following assumptions were made:

1. The model assumes obstruction on the bottom half of all downstream bridges and culverts.

2. One (1) acre-foot of pool volume at failure has been assumed for all bridges for calculation of breach parameters. The one (1) acre-foot of pool volume was considered a conservative assumption because it resulted in a faster breach time of approximately three (3) minutes.
3. All downstream structures breach when overtopped with two feet of flow, or more.
4. The entire bridge structure collapses due to the breach and washes away. The bottom breach widths were calculated using Froelich (2008) and widened to match the breach opening to the riverbed.

The average breach width and breach development time based on Froelich (2008) used for the analysis are summarized in Table 4. Breach parameter calculation for the three dams and Cove Road are presented in Attachment D.

Table 4: Summary of Breach Parameters used for Dam Breach Analysis

Modeled Dams and Bridges	Connection name used in the model	Average Breach Width (feet)	Breach Bottom Width (feet)	Breach Time (hour)
Lake Petit Dam	**Petit Dam**	326.1	217.4	0.45
Wolfscratch Drive	**1. Wolfscratch D**	44*	25	0.03
Lake Sconti Dam	**Sconti Dam**	120	80	0.27
Golf Course Road	**2. Golfcourse Ro**	99	80	0.03
Wilderness Parkway	**3. Wilderness Pa**	45*	12	0.03
Cove Road	**Cove Road**	132	88	0.1
Lake Cox Dam	**Cox Dam**	291	194	0.45
Pendley Woods Road	**4. Pendley Woods**	11*	3	0.08
Old Mill White Road (Upstream)	**5. Old Mill Upst**	47*	25	0.08
Old Mill White Road (Downstream)	**6. Old Mill Down**	39*	25	0.04
McArthur Road	**7. McArthur Road**	32	25	0.09
State Route 53 (Near Harrington Road)	**8. Harrington Ro**	106	90	0.04
Imerys Entrance Drive	**09. To Imery Pla**	37	25	0.05
State Route 53 (Near Sandy Bottom Road)	**10. State Route**	142	120	0.03
State Route 53 (Near Marbleblock Lane)	**11. Route 53 - M**	113	85	0.02

*Average breach width does not meet the SDP guidelines that minimum average breach width should be three (3) times the height of the dam. The bridge openings were widened to fit a natural ground profile. Widening breach bottom width further in order to increase average breach width would have made the bridge opening wider than the natural ground profile.

5. EMBANKMENT BREACH ANALYSIS

5.1 Breach Model Development

HEC-RAS 2D (HEC-RAS 5.0.7, 2019) modeling software was used to develop breach inundation maps for the study area. The following sections describe select parameters and assumptions used in developing the HEC-RAS 2D model.

Model Mesh

The downstream area was modeled with a computational mesh of 100-foot by 100-foot cells. Instead of computing an average elevation for each cell like competitive 2D modeling software, HEC-RAS 2D utilizes meshes for each cell such that the resolution of the underlying topography is not lost. The extent of 2D modeling domain is shown in Figure 1 as Study Area. 2D flow area break lines were added along modeled structures, roads and terrain ridges. Break lines force cell faces to follow terrain ridges and ensure the flow is going over the ridge lines.

Topography Data

2012 LiDAR data provided by NOAA (National Oceanic and Atmospheric Administration) was used to create a digital elevation model of the land surrounding the project area.

Floodplain Manning's Roughness Values

Landuse data was downloaded from National Land Cover Database (NLCD, 2016) and Manning's roughness values were assigned based on recommendations from Natural Resource Conservation Service provided in "Manning's n Values for Various Land Covers" (USDA, 2016). Table 5 provides a summary of the Manning's roughness values assigned for each land use. Figure 2 shows the extent of different land uses in the model.

Table 5: Floodplain Manning's Roughness

Land Use	Manning's Roughness
Barren land rock/sand/clay	0.025
Deciduous forest	0.16
Developed, high intensity	0.15
Developed, low intensity	0.10
Developed, medium intensity	0.08
Developed, open space	0.04
Emergent herbaceous wetlands	0.07
Evergreen forest	0.16
Grassland/herbaceous	0.035
Mixed forest	0.16
Open water	0.04
Pasture/hay	0.03
Shrub/scrub	0.10
Woody wetlands	0.12

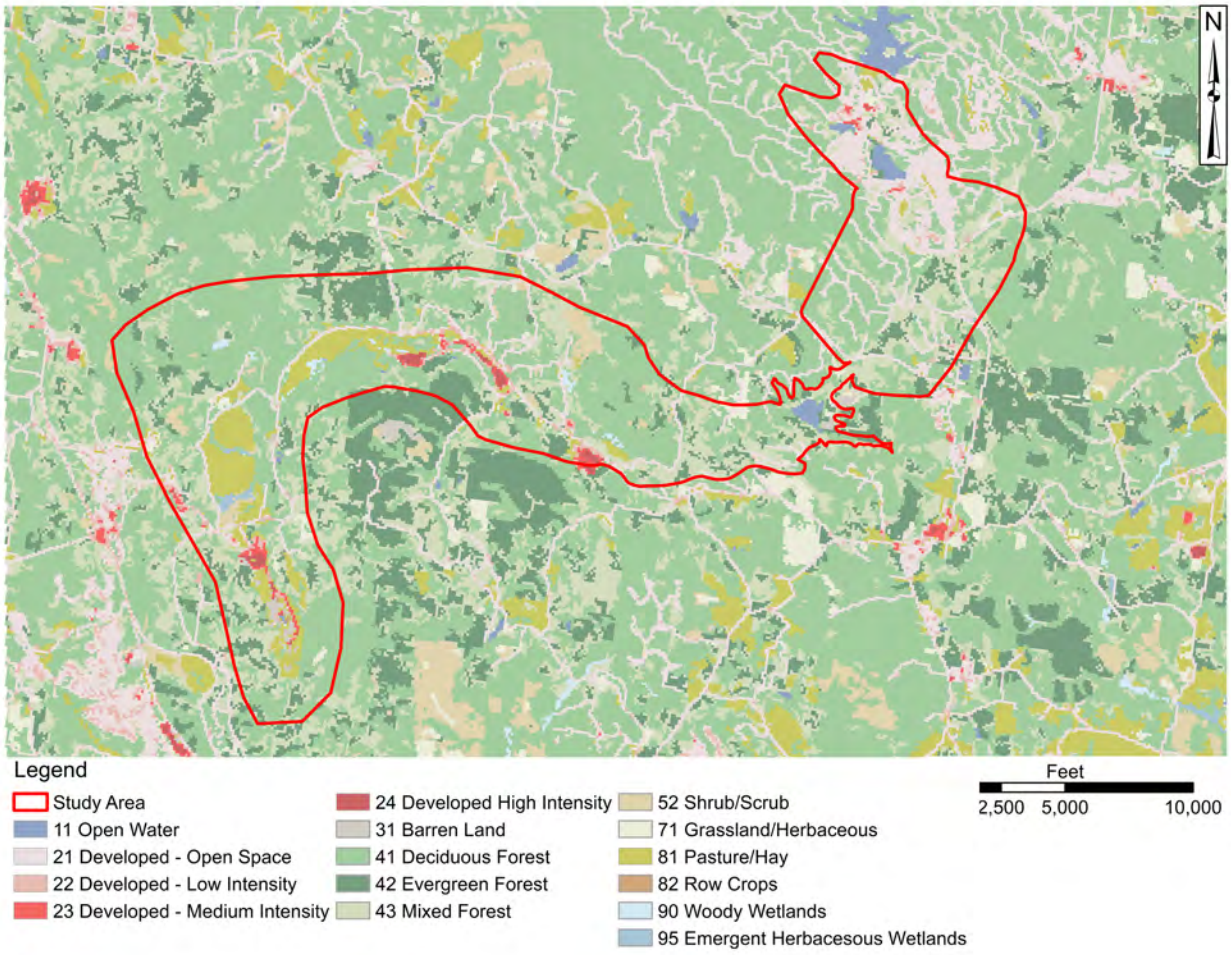

Figure 2: Extent of different land uses in the modeling domain

Unsteady Flow Data

The initial boundary condition was set to top of dam elevation 1,647 feet for Lake Petit and to normal water surface elevation 1,464.3 feet and 1,276.2 feet for Lake Sconti and Lake Cox, respectively. Water was assumed to flow off the grid with a normal depth boundary condition at the south-most location of the study area.

Computational Settings

An adaptive timestep based on courant number, mapping output of 5 minutes, hydrograph output of 1 minute and detailed output of 1 minute were selected for the run. The model was developed and refined with a diffusion wave equation and the final run utilized the full momentum equation as recommended by the HEC-RAS manual for dam breach analyses. The settings and tolerances used in HEC-RAS are shown in Attachment E.

Breach of Structures

A total of three (3) dams and twelve (12) crossings were modeled to be able to breach when overtopped with two (2) feet. The bridges consisted of circular culverts, rectangular box culverts or piers. The opening in Cove Road is small and was not included in modeling as a conservative measure. Due to limitations of HEC-RAS 5.0.7 version to model bridges; all bridge openings were

created using culverts. Box culverts with spacing were used to represent piers. The breach characteristics and assumptions are discussed in Section 4.3. The bridge profiles are provided in Attachment A.

5.2 Results

The 2D HEC-RAS model was run with the inputs described above. The breach analysis found that Lake Petit Dam and Lake Sconti Dam breached while Lake Cox overtopped but did not breach. Lake Disharoon Dam was inundated. All modeled downstream bridges (see Table 4), except State Route 53 (Near Marbleblock Lane), breached during the simulation. The maximum inundation depths and velocity for the 2D flow region are shown in Attachment F and Attachment G respectively. See Attachment H for summary of warnings and notes.

Please note that when the model was run with the full momentum equation, the full receding limb of the hydrograph was not observed in the downstream model domain; an apparent bug in the model. The results of the diffusion wave equation and the full momentum equation were compared, and it appears that the full momentum equation best represents the timing and intensity of the breach wave, as anticipated from HEC-RAS guidance. The diffusion wave equation is able to model the receding limb of the hydrograph and confirms that flow rates and water levels recede over time. The diffusion wave hydrographs were also smooth compared to some observed minor instability in the full momentum hydrographs.

5.2.1 Hazard Potential

The hazard classification is based on simulated flow depth and velocity downstream of Lake Petit. The areas that are shown to be inundated have habitable structures and public roads as shown in inundation map (Attachment F).

5.2.2 Probable Loss of Life

Loss of life is considered probable by the SDP when any of the following conditions exist:

1. A structure is flooded by 18 inches or more of water above finished floor elevation.
2. A structure is flooded by 30 inches or more of water against the building at lowest adjacent grade.
3. A structure is flooded such that the destruction factor (maximum velocity in feet per second x maximum depth in feet) is equal to or greater than 15.
4. An unanchored mobile home is flooded such that the destruction factor is equal to or greater than 9.
5. A structure which is flooded such that the destruction factor is 7 or greater shall be evaluated using engineering judgment to determine if other factors warrant a probable loss of life designation.

The SDP recommends classification of dams according to whether probable loss of life is present downstream. The maximum destruction factor raster was used to extract factors at the points of interests using GIS. Based on destruction factors higher than 15 for majority of points of interests and inundation areas encompassing existing structures, the breach of the dam would likely result in loss of life. Destruction factor at points of interests are provided in Table 6. The destruction factors are calculated as maximum velocity in feet per second times the maximum depth in feet.

Maximum overtopping depths (simulated depth over the point of interest) from a breach of Lake Petit Dam are calculated as shown in Table 7. Maximum velocity is taken at the location of the modeled structures as seen in velocity map in Attachment F. Based on the lateral extent of the inundation zone, the list of addresses potentially affected by the breach of Lake Petit Dam were provided by the Pickens County 911 on September 30th, 2022 and are available in Attachment I. Pickens County included structures within a 100-foot buffer outside of the extent of the mapped inundation zone.

Table 6: Destruction Factor at Points of Interest

Points of Interest	Maximum Overtopping Depth (ft)	Maximum Velocity (ft/sec)	Destruction Factor (sq.ft/sec)
Wolfscratch Drive	48.0	11.7	559.8
Lake Sconti Dam	42.8	17.4	743.1
Golf Course Road	41.6	15.8	657.4
Wilderness Parkway	36.3	16.4	597.3
Cove Road	6.7	12.3	82.0
Lake Cox Dam	1.0	6.2	5.9
Pendley Woods Road	34.1	13.5	458.9
Old Mill White Road (Upstream)	20.7	9.7	199.9
Old Mill White Road (Downstream)	19.5	14.1	275.0
McArthur Road	32.9	7.0	229.1
State Route 53 (Near Harrington Road)	9.4	9.4	88.3
Imerys Entrance Drive	16.0	9.9	159.1
State Route 53 (Near Sandy Bottom Road)	12.2	10.5	128.9
State Route 53 (Near Marbleblock Lane)	1.5	9.4	13.6

5.2.1 Flood Crest Profile Plot

Figure 3 presents the flood crest profile plot showing the three dams mentioned. Lake Petit Dam and Sconti Dam breached as they were overtopped by two (2) feet. Cox Dam did not breach. The depth of overtopping for all structures are presented in Table 7. See Attachment J for hydrographs at each of the points of interest listed in Table 7.

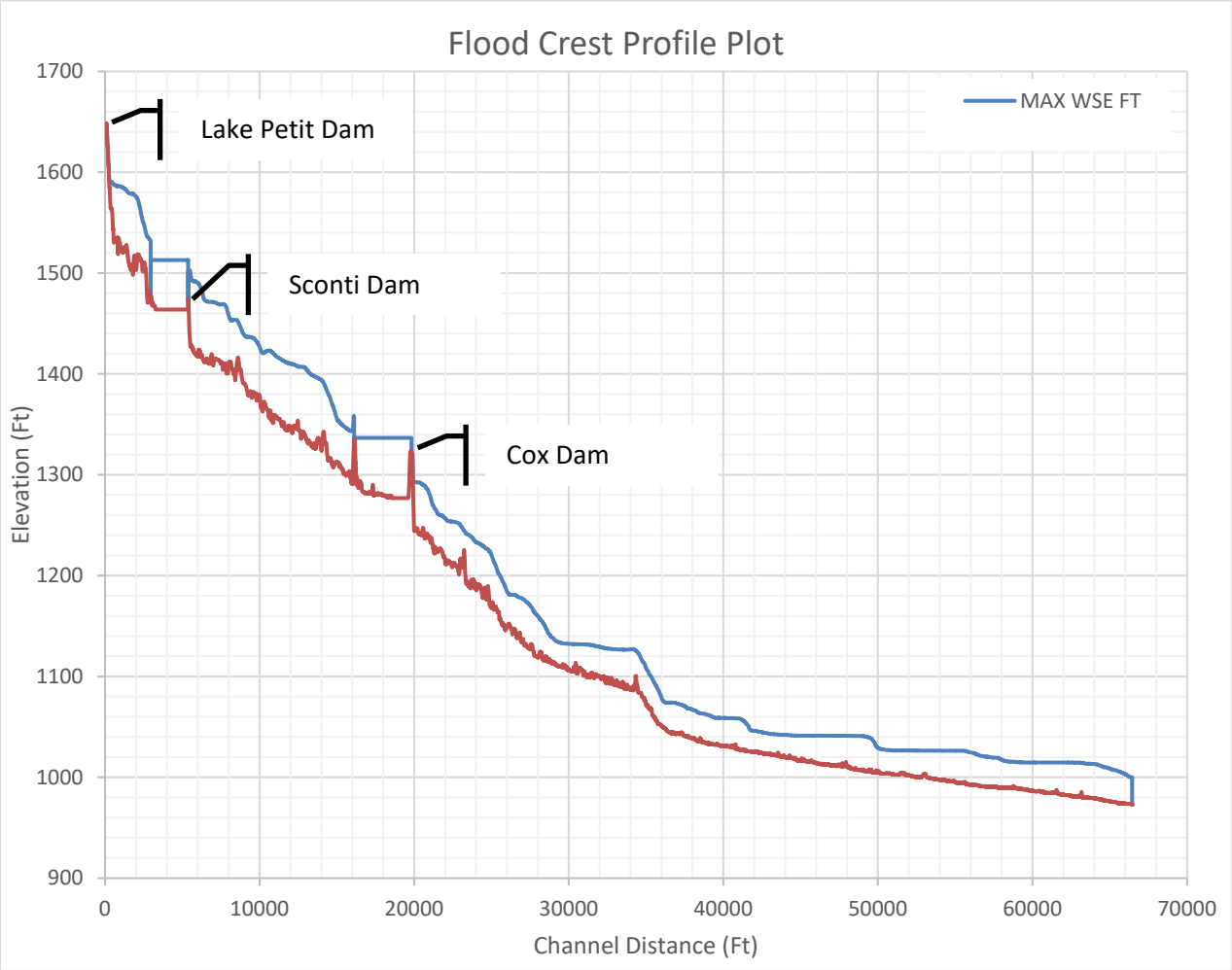

Figure 3: Flood Crest Profile Plot

Based on the profile plot (Figure 3), Lake Cox Dam appears to overtop with depth greater than two feet indicating breach of Lake Cox Dam however, computation message from HEC-RAS and hydrograph directly taken from HEC-RAS confirm that Lake Cox Dam overtopped by one foot and did not breach. The maximum water surface elevation at Lake Cox Dam is 1,336.5 feet and the dam crest is at 1,335.5 feet as seen in terrain profile. The ground elevation as seen in the profile plots are based on a profile line that goes through the spillway and thus shows a lower ground elevation of approximately 1,324 feet. See Figure 4 for terrain profile of Lake Cox Dam and Figure 5 for zoomed in flood crest profile plot at Lake Cox Dam.

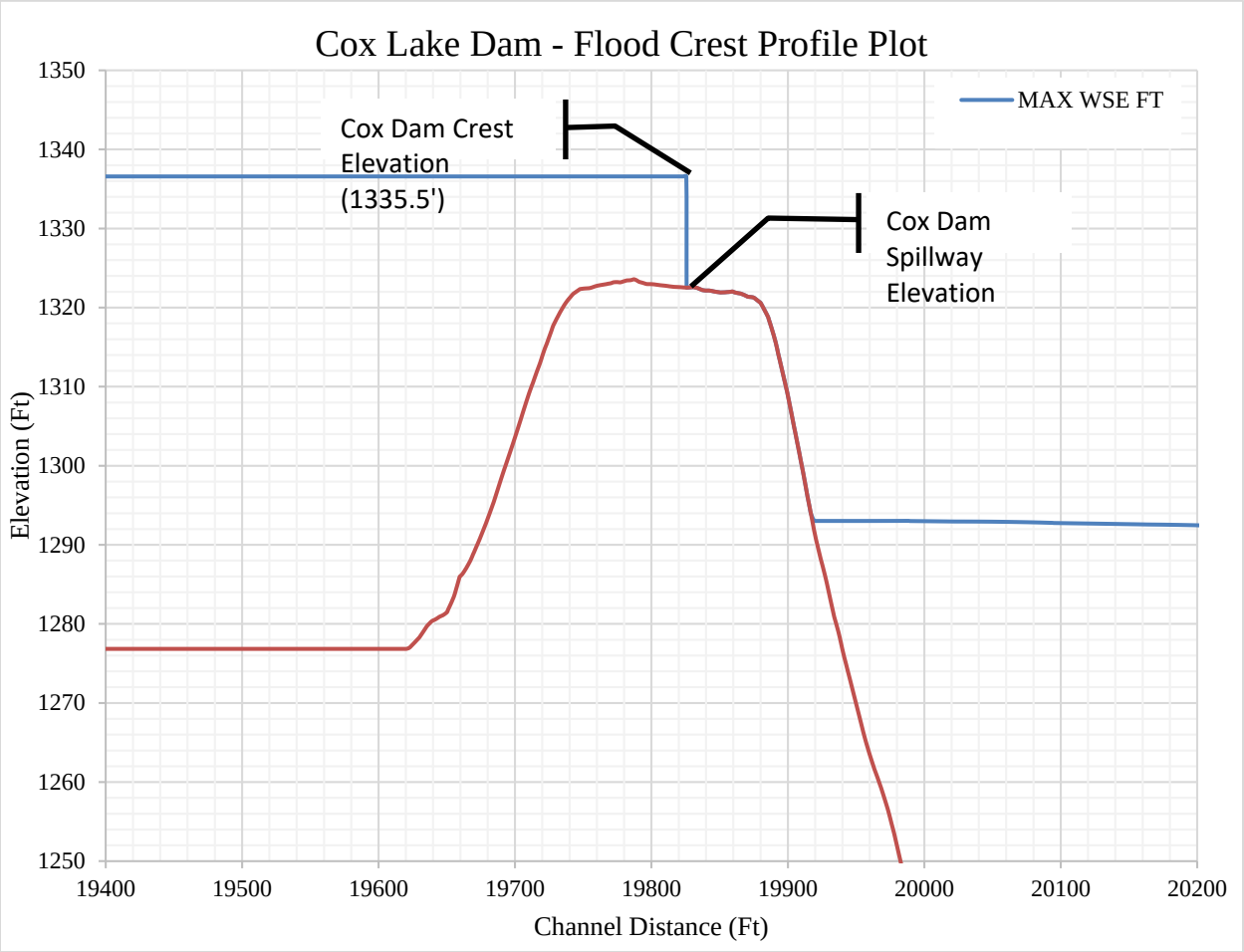

Figure 4: Zoomed-in Flood Crest Profile at Lake Cox Dam

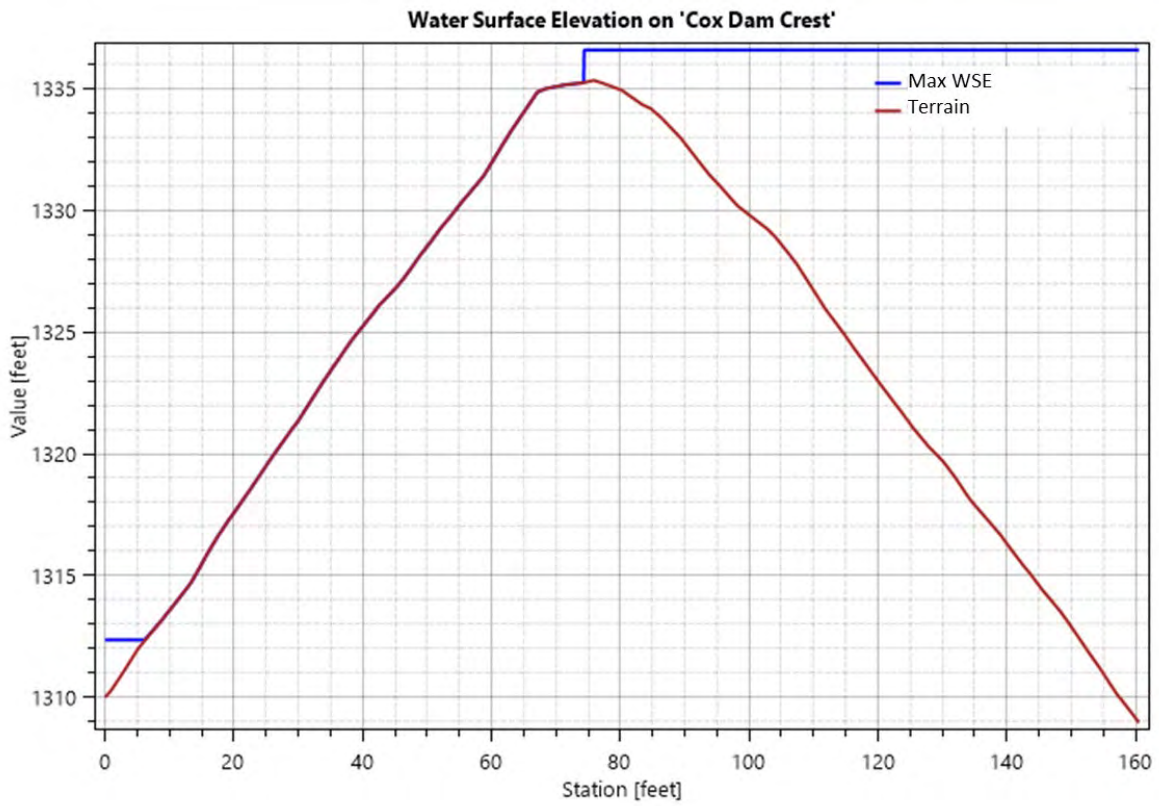

Figure 5: Terrain Profile - Lake Cox Dam

Table 7: Overtopping Depths at Points of Interest (Elevations in NAVD 88)

Points of Interest	High Chord (feet)	Max Stage Elevation (feet)	Maximum Overtopping Depth (feet)
Wolfscratch Drive	1538.0	1586.0	48.0
Lake Sconti Dam	1470.0	1512.8	42.8
Golf Course Road	1447.8	1489.4	41.6
Wilderness Parkway	1371.5	1407.9	36.3
Cove Road	1335.0	1341.7	6.7
Lake Cox Dam	1335.5	1336.5	1.0
Pendley Woods Road	1230.1	1264.2	34.1
Old Mill White Road (Upstream)	1160.1	1180.8	20.7
Old Mill White Road (Downstream)	1129.8	1149.3	19.5
McArthur Road	1093.6	1126.5	32.9
State Route 53 (Near Harrington Road)	1066.3	1075.7	9.4
Imerys Entrance Drive	1042.8	1058.8	16.0
State Route 53 (Near Sandy Bottom Road)	1028.7	1040.9	12.2
State Route 53 (Near Marbleblock Lane)	1017.8	1019.3	1.5

6. CONCLUSIONS

This report summarizes the results of the dam breach analysis for Lake Petit Dam. The findings of the inundation model are consistent with Lake Petit Dam's current classification as a Category I, Very Large Dam per the Georgia SDP Engineering Guidelines. This analysis also provides an updated inundation map for evacuation considerations during a breach failure.

7. REFERENCES

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ATTACHMENT A

BRIDGE SURVEY, PROFILE AND PHOTOS OF POINTS OF INTEREST

Approximate Distance of Structures from Lake Petit Dam

Modeled Dams and Bridges	Distance (Miles) from Lake Petit Dam
Lake Petit Dam	0
Wolfscratch Drive	0.2
Lake Sconti Dam	1.0
Golf Course Road	1.2
Wilderness Parkway	2.4
Cove Road	3.1
Lake Cox Dam	3.8
Pendley Woods Road	4.0
Old Mill White Road (Upstream)	5.0
Old Mill White Road (Downstream)	5.4
McArthur Road	6.5
State Route 53 (Near Harrington Road)	6.8
Imerys Entrance Drive	7.6
State Route 53 (Near Sandy Bottom Road)	9.3
State Route 53 (Near Marbleblock Lane)	10.8

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WOLFSCRATCH DRIVE

0' 20' 40' 60'
SCALE 1" = 20'

PETTIT CREEK

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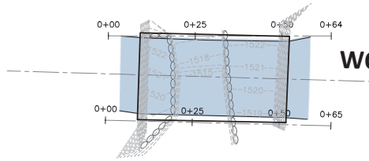

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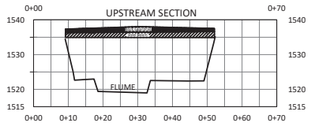

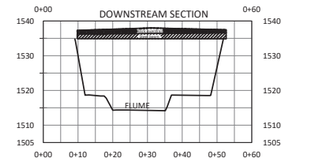

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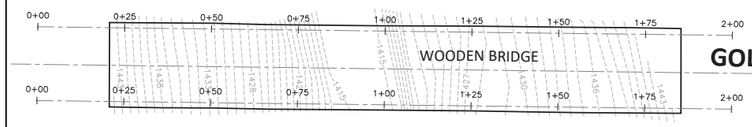
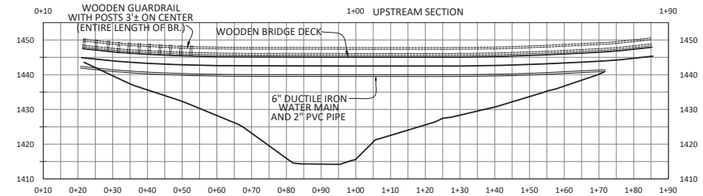
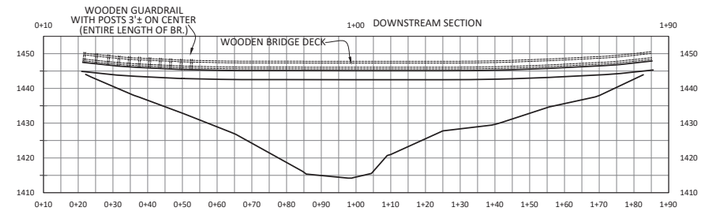


GOLF COURSE ROAD





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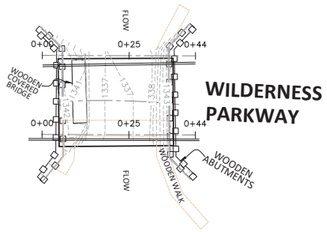
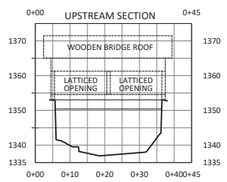
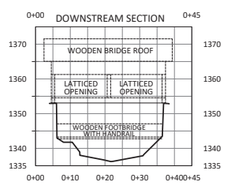


WILDERNESS PARKWAY

GRID





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PENDLEY WOODS ROAD

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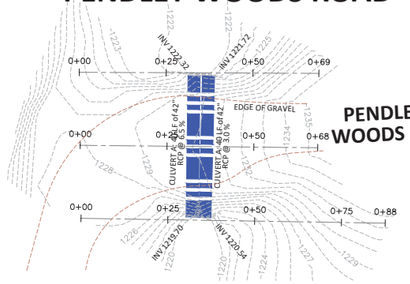

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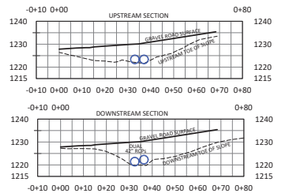

0' 20' 40' 60'
SCALE 1" = 20'

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Land Planning ◆ Surveying ◆ Soils Classification

SITES:
1 - WILDERNESS PARKWAY
5 - GOLF COURSE ROAD
6 - WILDERNESS PARKWAY
10 - PENDLEY WOODS ROAD

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial Issue	XX/XX/XX

Sheet No.
1 of 3

S:\SURVEY\GEOSYNTEC - BIG CANOE SECTIONS\GEOSYNTEC - BIG CANOE R3.DWG January 20, 2021

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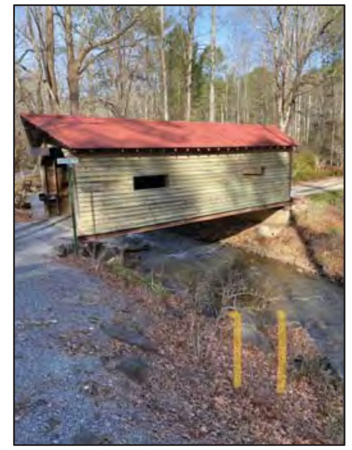
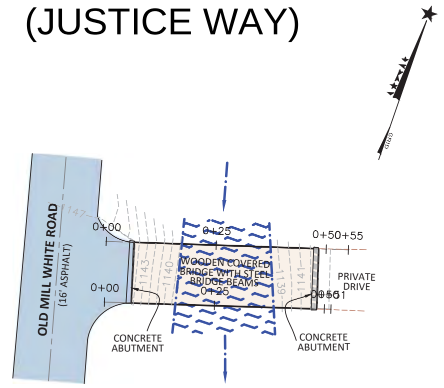
(JUSTICE WAY)

FROM NORTHWEST

FROM SOUTHWEST





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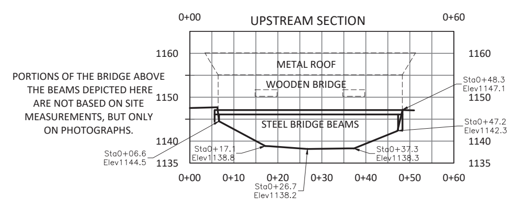

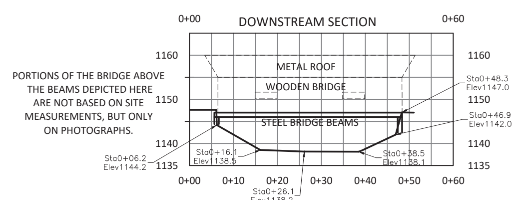

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SITE 12
OLD MILL WHITE ROAD

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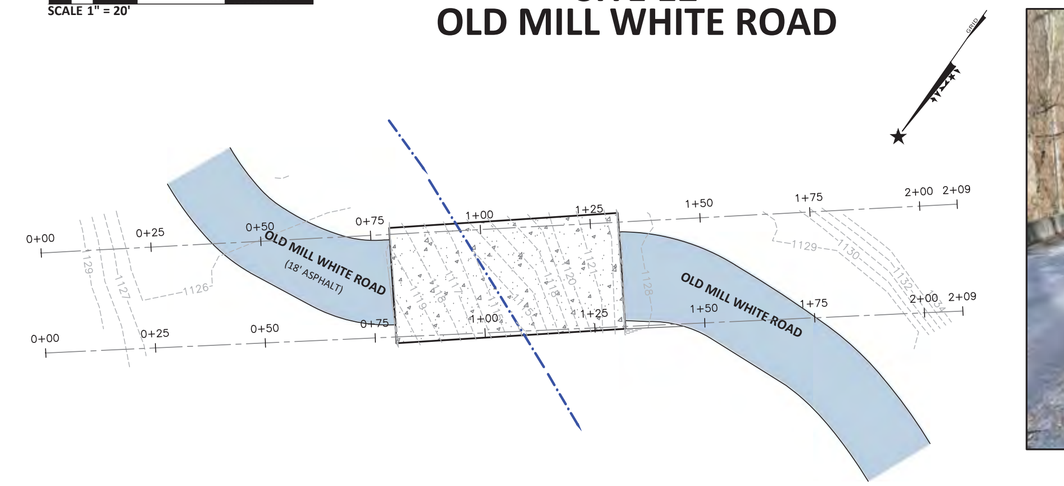

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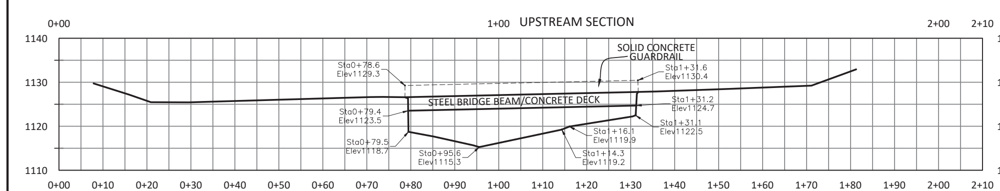

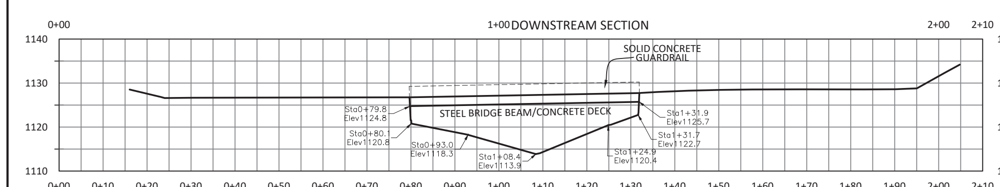

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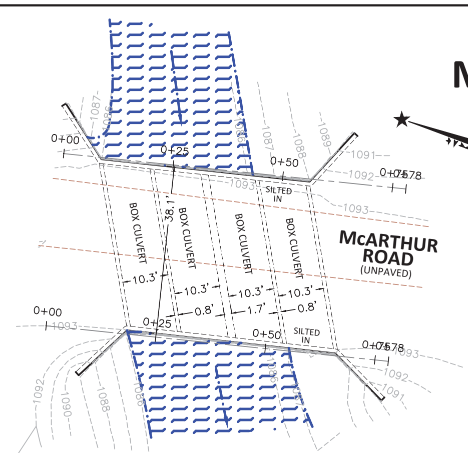

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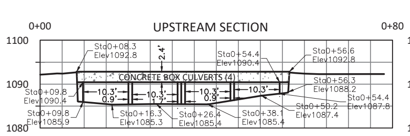

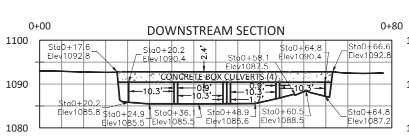

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FROM NORTH

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(NEAR HARRINGTON RD)

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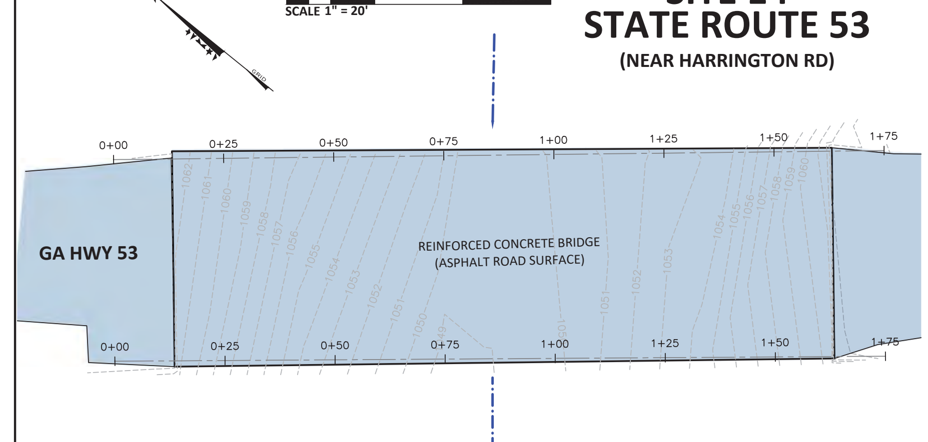

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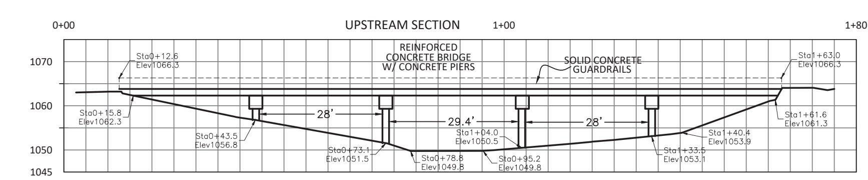

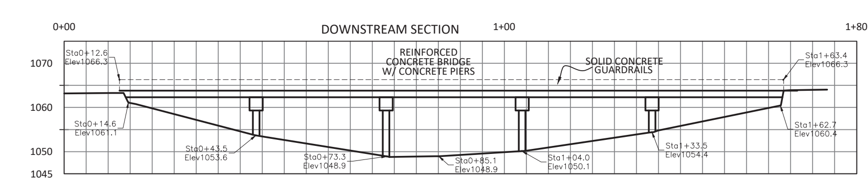

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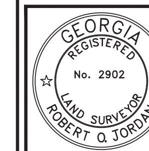

SITES:
11 - OLD MILL WHITE ROAD
12 - OLD MILL WHITE ROAD
13 - McARTHUR ROAD
14 - STATE ROUTE 53 (HARRINGTON RD)

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial Issue - sheet 1	01/22/21

Sheet No.
2 of 3

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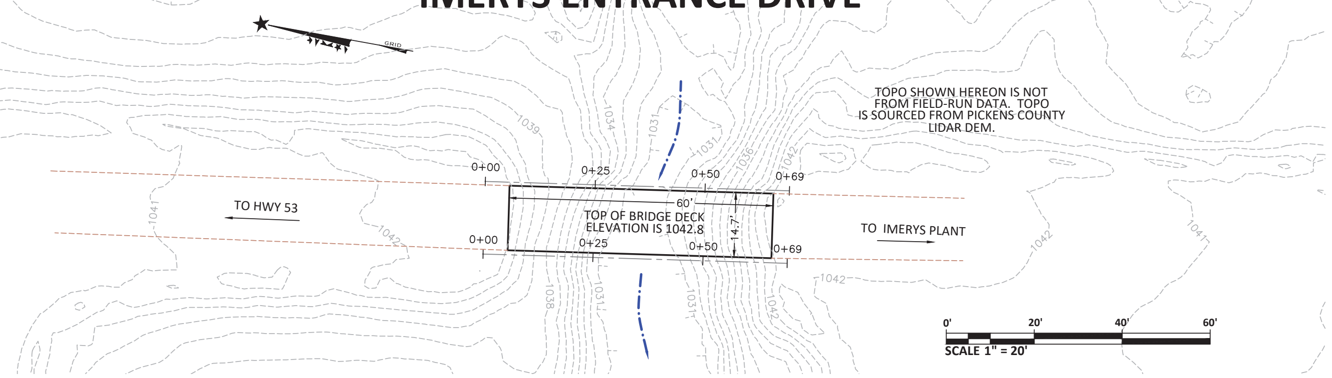
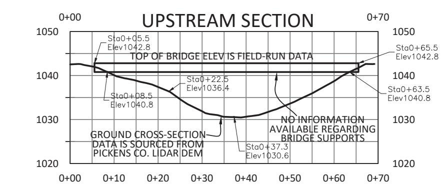
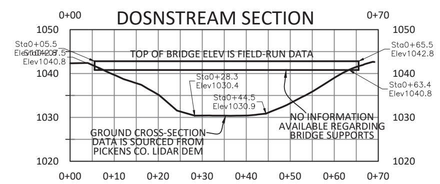
IMERYS ENTRANCE DRIVE







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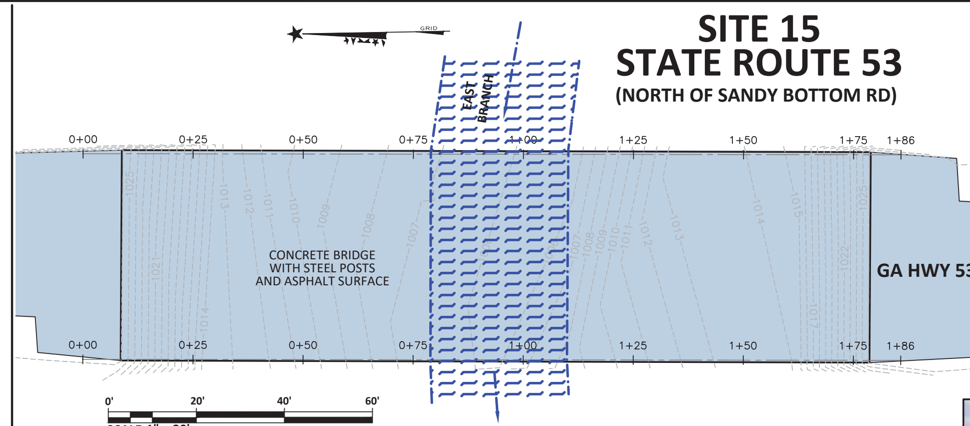

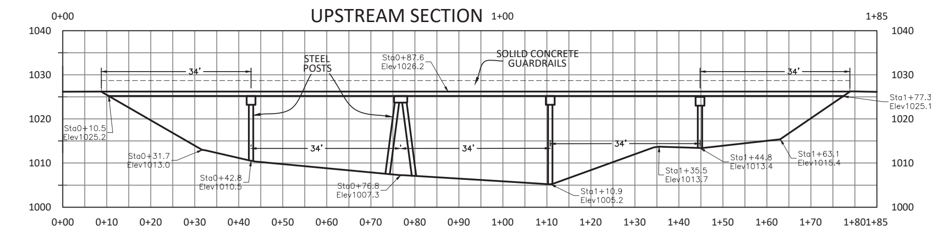

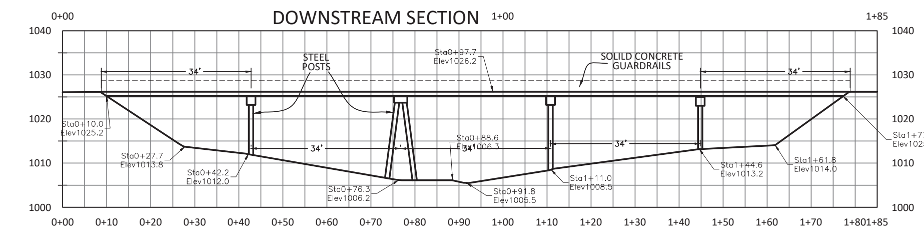

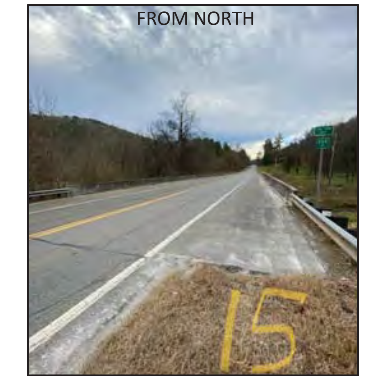

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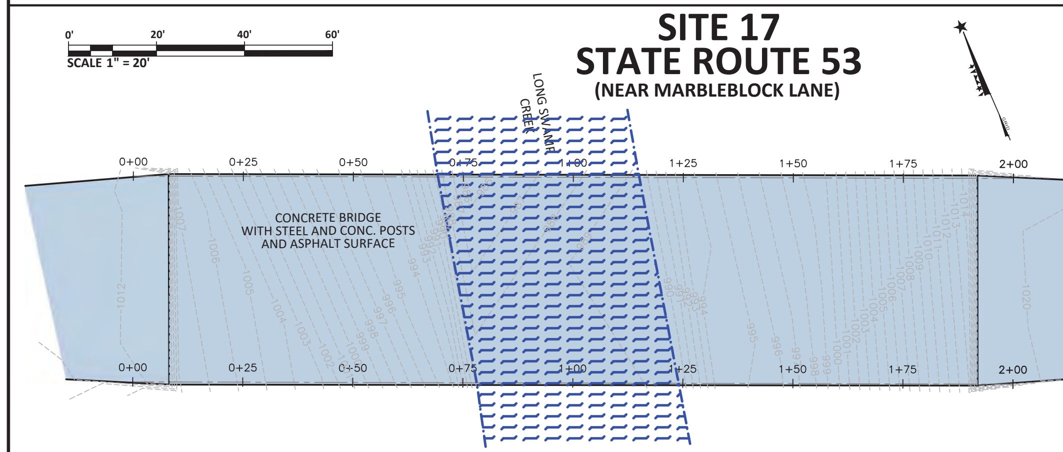
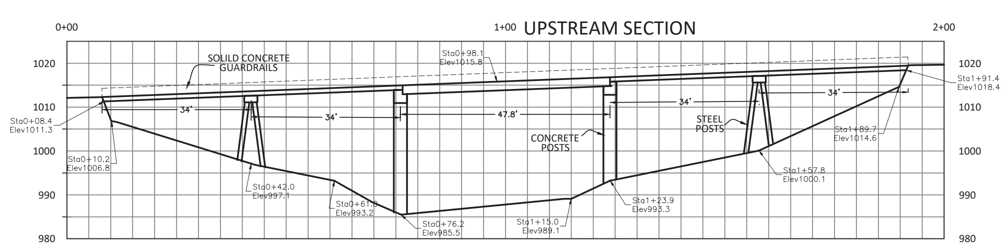
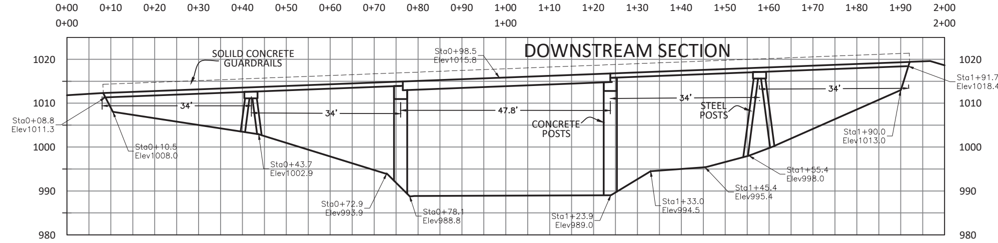
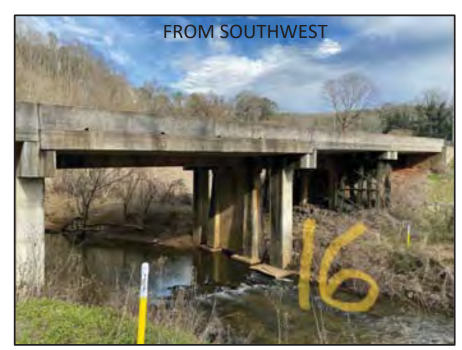
(NEAR MARBLEBLOCK LANE)









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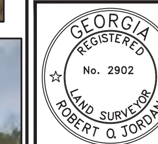


SITES:
16 - IMERYS ENTRANCE DRIVE
15 - STATE ROUTE 53
17 - STATE ROUTE 53

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial Issue - sheet 1	01/22/21
1	Initial Issue - sheets 2 and 3	01/28/21

Sheet No.
3 of 3

S:\SURVEY\GEOSYNTEC - BIG CANOE SECTIONS\GEOSYNTEC - BIG CANOE R4.DWG January 28, 2021

ATTACHMENT B

ELECTRONIC COPY WITH DIGITAL FILES (ON CD)

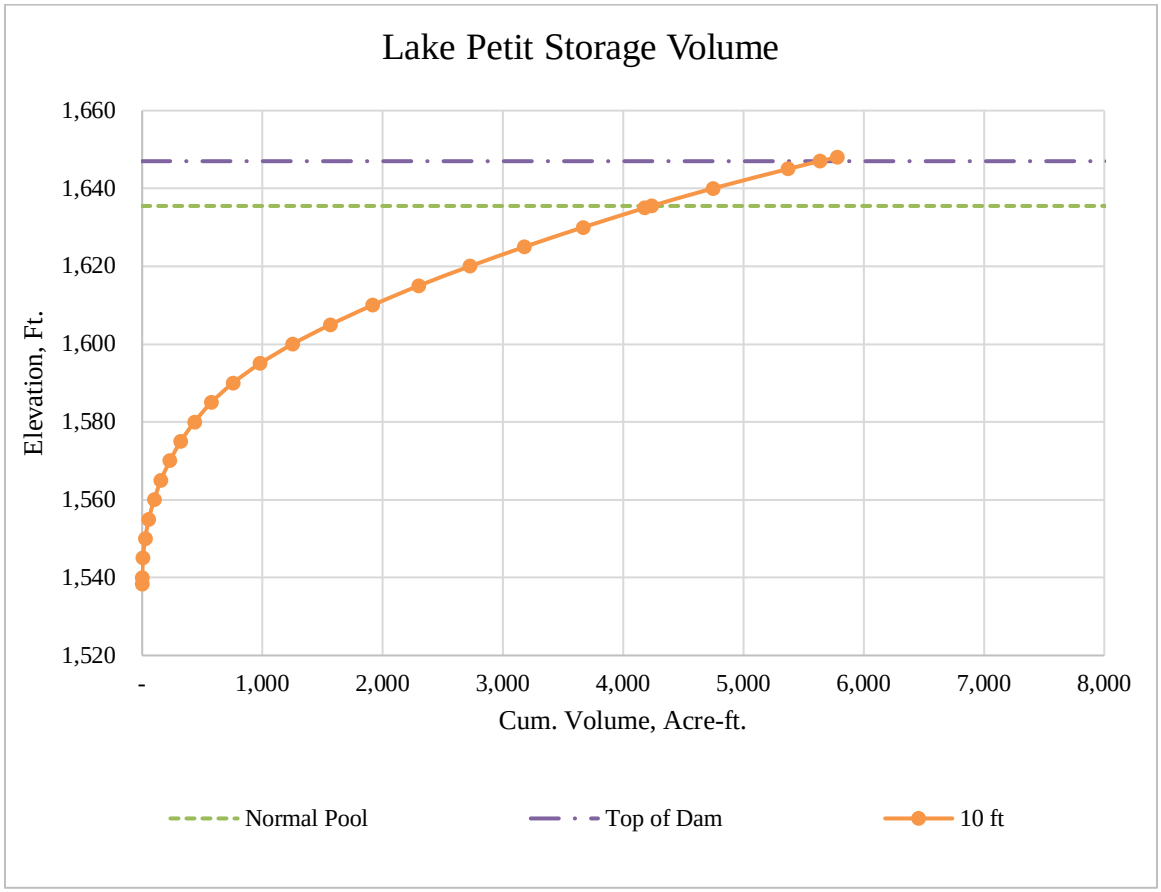
List of files Provided on CD

1. Shapefiles
    a. Dam Breach Location
    b. Inundation Boundary (Limits of Inundation)
    c. Inundation Raster
    d. Velocity Raster
    e. Potential Hazards Labeled with Address
    f. Distance Downstream
    g. Points of Interest
        i. Distance downstream
        ii. Name of Road or Dam
        iii. Depth of Overtopping
        iv. Maximum Flow Velocity
        v. Destruction Factor
        vi. Lowest Adjacent Grade
    h. Digital Elevation Model
2. HEC-RAS Model

ATTACHMENT C

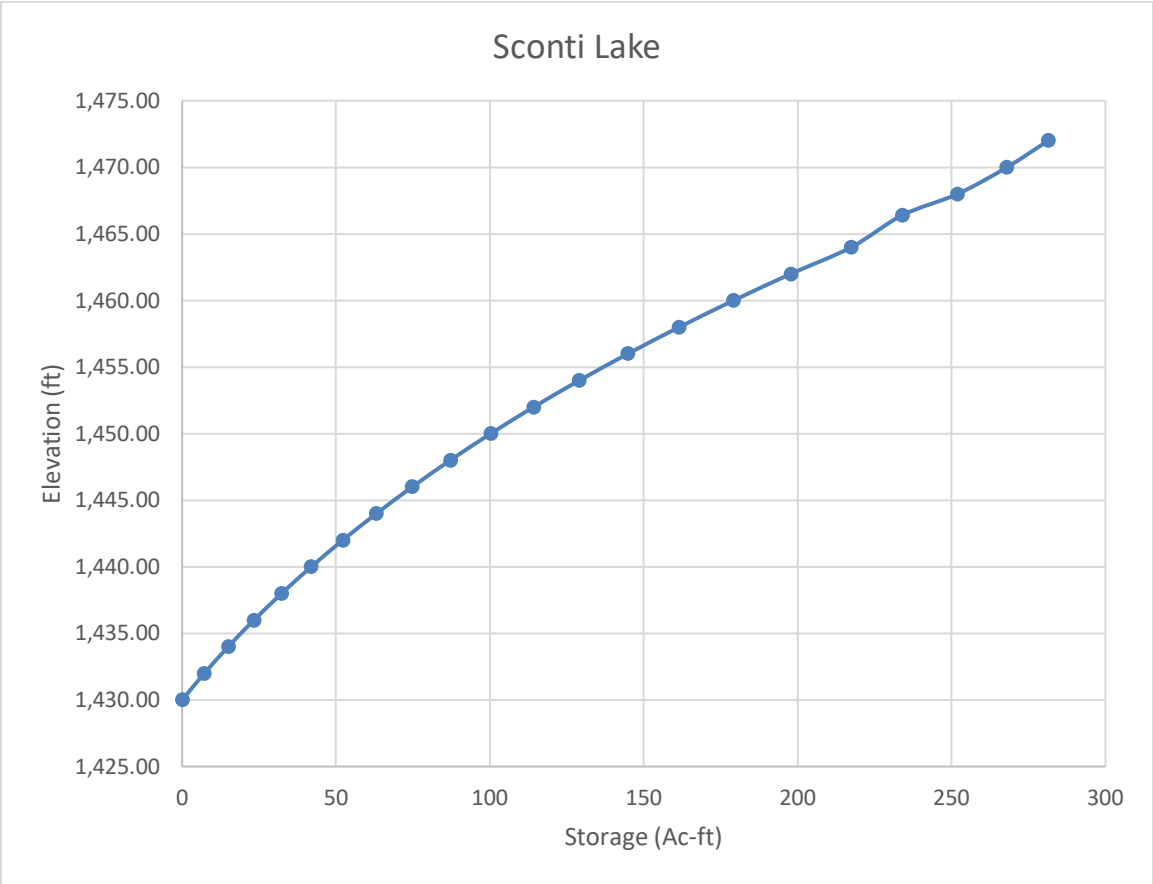
STAGE STORAGE TABLES

1. Lake Petit Stage-storage Table



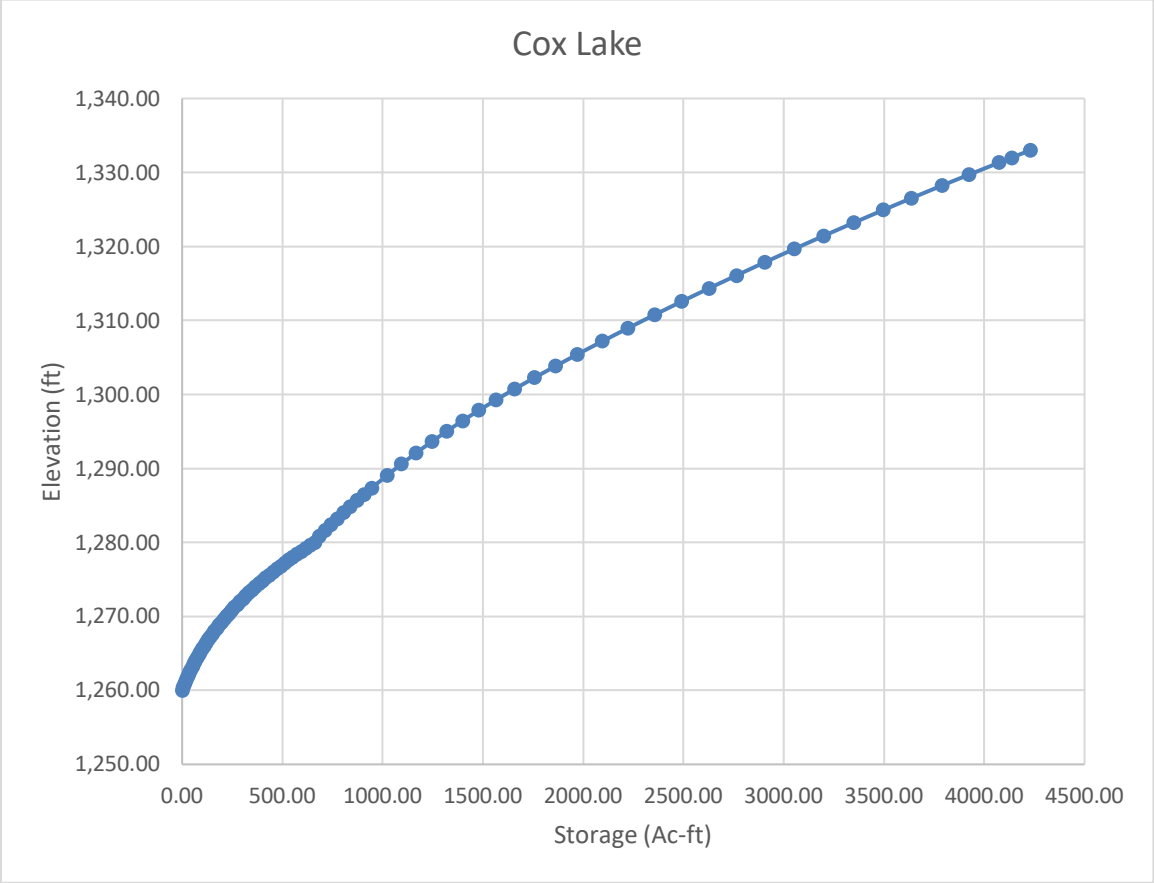
Elevation (ft)	Volume (Acre-ft)
1,538.38	0
1,540	0.4
1,560	100
1,580	435
1,600	1250
1,620	2725
1,635	4180
1,647	5635
1,648	5780

2. Lake Sconti Stage-storage Table



Elevation (ft)	Volume (Acre-ft)
1,430.00	0
1,432.00	7.21
1,434.00	14.99
1,436.00	23.36
1,438.00	32.34
1,440.00	41.95
1,442.00	52.21
1,444.00	63.15
1,446.00	74.79
1,448.00	87.14
1,450.00	100.27
1,452.00	114.26
1,454.00	129.12
1,456.00	144.88
1,458.00	161.56
1,460.00	179.21
1,462.00	197.83
1,464.00	217.46
1,466.40	234
1,468.00	252
1,470.00	268
1,472.00	281.40

3. Lake Cox Stage-storage Table



Elevation (ft)	Volume (Acre-ft)
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1,260.80	11.38
1,261.20	17.42
1,261.60	23.71
1,262.00	30.25
1,262.40	37.05
1,262.80	44.10
1,263.20	51.42
1,263.60	59.00
1,264.00	66.86
1,264.40	75.00
1,264.80	83.42
1,265.20	92.13
1,265.60	101.13
1,266.00	110.43
1,266.40	120.03
1,266.80	129.94
1,267.20	140.16
1,267.60	150.70
1,268.00	161.57
1,268.40	172.75
1,268.80	184.27
1,269.20	196.13
1,269.60	208.33
1,270.00	220.87
1,270.40	233.77
1,270.80	247.02
1,271.20	260.63
1,271.60	274.61
1,272.00	288.95
1,272.40	303.68
1,272.80	318.78
1,273.20	334.27
1,273.60	350.15
1,274.00	366.42

Elevation (ft)	Volume (Acre-ft)
1,274.40	383.09
1,274.80	400.17
1,275.20	417.66
1,275.60	435.56
1,276.00	453.88
1,276.40	472.62
1,276.80	491.79
1,277.20	511.40
1,277.60	531.44
1,278.00	551.93
1,278.40	572.86
1,278.80	594.25
1,279.20	616.09
1,279.60	638.40
1,280.00	661.18
1,280.83	685.85
1,281.60	713.28
1,282.39	742.58
1,283.19	772.93
1,284.00	804.74
1,284.82	837.71
1,285.65	872.23
1,286.49	907.89
1,287.34	944.58
1,289.04	1,021.15
1,290.60	1,094.26
1,292.10	1,167.52
1,293.61	1,244.65
1,295.01	1319.24
1,296.44	1,398.50
1,297.84	1,479.73
1,299.28	1,566.68
1,300.75	1,658.89
1,302.25	1,756.54
1,303.81	1,860.78
1,305.43	1,972.16
Elevation (ft)	Volume (Acre-ft)

1,307.19	2,096.00
1,308.94	2,222.23
1,310.76	2,355.77
1,312.55	2,490.39
1,314.34	2,627.39
1,316.08	2,764.12
1,317.87	2,906.40
1,319.66	3,052.27
1,321.44	3,199.95
1,323.21	3,349.16
1,324.92	3,496.27
1,326.51	3,635.25
1,328.23	3,788.83
1,329.69	3,922.35
1,331.34	4,075.13
1,332.00	4,136.09
1,333.00	4,228.77
1,335.00	4,344.62
1,337.50	4,490.22

ATTACHMENT D

BREACH PARAMETER CALCULATION

Dam Name:	Petit Lake	Prepared by:	SS
Location:	Pickens County, GA	Date:	8/17/2022
Breach Scenario:	Sunny Day		

Height of Dam (ft):	108.7
Breach Bottom Elevation:	1538.3
Height of water above breach bottom (ft):	108.7
Reservoir Storage Volume at Failure (acre-feet):	5635.0
Reservoir Surface Area at Failure (acres):	148.80
Failure Scenario:	Overtopping
Discharge through spillways at failure (Q_o, cfs):	0

Breach Parameters

Froelich (2008)

Avg. Breach Width (ft):	326.1	Breach Side Slopes:	1.0 H:1V
Breach Bottom Width (ft):	217.4	K_o Factor:	1.3
Time of failure (hrs):	0.45		

Froelich (1995)

Avg. Breach Width (ft):	326.1	Breach Side Slopes:	1.4 H:1V
Breach Bottom Width (ft):	173.9	K_o Factor:	1.0
Time of failure (hrs):	0.48		

MacDonald & Langridge-Monopolis (1984)

[For Piping Scenario Only when Storage Volume is less than 100 acre-feet]

Avg. Breach Width (ft):	66.5	Breach Side Slopes:	0.5 H:1V
Breach Bottom Width (ft):	12.2	Upstream Slopes:	2.5 H:1V
Time of failure (hrs):	1.03	Downstream Slopes:	3.5 H:1V
	Storage exceeds 100 ac-ft	Crest Width (ft):	35

VALUES USED FOR ANALYSIS (To be Entered by Engineer)

Avg. Breach Width (ft):	326.1	Breach Side Slopes:	1 H:1V
Breach Bottom Width (ft):	217.4	(based on on selected values)	
Time of failure (hrs):	0.45		

Check for: Time of Failure too long

Check for: Time of Failure less than recommended minimum value

Notes:

- The average breach width cannot be wider than The width of The stream valley at The particular elevation.
- The check for time of failures are based on minimum reasonable value (based on MDE experience) and the maximum reasonable valuesbased on expected erosion rate (Von Thun & Gillette (1990)).

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Petit Lake	Prepared by:	SS
Location:	Pickens County, GA	Date:	8/17/2022
Breach Scenario:	Sunny Day		

Peak Breach Discharge

National Weather Service Simple Dam Break Equation

Avg. Breach Width (ft) from previous sheet:	326.1
Time of failure (hrs) from previous sheet:	0.45
Height of water above breach bottom (ft):	108.7
Reservoir Surface Area at Failure (acres):	148.8
Discharge through spillways at failure (Q_o, cfs):	0

$$Q_b = Q_o + 3.1 B_r (C/(T_f + C/\sqrt{H}))^3$$

Q_b = Peak breach discharge plus discharge through spillways (cfs)

Q_o = Discharge through principal and emergency spillways with water surface at failure level

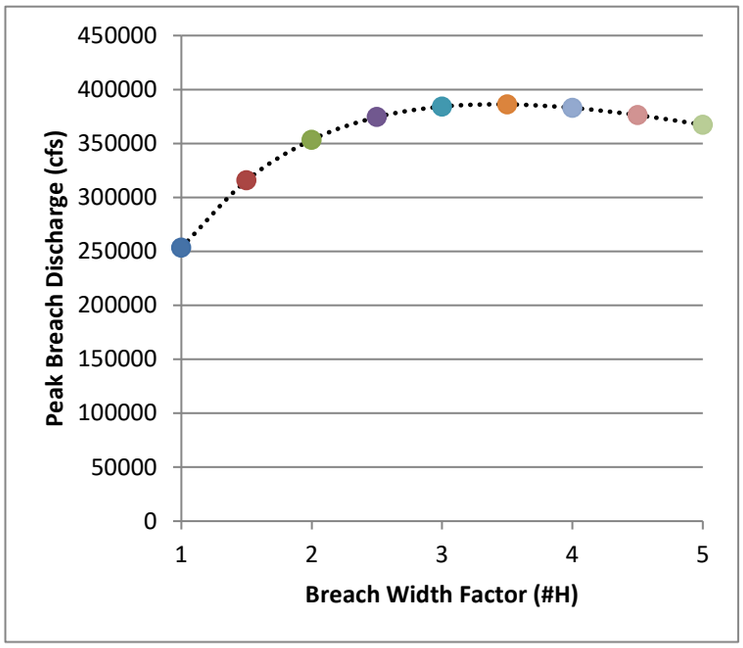
B_r = Avg. Breach Width (ft), typically 1 to 5 times height of dam

A_s = Reservoir Surface Area at with water surface at failure level (acres)

H = Height of water above breach bottom (ft)

T_f = Time to failure (hrs)

C = $23.4 * A_s / B_r$



Breach Width Factor	Breach Width (feet)	C	Q_b (cfs)
[H]	108.7	32.03	253426
[1.5H]	163.05	21.35	315695
[2H]	217.4	16.02	353377
[2.5H]	271.75	12.81	374425
[3H]	326.1	10.68	384161
[3.5H]	380.45	9.15	386192
[4.0H]	434.8	8.01	382998
[4.5H]	489.15	7.12	376297
[5.0H]	543.5	6.41	367293

Peak Breach Discharge: 386192.1 cfs

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Sconti Lake	Prepared by:	RT
Location:	Pickens County, GA	Date:	4/19/2021
Breach Scenario:	Sunny Day		

Height of Dam (ft):	40
Breach Bottom Elevation:	1430
Height of water above breach bottom (ft):	42
Reservoir Storage Volume at Failure (acre-feet):	281.4
Reservoir Surface Area at Failure (acres):	140.70
Failure Scenario:	Overtopping
Discharge through spillways at failure (Q_o, cfs):	0

Breach Parameters

Froelich (2008)

Avg. Breach Width (ft):	120.0	Breach Side Slopes:	1.0	H:1V
Breach Bottom Width (ft):	80.0	K_o Factor:	1.3	
Time of failure (hrs):	0.26			

Froelich (1995)

Avg. Breach Width (ft):	99.1	Breach Side Slopes:	1.4	H:1V
Breach Bottom Width (ft):	43.1	K_o Factor:	1.0	
Time of failure (hrs):	0.28			

MacDonald & Langridge-Monopolis (1984)

[For Piping Scenario Only when Storage Volume is less than 100 acre-feet]

Avg. Breach Width (ft):	20.2	Breach Side Slopes:	0.5	H:1V
Breach Bottom Width (ft):	0.2	Upstream Slopes:	3.0	H:1V
Time of failure (hrs):	0.34	Downstream Slopes:	3.0	H:1V
	Storage exceeds 100 ac-ft	Crest Width (ft):	35	

VALUES USED FOR ANALYSIS (To be Entered by Engineer)

Avg. Breach Width (ft):	120.0	Breach Side Slopes:	1	H:1V
Breach Bottom Width (ft):	80.0	(based on on selected values)		
Time of failure (hrs):	0.27			

Check for: Time of Failure too long

Check for: Time of Failure less than recommended minimum value

Notes:

- The average breach width cannot be wider than The width of The stream valley at The particular elevation.
- The check for time of failures are based on minimum reasonable value (based on MDE experience) and the maximum reasonable valuesbased on expected erosion rate (Von Thun & Gillette (1990)).

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Sconti Lake	Prepared by:	RT
Location:	Pickens County, GA	Date:	4/19/2021
Breach Scenario:	Sunny Day		

Peak Breach Discharge

National Weather Service Simple Dam Break Equation

Avg. Breach Width (ft) from previous sheet:	120
Time of failure (hrs) from previous sheet:	0.27
Height of water above breach bottom (ft):	42
Reservoir Surface Area at Failure (acres):	140.7
Discharge through spillways at failure (Q_o, cfs):	0

$$Q_b = Q_o + 3.1B_r(C/(T_f + C/\sqrt{H}))^3$$

Q_b = Peak breach discharge plus discharge through spillways (cfs)

Q_o = Discharge through principal and emergency spillways with water surface at failure level

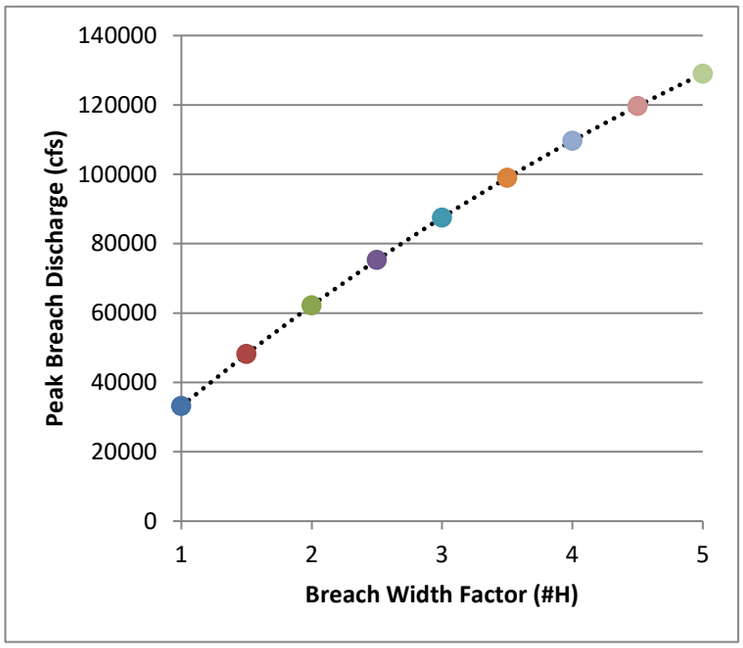
B_r = Avg. Breach Width (ft), typically 1 to 5 times height of dam

A_s = Reservoir Surface Area at with water surface at failure level (acres)

H = Height of water above breach bottom (ft)

T_f = Time to failure (hrs)

C = $23.4*A_s/B_r$



Breach Width Factor	(feet)	C	Q_b (cfs)
[H]	42	78.39	**33168**
[1.5H]	63	52.26	**48158**
[2H]	84	39.20	**62174**
[2.5H]	105	31.36	**75279**
[3H]	126	26.13	**87530**
[3.5H]	147	22.40	**98979**
[4.0H]	168	19.60	**109678**
[4.5H]	189	17.42	**119671**
[5.0H]	210	15.68	**129003**

Peak Breach Discharge: 129002.8 cfs

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Cox Lake	Prepared by:	RT
Location:	Pickens County, GA	Date:	4/19/2021
Breach Scenario:	Sunny Day		

Height of Dam (ft):	97
Breach Bottom Elevation:	1235.5
Height of water above breach bottom (ft):	99
Reservoir Storage Volume at Failure (acre-feet):	4490.2
Reservoir Surface Area at Failure (acres):	222.91
Failure Scenario:	Overtopping
Discharge through spillways at failure (Q_o, cfs):	0

Breach Parameters

Froelich (2008)

Avg. Breach Width (ft):	291.0	Breach Side Slopes:	1.0	H:1V
Breach Bottom Width (ft):	194.0	K_o Factor:	1.3	
Time of failure (hrs):	0.44			

Froelich (1995)

Avg. Breach Width (ft):	245.3	Breach Side Slopes:	1.4	H:1V
Breach Bottom Width (ft):	109.5	K_o Factor:	1.0	
Time of failure (hrs):	0.47			

MacDonald & Langridge-Monopolis (1984)

[For Piping Scenario Only when Storage Volume is less than 100 acre-feet]

Avg. Breach Width (ft):	64.5	Breach Side Slopes:	0.5	H:1V
Breach Bottom Width (ft):	16.0	Upstream Slopes:	3.0	H:1V
Time of failure (hrs):	0.94	Downstream Slopes:	3.0	H:1V
	Storage exceeds 100 ac-ft	Crest Width (ft):	35	

VALUES USED FOR ANALYSIS (To be Entered by Engineer)

Avg. Breach Width (ft):	291.0	Breach Side Slopes:	1	H:1V
Breach Bottom Width (ft):	194.0	(based on on selected values)		
Time of failure (hrs):	0.45			

Check for: Time of Failure too long

Check for: Time of Failure less than recommended minimum value

Notes:

- The average breach width cannot be wider than The width of The stream valley at The particular elevation.
- The check for time of failures are based on minimum reasonable value (based on MDE experience) and the maximum reasonable valuesbased on expected erosion rate (Von Thun & Gillette (1990)).

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Cox Lake	Prepared by:	RT
Location:	Pickens County, GA	Date:	4/19/2021
Breach Scenario:	Sunny Day		

Peak Breach Discharge

National Weather Service Simple Dam Break Equation

Avg. Breach Width (ft) from previous sheet:	291
Time of failure (hrs) from previous sheet:	0.45
Height of water above breach bottom (ft):	99
Reservoir Surface Area at Failure (acres):	222.91
Discharge through spillways at failure (Q_o, cfs):	0

$$Q_b = Q_o + 3.1B_r(C/(T_f + C/\sqrt{H}))^3$$

Q_b = Peak breach discharge plus discharge through spillways (cfs)

Q_o = Discharge through principal and emergency spillways with water surface at failure level

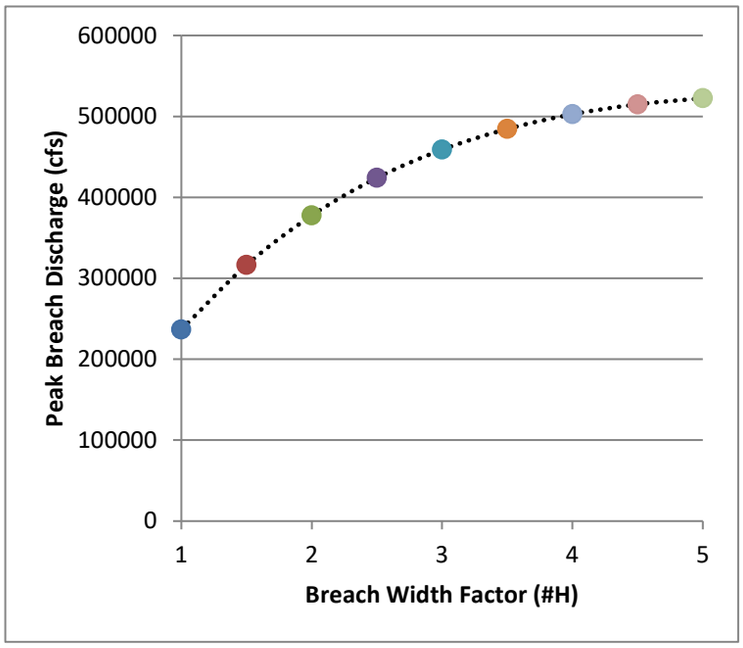
B_r = Avg. Breach Width (ft), typically 1 to 5 times height of dam

A_s = Reservoir Surface Area at with water surface at failure level (acres)

H = Height of water above breach bottom (ft)

T_f = Time to failure (hrs)

$C = 23.4*A_s/B_r$



Breach Width Factor	Breach Width (feet)	C	Q_b (cfs)
[H]	99	52.69	236692
[1.5H]	148.5	35.13	316392
[2H]	198	26.34	377542
[2.5H]	247.5	21.08	424030
[3H]	297	17.56	458881
[3.5H]	346.5	15.05	484466
[4.0H]	396	13.17	502656
[4.5H]	445.5	11.71	514931
[5.0H]	495	10.54	522473

Peak Breach Discharge 522472.8 cfs

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Cove Road	Prepared by:	EC
Location:	Pickens County, GA	Date:	10/24/2022
Breach Scenario:	Sunny Day		

Height of Dam (ft):	44
Breach Bottom Elevation:	1291
Height of water above breach bottom (ft):	46
Reservoir Storage Volume at Failure (acre-feet):	206.8
Reservoir Surface Area at Failure (acres):	10.37
Failure Scenario:	Overtopping
Discharge through spillways at failure (Q_o, cfs):	0

Breach Parameters

Froelich (2008)

Avg. Breach Width (ft):	132.0	Breach Side Slopes:	1.0	H:1V
Breach Bottom Width (ft):	88.0	K_o Factor:	1.3	
Time of failure (hrs):	0.20			

Froelich (1995)

Avg. Breach Width (ft):	132.0	Breach Side Slopes:	1.4	H:1V
Breach Bottom Width (ft):	70.4	K_o Factor:	1.0	
Time of failure (hrs):	0.22			

MacDonald & Langridge-Monopolis (1984)

[For Piping Scenario Only when Storage Volume is less than 100 acre-feet]

Avg. Breach Width (ft):	14.4	Breach Side Slopes:	0.5	H:1V
Breach Bottom Width (ft):	-7.6	Upstream Slopes:	3.0	H:1V
Time of failure (hrs):	0.32	Downstream Slopes:	3.0	H:1V
	Storage exceeds 100 ac-ft	Crest Width (ft):	35	

VALUES USED FOR ANALYSIS (To be Entered by Engineer)

Avg. Breach Width (ft):	132.0	Breach Side Slopes:	1	H:1V
Breach Bottom Width (ft):	88.0	(based on on selected values)		
Time of failure (hrs):	0.20			

Check for: Time of Failure too long

Check for: Time of Failure less than recommended minimum value

Notes:

- The average breach width cannot be wider than The width of The stream valley at The particular elevation.

- The check for time of failures are based on minimum reasonable value (based on MDE experience) and the maximum reasonable valuesbased on expected erosion rate (Von Thun & Gillette (1990)).

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

Dam Name:	Cove Road	Prepared by:	EC
Location:	Pickens County, GA	Date:	10/24/2022
Breach Scenario:	Sunny Day		

Peak Breach Discharge

National Weather Service Simple Dam Break Equation

Avg. Breach Width (ft) from previous sheet:	132
Time of failure (hrs) from previous sheet:	0.201862415
Height of water above breach bottom (ft):	46
Reservoir Surface Area at Failure (acres):	10.37
Discharge through spillways at failure (Q_o, cfs):	0

$$Q_b = Q_o + 3.1 B_r (C/(T_f + C/\sqrt{H}))^3$$

Q_b = Peak breach discharge plus discharge through spillways (cfs)

Q_o = Discharge through principal and emergency spillways with water surface at failure level

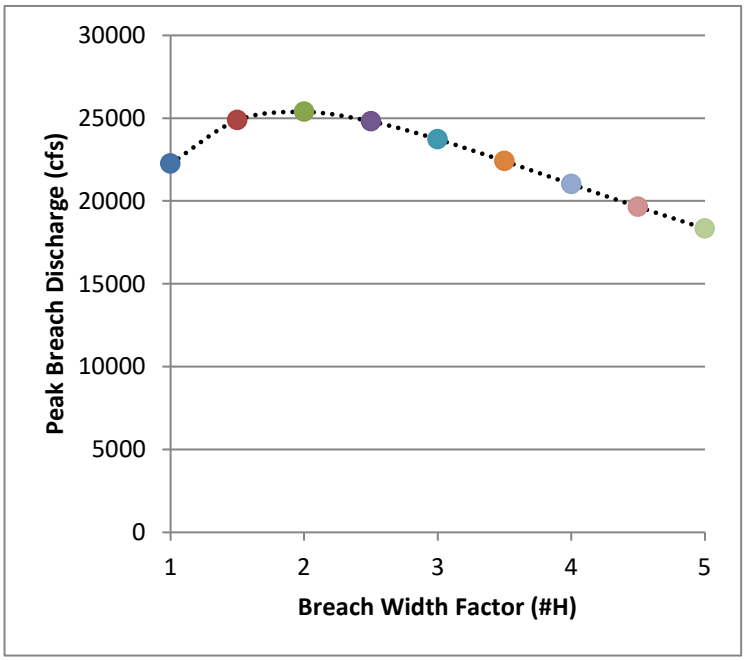
B_r = Avg. Breach Width (ft), typically 1 to 5 times height of dam

A_s = Reservoir Surface Area at with water surface at failure level (acres)

H = Height of water above breach bottom (ft)

T_f = Time to failure (hrs)

$C = 23.4 * A_s / B_r$



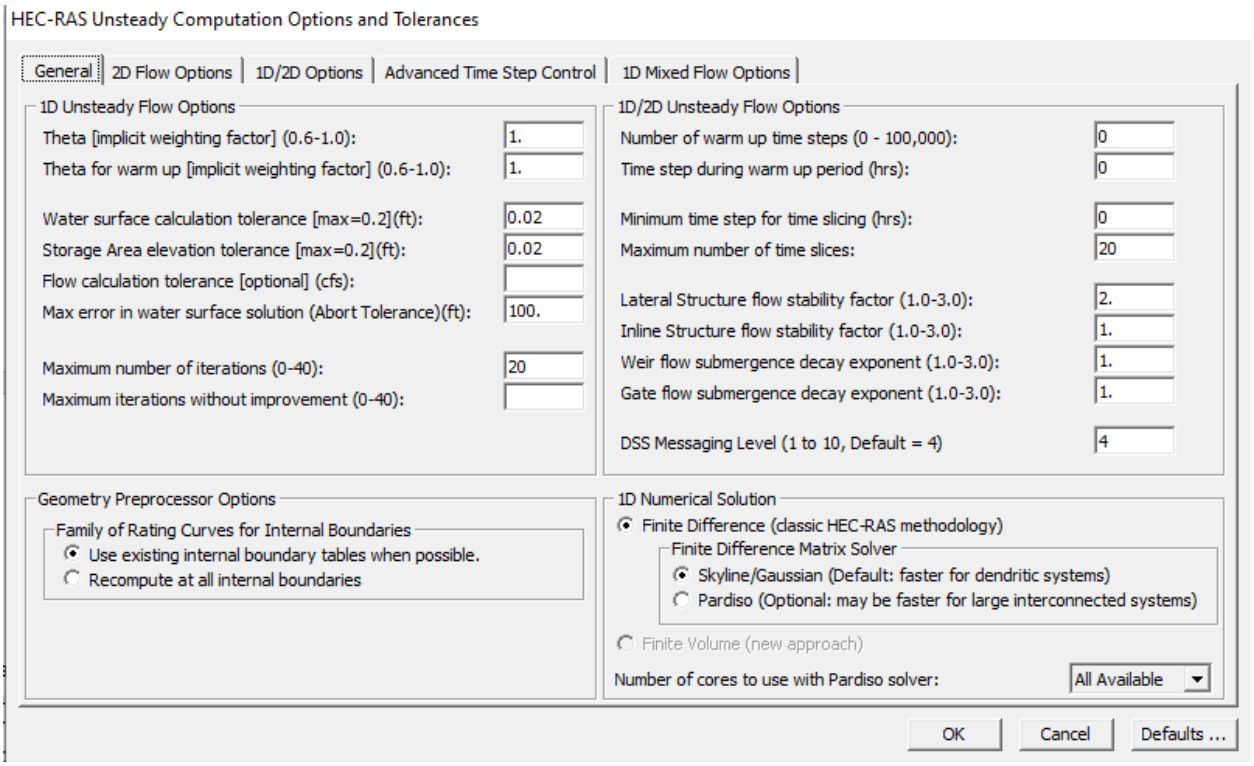
Breach Width Factor	Breach Width (feet)	C	Q_b (cfs)
[H]	46	5.28	22265
[1.5H]	69	3.52	24886
[2H]	92	2.64	25383
[2.5H]	115	2.11	24812
[3H]	138	1.76	23721
[3.5H]	161	1.51	22404
[4.0H]	184	1.32	21019
[4.5H]	207	1.17	19649
[5.0H]	230	1.06	18338

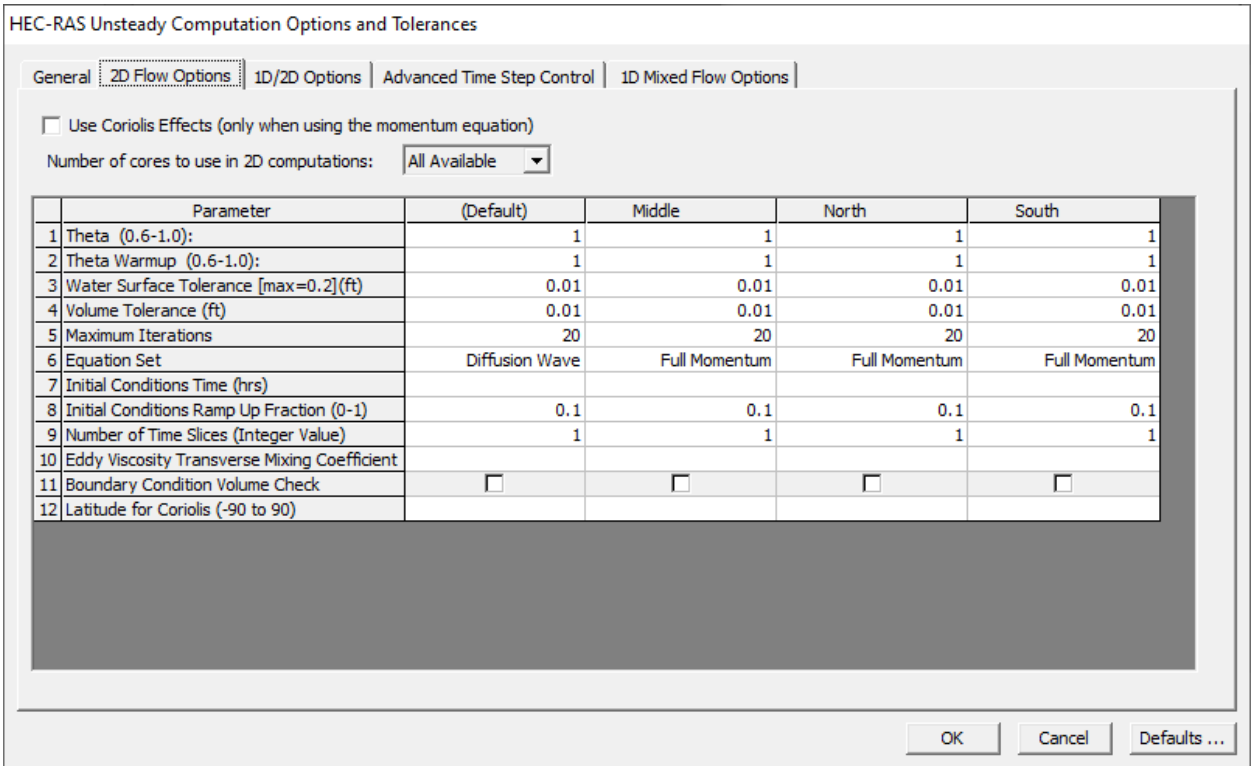
Peak Breach Discharge: 25383.5 cfs

Note: This spreadsheet is provided for the convenience of the engineering community in the State of Maryland. All results should be verified as accurate by the user.

ATTACHMENT E

SETTINGS AND TOLERANCES


HEC-RAS Unsteady Computation Options and Tolerances
General
2D Flow Options
1D/2D Options
Advanced Time Step Control
1D Mixed Flow Options
1D Unsteady Flow Options
Theta [implicit weighting factor] (0.6-1.0):
1.
Theta for warm up [implicit weighting factor] (0.6-1.0):
1.
Water surface calculation tolerance [max=0.2](ft):
0.02
Storage Area elevation tolerance [max=0.2](ft):
0.02
Flow calculation tolerance [optional] (cfs):
Max error in water surface solution (Abort Tolerance)(ft):
100.
Maximum number of iterations (0-40):
20
Maximum iterations without improvement (0-40):
1D/2D Unsteady Flow Options
Number of warm up time steps (0 - 100,000):
0
Time step during warm up period (hrs):
0
Minimum time step for time slicing (hrs):
0
Maximum number of time slices:
20
Lateral Structure flow stability factor (1.0-3.0):
2.
Inline Structure flow stability factor (1.0-3.0):
1.
Weir flow submergence decay exponent (1.0-3.0):
1.
Gate flow submergence decay exponent (1.0-3.0):
1.
DSS Messaging Level (1 to 10, Default = 4)
4
Geometry Preprocessor Options
Family of Rating Curves for Internal Boundaries
Use existing internal boundary tables when possible.
Recompute at all internal boundaries
1D Numerical Solution
Finite Difference (classic HEC-RAS methodology)
Finite Difference Matrix Solver
Skyline/Gaussian (Default: faster for dendritic systems)
Pardiso (Optional: may be faster for large interconnected systems)
Finite Volume (new approach)
Number of cores to use with Pardiso solver:
All Available
OK
Cancel
Defaults ...


HEC-RAS Unsteady Computation Options and Tolerances
General
2D Flow Options
1D/2D Options
Advanced Time Step Control
1D Mixed Flow Options
Use Coriolis Effects (only when using the momentum equation)
Number of cores to use in 2D computations:
All Available
Parameter
(Default)
Middle
North
South
1 Theta (0.6-1.0): 1 1 1 1
2 Theta Warmup (0.6-1.0): 1 1 1 1
3 Water Surface Tolerance [max=0.2](ft) 0.01 0.01 0.01 0.01
4 Volume Tolerance (ft) 0.01 0.01 0.01 0.01
5 Maximum Iterations 20 20 20 20
6 Equation Set Diffusion Wave Full Momentum Full Momentum Full Momentum
7 Initial Conditions Time (hrs)
8 Initial Conditions Ramp Up Fraction (0-1) 0.1 0.1 0.1 0.1
9 Number of Time Slices (Integer Value) 1 1 1 1
10 Eddy Viscosity Transverse Mixing Coefficient
11 Boundary Condition Volume Check
12 Latitude for Coriolis (-90 to 90)
OK
Cancel
Defaults ...

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Maximum iterations between 1D and 2D (0=off, 1 to 20):	0
Water surface tolerance (ft):	0.01
Flow Tolerance (%)	0.1
Minimum flow tolerance (cfs):	1.

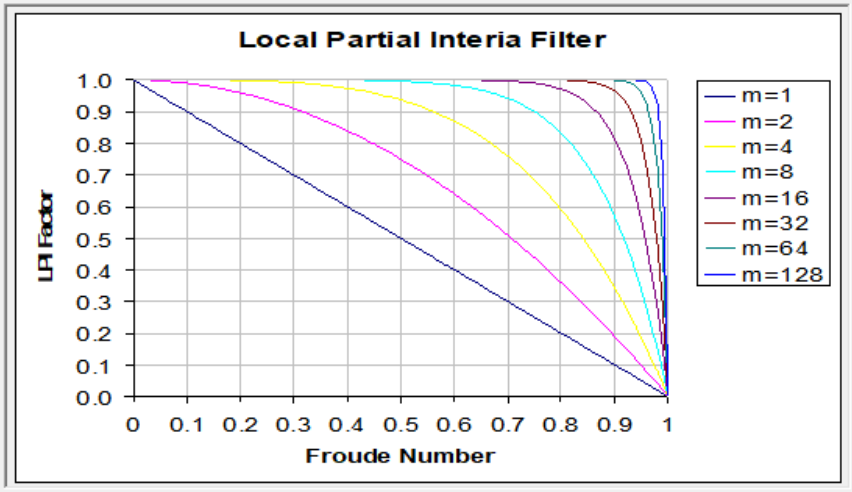
OK | Cancel | Defaults ...

HEC-RAS Unsteady Computation Options and Tolerances

General | 2D Flow Options | 1D/2D Options | Advanced Time Step Control | 1D Mixed Flow Options

Mixed Flow Regime (see menu: "Options/Mixed Flow Options ...")

Exponent for Froude number reduction factor m (m>0):	4.
Froude number threshold for eliminating acceleration terms:	0.8



OK | Cancel | Defaults ...

ATTACHMENT F

INUNDATION MAP

LAKE PETIT DAM FAILURE

LOCATION MAP

LEGEND

▲ Inundated Structures (Total Count: 142)

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

NOTE: The list of inundated structure were provided by Pickens County and included structures within a 100 ft buffer outside of the extent of the mapped inundation zone.

The method used to develop inundation zones are approximate. Actual areas inundated will depent on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

Geosyntec consultants

07-Oct-2022

Feet

0 2,000 4,000 8,000

Meters

0 250 500 1,000 1,500

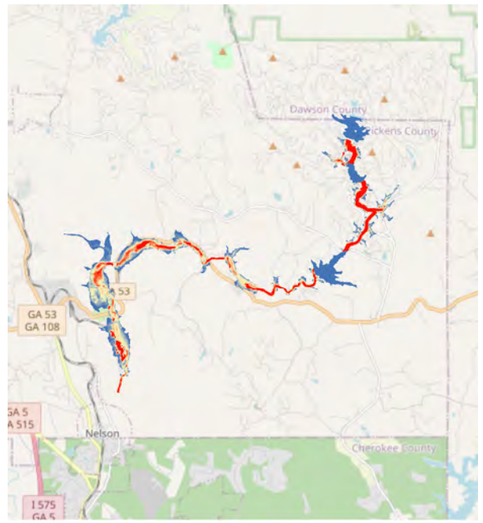
Lake Petit Dam
Wolfscratch Drive
Disharoon Lake
Lake Sconti Dam
Golf Course Road
Wilderness Parkway
Cove Road
Lake Cox Dam
Pendley Woods Road
Old Mill White Road (Upstream)
Old Mill White Road (Downstream)
McArthur Road
Imery's Entrance Drive
State Route 53 (Near Sandy Bottom Road)
State Route 53 (Near Harrington Road)
State Route 53 (Near Marbleblock Lane)

ATTACHMENT G

VELOCITY MAP

LAKE PETIT DAM FAILURE

LOCATION MAP



LEGEND

Maximum Velocity (ft/s)

- < 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- > 9

Lake Petit Dam
Wolfscratch Drive
Disharoon Lake
Lake Sconti Dam
Golf Course Road
Wilderness Parkway
Cove Road
Lake Cox Dam
Pendley Woods Road
Old Mill White Road (Upstream)
Old Mill White Road (Downstream)
McArthur Road
Imery's Entrance Drive
State Route 53 (Near Sandy Bottom Road)
State Route 53 (Near Harrington Road)
State Route 53 (Near Marbleblock Lane)
Marblehill
Tate

The method used to develop inundation zones are approximate. Actual areas inundated will depent on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

Geosyntec consultants

07-Oct-2022

Feet
0 2,000 4,000 8,000

Meters
0 250 500 1,000 1,500

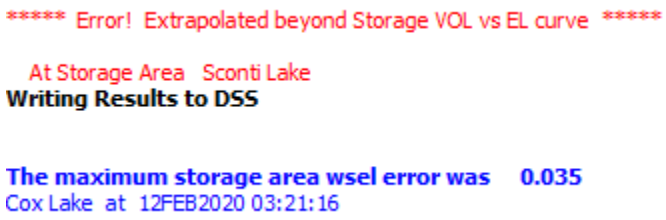
ATTACHMENT H

SUMMARY OF WARNINGS AND NOTES

Model Errors

1. Extrapolated beyond Storage VOL vs EL curve at Storage Area Sconti Lake
2. The maximum storage area wsel error was 0.035 (Cox Lake at 12FEB2020 03:21:16)

Snip from Plan Computation in HEC-RAS



HEC-RAS - River Analysis System

Project File: C:\Office_Projects\Lake Petit\2022(0927)_Final Model\LakePetit.prj

Project Name: Lake Petit

Plan Name: 0927(2022)_Lake Petit Plan

Short ID: Lake Petit 092722

Starting Time: 11Feb2020 2400

Ending Time: 12Feb2020 0600

```
################################################
#                                              #
#                                              #
#      1D and 2D Unsteady Flow Module          #
#                                              #
#                                              #
#        HEC-RAS 5.0.7 March 2019              #
#                                              #
#          27SEP22 at 17:49:08                 #
#                                              #
################################################
```

Volume Accounting in Acre Feet

External Boundary Flux of Water

US Inflow	Lat Hydro	DS Outflow	SA Hydro	Groundwater	2D Inflow	2D Outflow	Diversions
**********	**********	**********	**********	**********	**********	**********	**********
					3980.		

River Reaches, Storage Areas, and 2D Areas

Start 1D Reach	Starting SA's	Starting 2D	Final 1D Reach	Final SA's	Final 2D Areas
**********	**********	**********	**********	**********	**********
6318.			18308.		

Error Percent Error

*****	**********
15970.	252.8

Volume Accounting for 2D Flow Area in Acre Feet

2D Area	Starting Vol	Ending Vol	Cum Inflow	Cum Outflow	Error	Percent Error
*******	**********	**********	**********	**********	*****	**********
Middle	231.8	141168.	141804.	867.9	0.6148	
North	15.10	5637.	5844.	221.8	3.935	
South	18061.	22038.	3980.	2.513	0.01140	

ATTACHMENT I

POTENTIAL HAZARD ADDRESSES

INUNDATED STRUCTURES ADDRESS	
1136 WOLFSCRATCH DR	9399 HIGHWAY 53 E
1136 WOLFSCRATCH DR	25 PULLTIGHT RD
1136 WOLFSCRATCH DR	9077 HIGHWAY 53 E
1136 WOLFSCRATCH DR	9037 HIGHWAY 53 E
48 SCONTI RDG	454 OLD HARBIN RD
86 SCONTI RDG	356 OLD HARBIN RD
40 TREETOP LN	8839 HIGHWAY 53 E
104 TREETOPPER LN	8817 HIGHWAY 53 E
92 TREETOPPER LN	280 OLD HARBIN RD
52 TREETOPPER LN	154 OLD HARBIN RD
309 BUCKSKULL HOLLOW DR	34 LIMESTONE LN
301 BUCKSKULL HOLLOW DR	9 HARRINGTON RD
293 BUCKSKULL HOLLOW DR	9502 HIGHWAY 53 E
229 BUCKSKULL HOLLOW DR	1511 SANDY BOTTOM RD
41 BUCKSKULL HOLLOW DR	1150 SANDY BOTTOM RD E
75 BUCKSKULL HOLLOW DR	200 GEORGIA MARBLE LN
11 BUCKSKULL BROW	6361 HIGHWAY 53 E
11 BUCKSKULL HOLLOW DR	66 MARBLEBLOCK DR
26 BUCKSKULL PT	220 SINTI TRL
28 BUCKSKULL PT	104 TWIN CREEKS DR
32 BUCKSKULL HOLLOW DR	22 BUCKSKULL PT
30 BUCKSKULL PT	57 BUCKSKULL HOLLOW DR
10 BUCKSKULL BROW	126 SINTI TRL
26 BUCKSKULL BROW	115 TWIN CREEKS DR
202 BUCKSKULL HOLLOW DR	14 E BRANCH LN
242 BUCKSKULL HOLLOW DR	11 ISUBA TRL
110 HIGHLAND CT	204 SINTI TRL
15 HIGHLAND CT	180 SINTI TRL
186 SCONTI KNOLL DR	461 WOLFSCRATCH DR
196 SCONTI KNOLL DR	50 WOLFSCRATCH VILLAGE CIR
200 SCONTI KNOLL DR	84 WOLFSCRATCH VILLAGE CIR
193 SCONTI KNOLL DR	100 WOLFSCRATCH VILLAGE CIR
191 SCONTI KNOLL DR	800 WOLFSCRATCH DR
60 SCONTI PT	131 TWIN CREEKS DR
86 SCONTI PT	333 CHOCTAW PASS
17 LAUREL RIDGE WAY	315 CHOCTAW PASS
261 LAUREL RIDGE TRL	185 TWIN CREEKS DR
279 LAUREL RIDGE TRL	125 TROTTERS LN
327 LAUREL RIDGE TRL	226 WOLFSCRATCH VILLAGE CIR

INUNDATED STRUCTURES ADDRESS	
194 TWIN CREEKS DR	35 TREETOP KNOLL DR
1944 WILDERNESS PKY	151 TWIN CREEKS DR
1944 WILDERNESS PKY	165 TWIN CREEKS DR
1944 WILDERNESS PKY	8100 HIGHWAY 53 E
1944 WILDERNESS PKY	112 TWIN CREEKS DR
1944 WILDERNESS PKY	298 CLUBHOUSE DR
1944 WILDERNESS PKY	111 SCONTI PT
1944 WILDERNESS PKY	1138 SANDY BOTTOM RD
1944 WILDERNESS PKY	2191 STEVE TATE RD
1944 WILDERNESS PKY	2193 STEVE TATE RD
10 SHETLAND TRCE	2195 STEVE TATE RD
42 OSI WAY	84 HIGHLAND TRL
48 OSI WAY	57 HIGHLAND CT
140 SINTI TRL	38 HIGHLAND TRL
52 NASHOBA TRL	244 WOLFSCRATCH DR
1543 OLD MILL WHITE RD	400 CAMERON CT
30 JUSTICE WAY	61 HUNTERS TRCE
189 TIMBER CREEK DR	835 COVE LAKE DR
112 OVERLOOK CT	833 COVE LAKE DR
391 COVE LAKE DR	43 OSI WAY
87 TROTTERS LN	30 E BRANCH LN
100 HUNTERS TRCE	101 TWIN CREEKS DR
270 BLACKWELL CREEK WAY	250 SINTI TRL
295 BLACKWELL CREEK WAY	350 WOLFSCRATCH VILLAGE CIR
255 BLACKWELL CREEK WAY	1125 WOLFSCRATCH DR
482 MARBLEHEAD LN	1127 WOLFSCRATCH DR
427 MCARTHUR RD	8200 HIGHWAY 53 E
393 MCARTHUR RD	475 DELL MOORE RD
1985 OLD MILL WHITE RD	95 TREETOP KNOLL DR
2192 OLD MILL WHITE RD	1175 WOLFSCRATCH DR
10322 HIGHWAY 53 E	80 E BRANCH RD
414 MARBLE HILL CHURCH RD	9679 HIGHWAY 53 E

Note: Property information was provided by the Pickens County EMA in September 2022 using the mapped inundation area plus an additional 100-foot horizontal buffer outside the extent of the mapped inundation zone.

Figure 1 - Lake Petit Dam Evacuation Map Vicinity of Big Canoe

LOCATION MAP

LEGEND

- Inundated Structures
- Site Access
- Inundated Parcels

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

NOTE: The list of inundated structure were provided by Pickens County and included structures within a 100 ft buffer outside of the extent of the mapped inundation zone.

The method used to develop inundation zones are approximate. Actual areas inundated will depend on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

Geosyntec consultants

07-Oct-2022

Feet

0 1,000 2,000 4,000

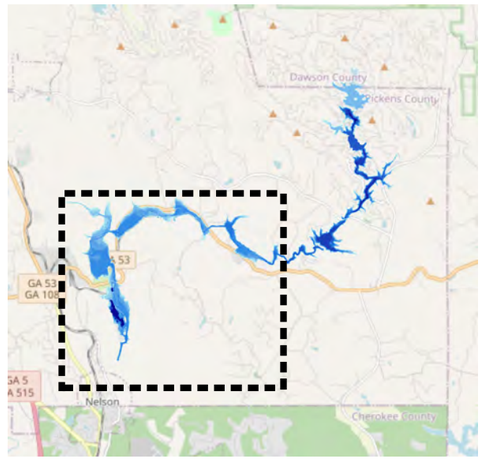
Meters

0 250 500 1,000

Lake Petit Dam
Wolfscratch Drive
Disharoon Lake
Lake Sconti Dam
Golf Course Road
Wilderness Parkway
Cove Road
Lake Cox Dam
Pendley Woods Road
Imery's Entrance Drive
McArthur Road
Old Mill White Road (Upstream)
State Route 53 (Near Harrington Road)
Old Mill White Road (Downstream)

Figure 2 - Lake Petit Dam Evacuation Map Downstream of Big Canoe

LOCATION MAP



Imery's Entrance Drive

State Route 53 (Near Harrington Road)

State Route 53 (Near Sandy Bottom Road)

McArthur Road

Old Mill White Road (Upstream)

Old Mill White Road (Downstream)

State Route 53 (Near Marbleblock Lane)

LEGEND

- Inundated Structures
- Site Access
- Inundated Parcels

Maximum Depth (feet)

- < 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 -70
- > 70

NOTE: This evacuation map displays the inundated structures and parcels downstream of Big Canoe (i.e., downstream of Figure 1).

The list of inundated structure were provided by Pickens County and included structures within a 100 ft buffer outside of the extent of the mapped inundation zone.

The method used to develop inundation zones are approximate. Actual areas inundated will depend on actual failure and pre-failure hydrologic conditions and may differ significantly from information shown on maps.

Geosyntec consultants

04-Oct-2022

Feet

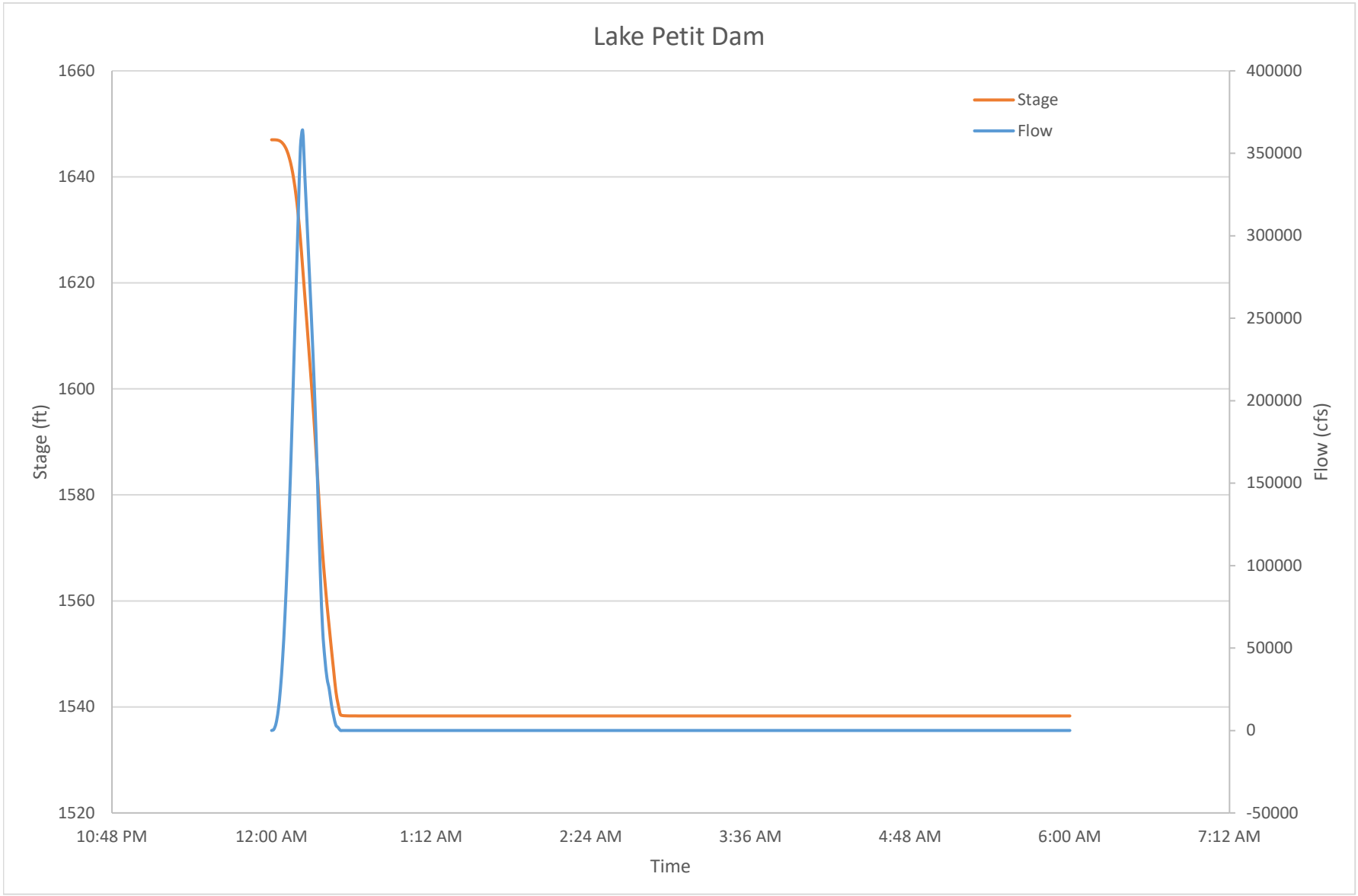
0 1,000 2,000 4,000

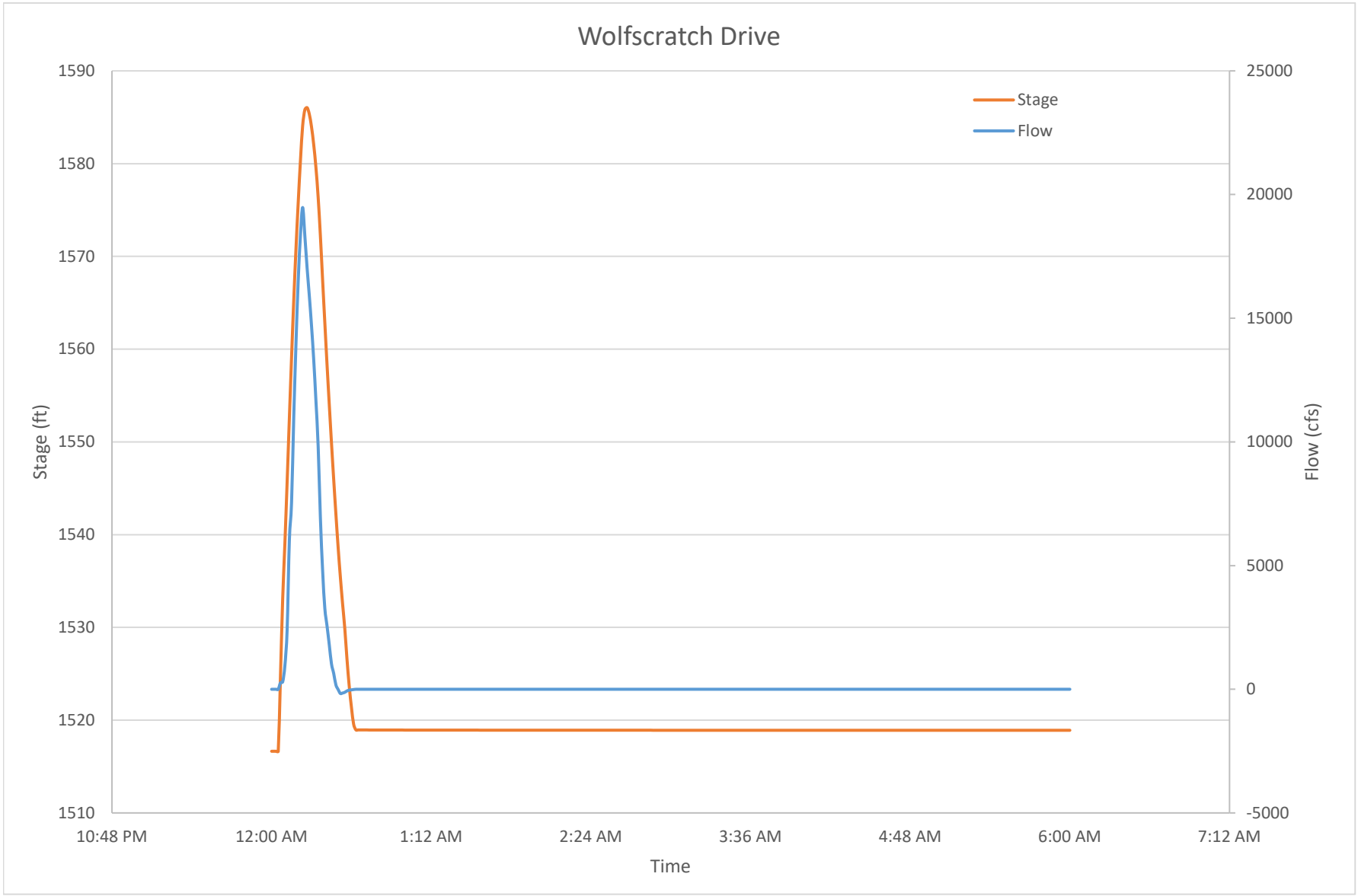
Meters

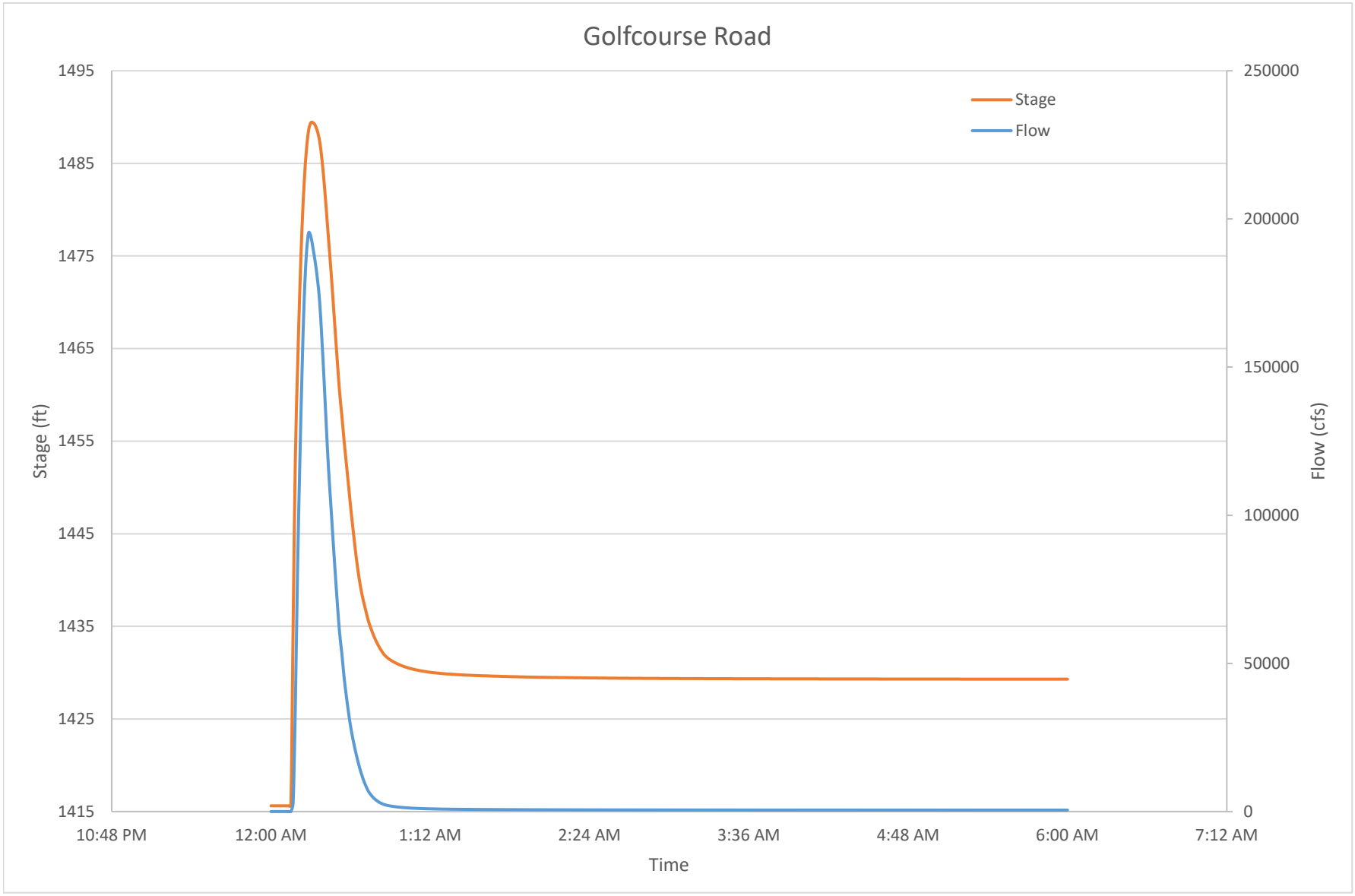
0 250 500 1,000

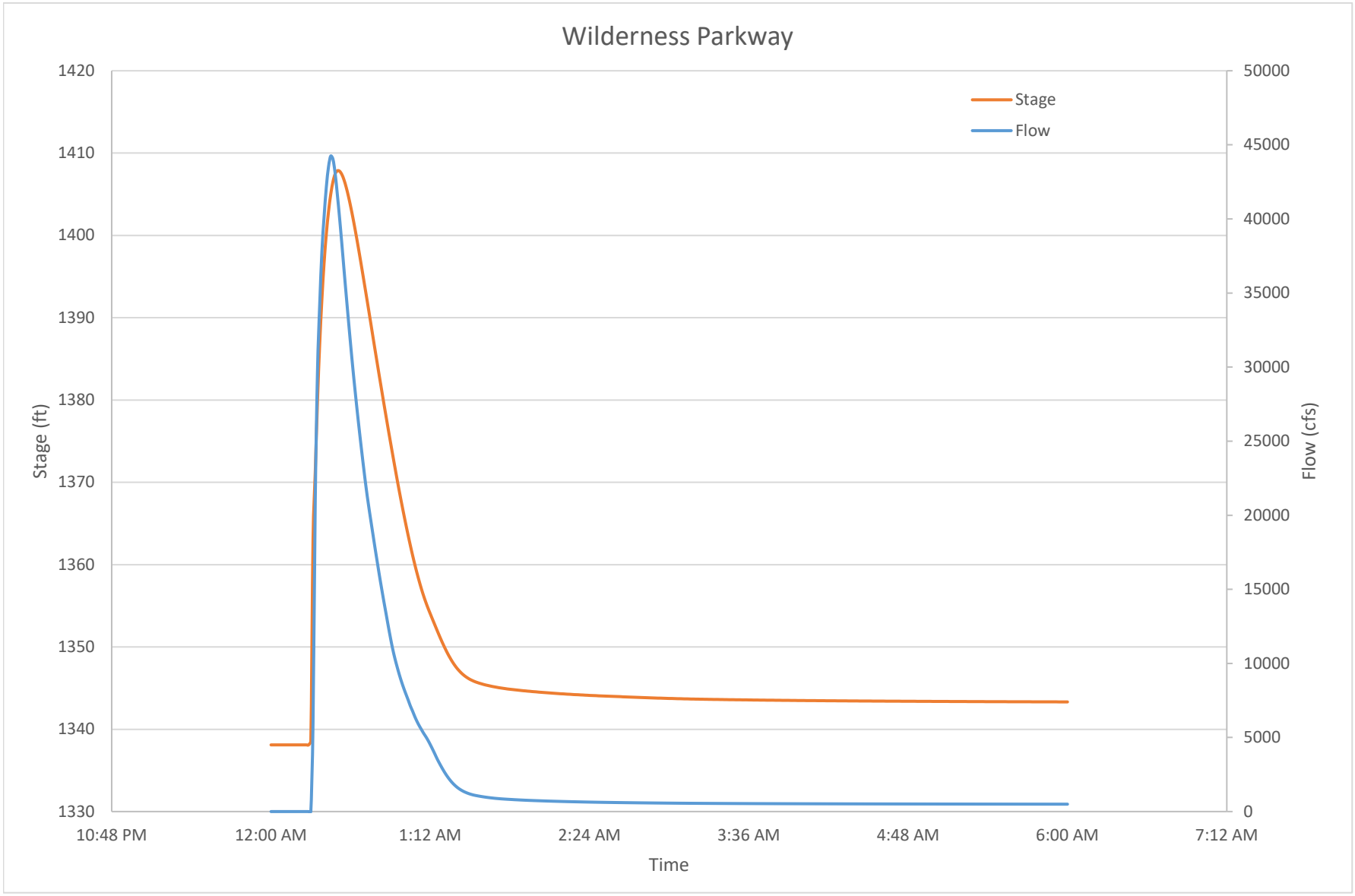
ATTACHMENT J

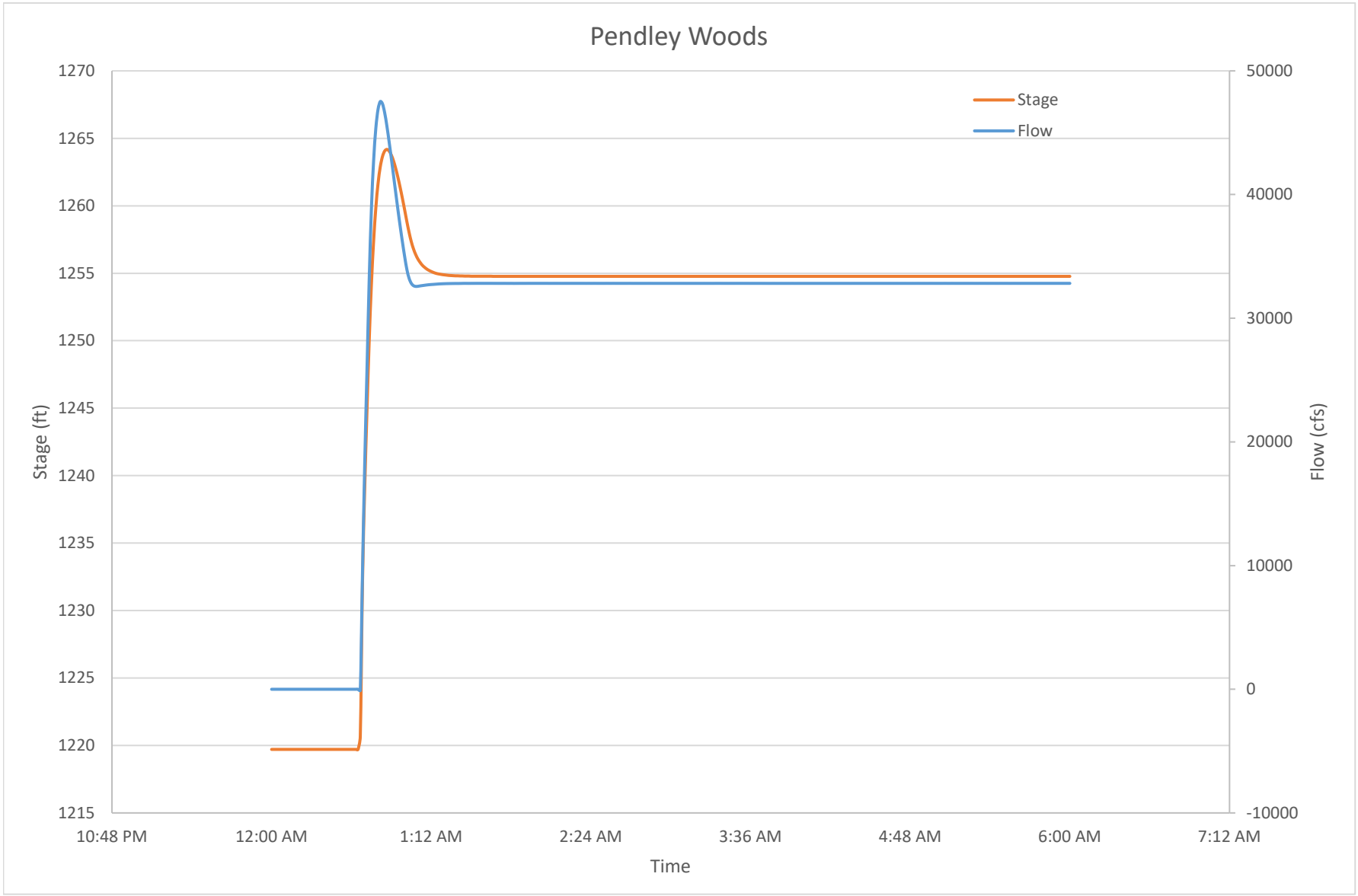
HYDROGRAPHS

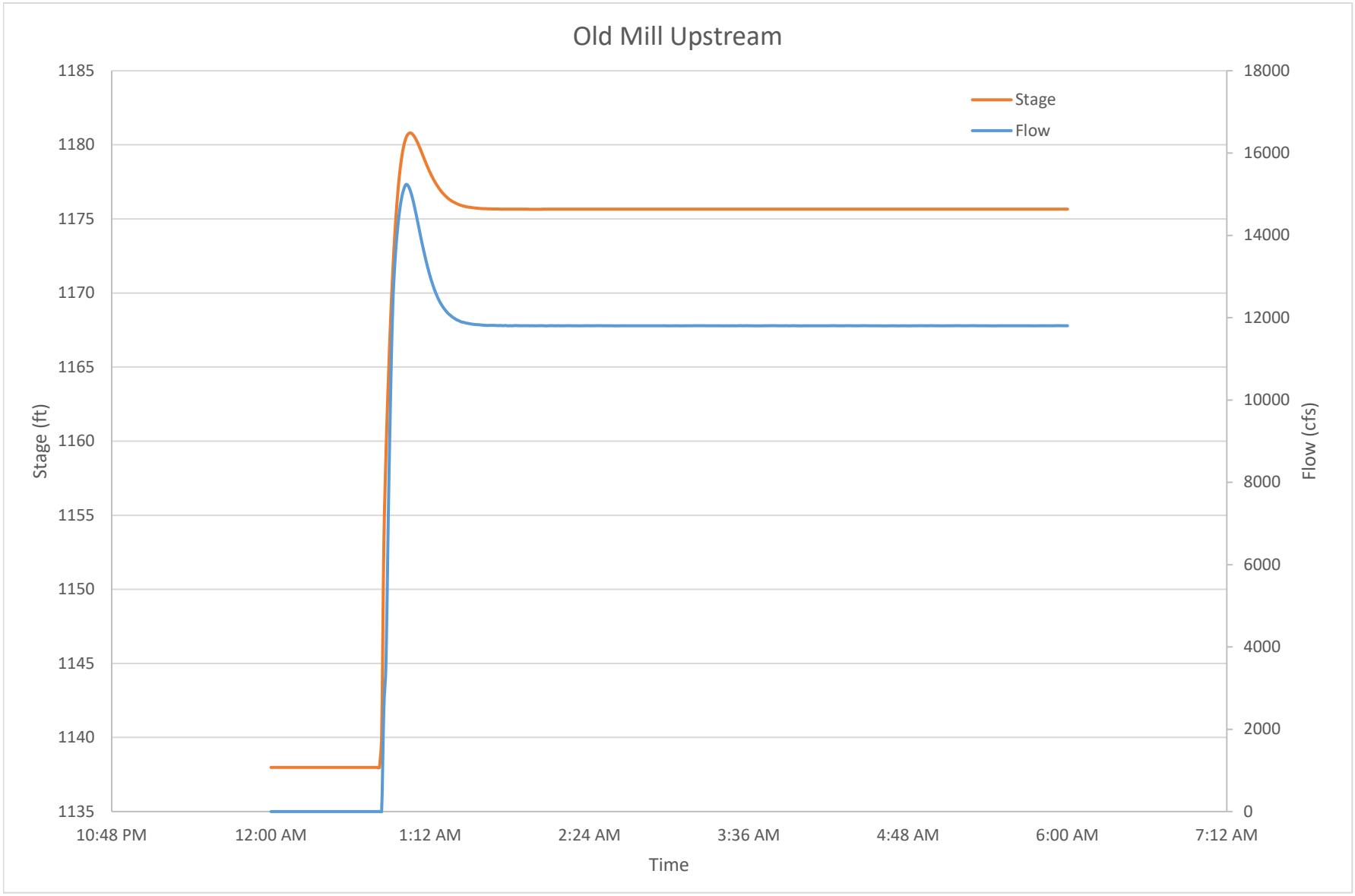

Lake Petit Dam
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1660
1640
1620
1600
1580
1560
1540
1520
400000
350000
300000
250000
200000
150000
100000
50000
0
-50000
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

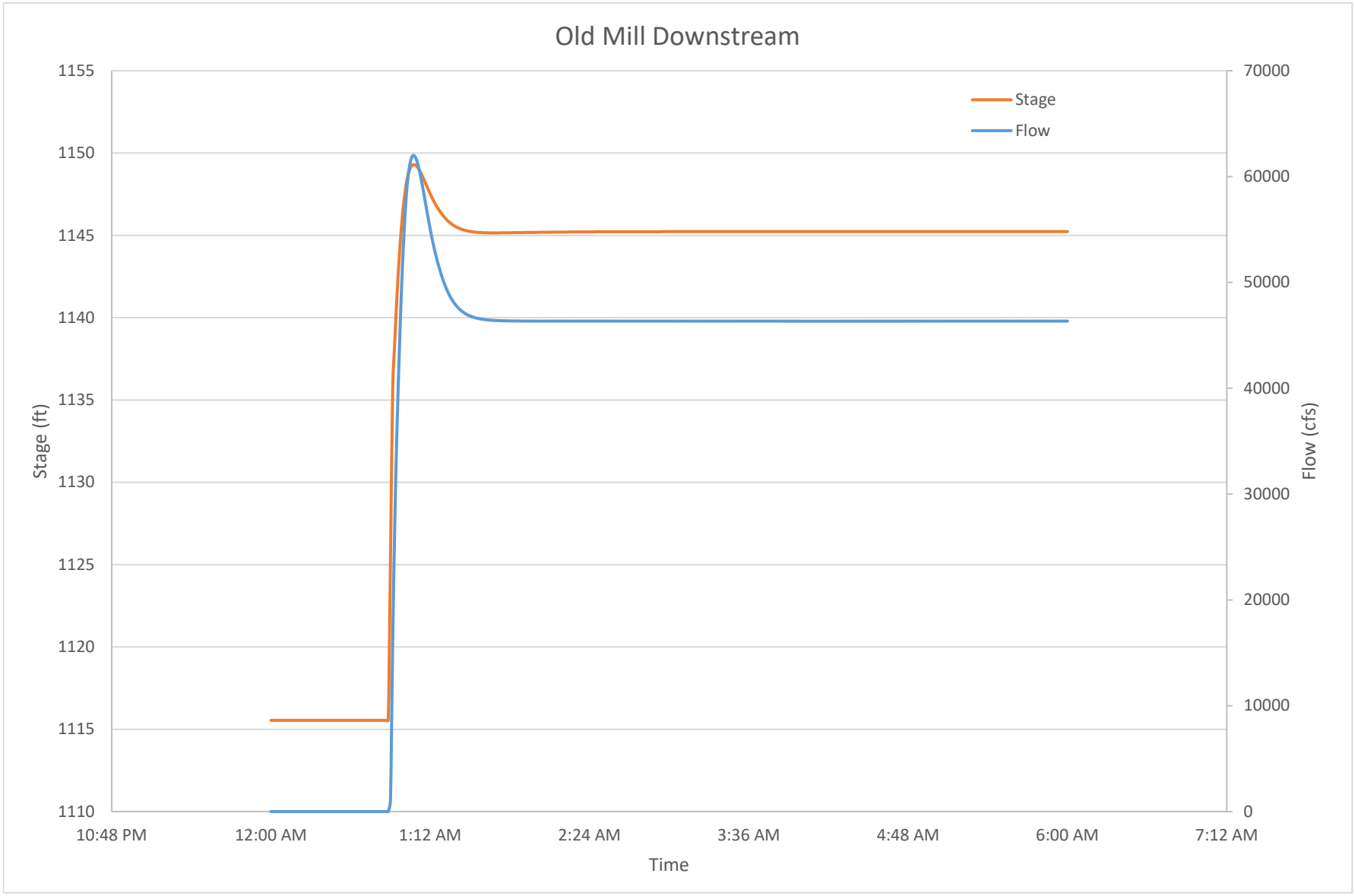

Wolfscratch Drive
1590
1580
1570
1560
1550
1540
1530
1520
1510
Stage (ft)
25000
20000
15000
10000
5000
0
-5000
Flow (cfs)
Stage
Flow
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
Time

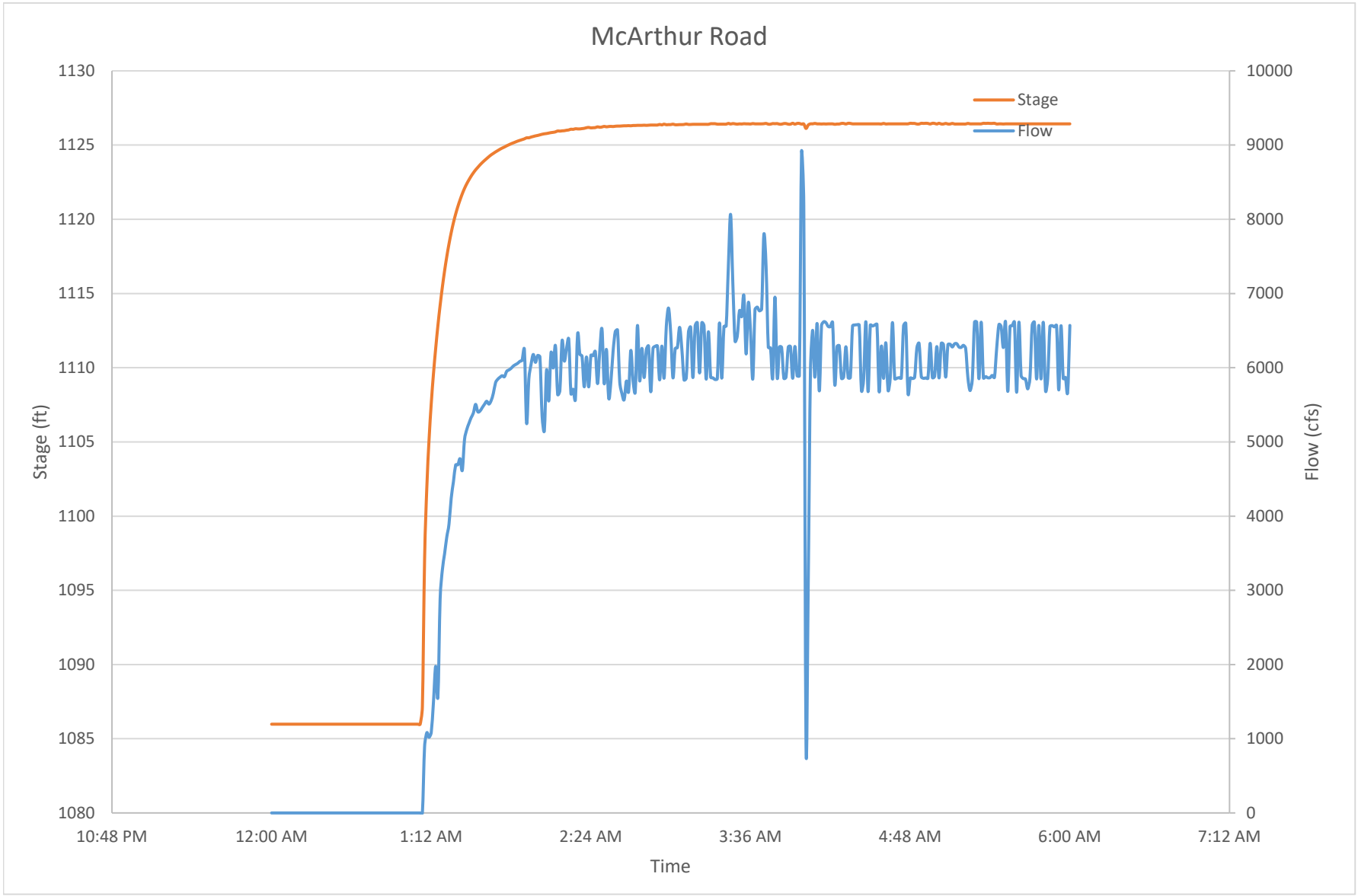

Golfcourse Road
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1495
1485
1475
1465
1455
1445
1435
1425
1415
250000
200000
150000
100000
50000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

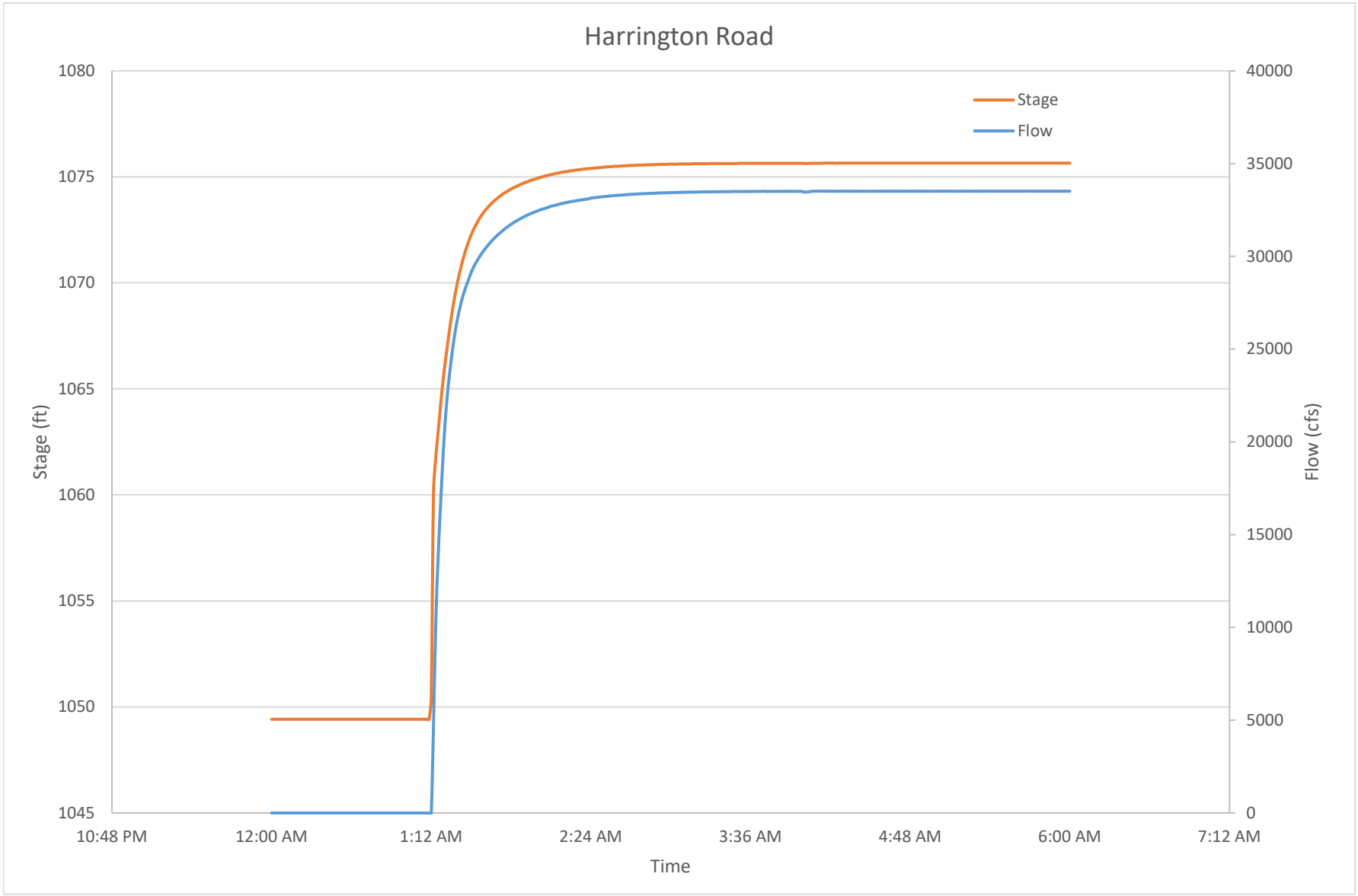

Wilderness Parkway
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1420
1410
1400
1390
1380
1370
1360
1350
1340
1330
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


Pendley Woods
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1270
1265
1260
1255
1250
1245
1240
1235
1230
1225
1220
1215
50000
40000
30000
20000
10000
0
-10000
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

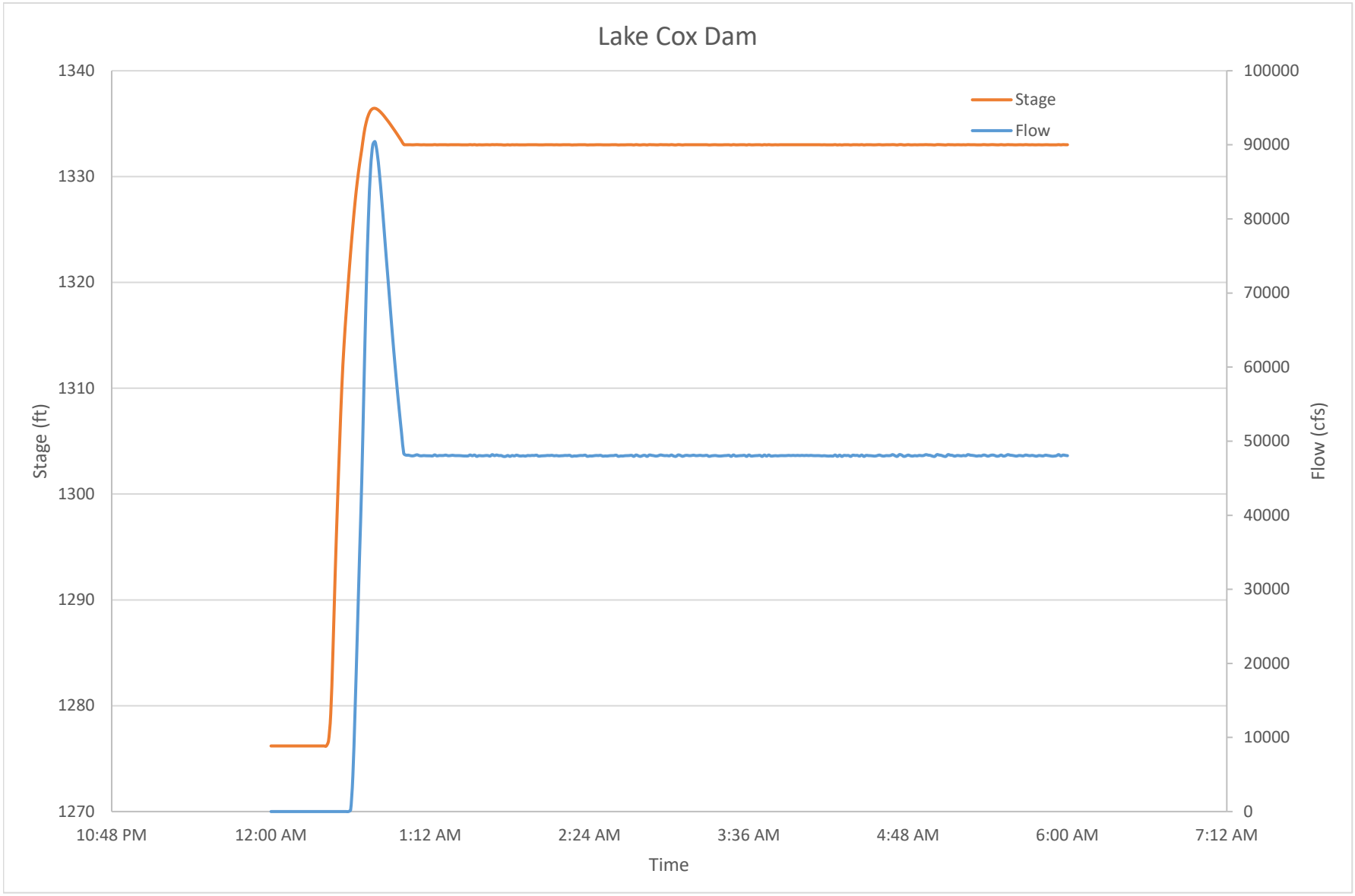

Old Mill Upstream
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1185
1180
1175
1170
1165
1160
1155
1150
1145
1140
1135
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

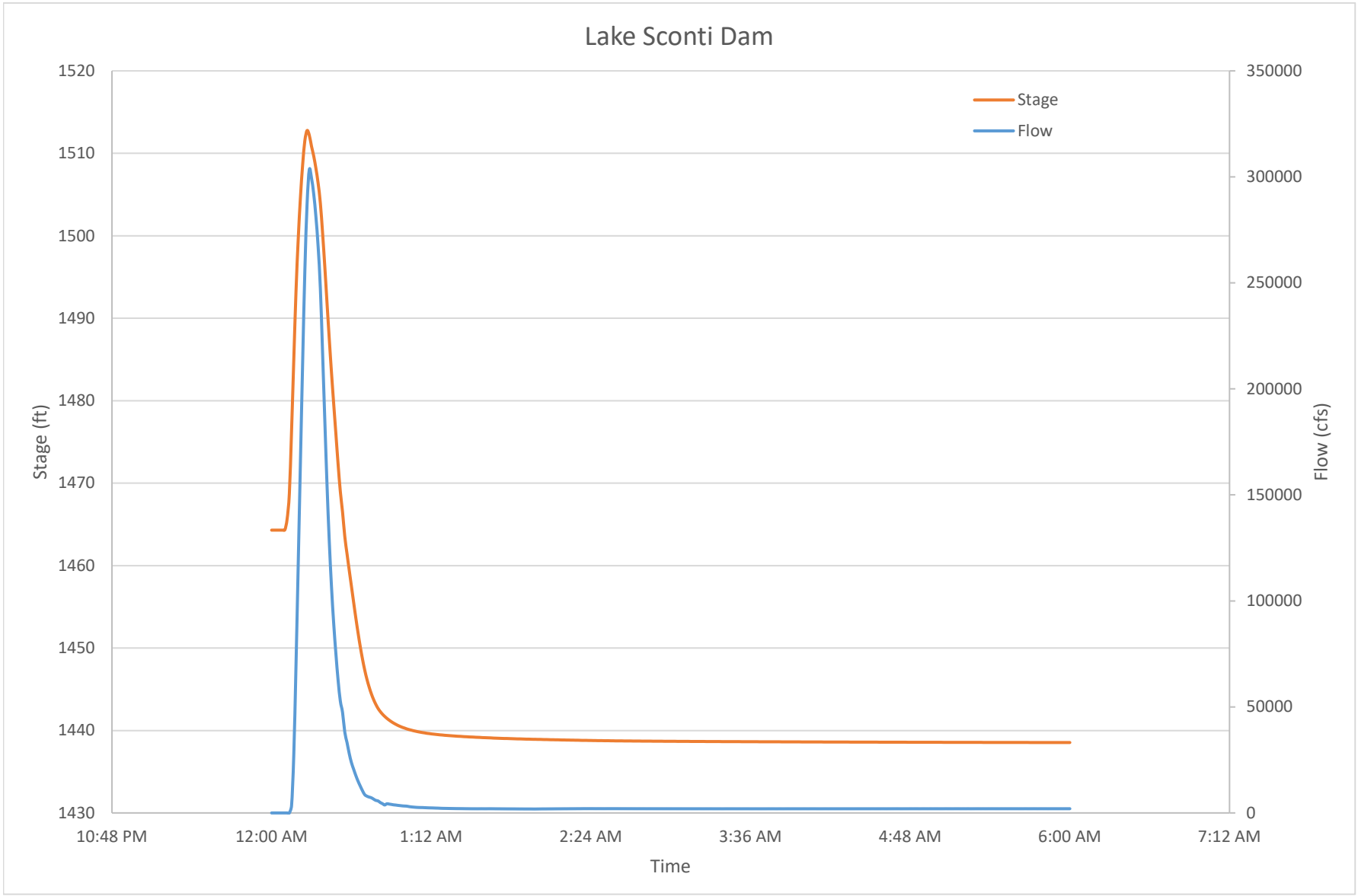

Old Mill Downstream
1155
1150
1145
1140
1135
1130
1125
1120
1115
1110
Stage (ft)
70000
60000
50000
40000
30000
20000
10000
0
Flow (cfs)
Stage
Flow
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
Time

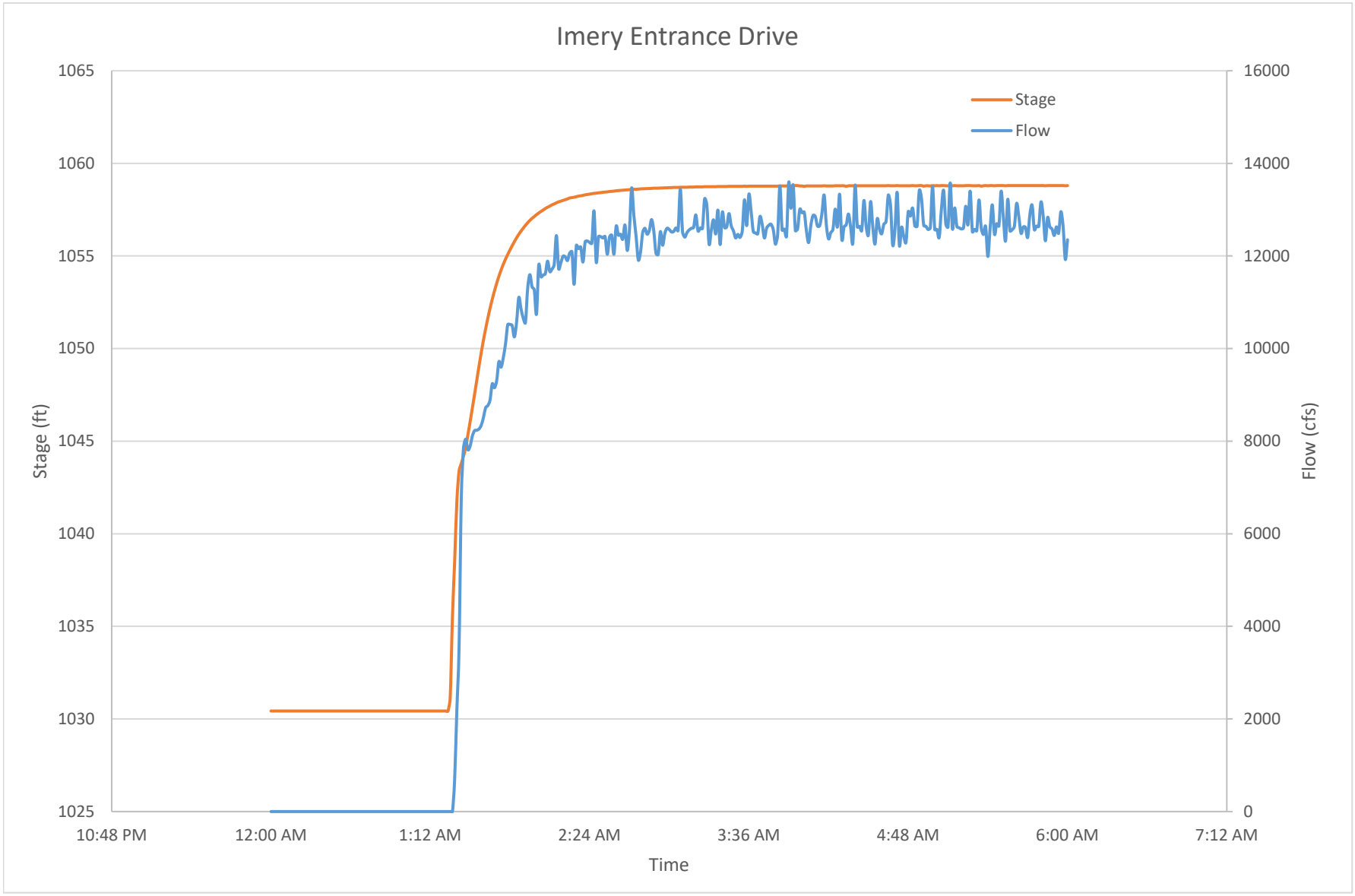

McArthur Road
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1130
1125
1120
1115
1110
1105
1100
1095
1090
1085
1080
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

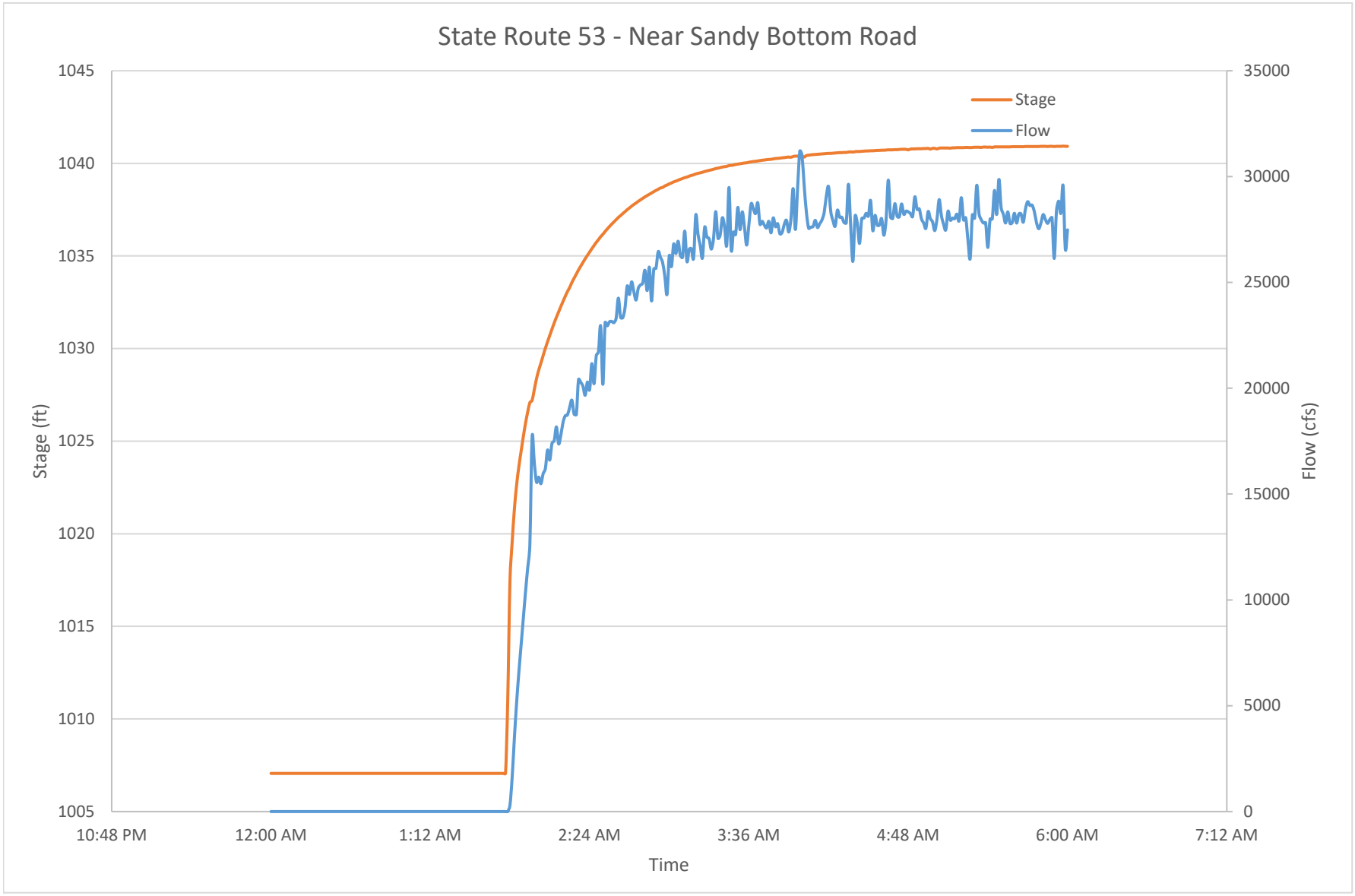

Harrington Road
1080
1075
1070
1065
1060
1055
1050
1045
Stage (ft)
40000
35000
30000
25000
20000
15000
10000
5000
0
Flow (cfs)
Stage
Flow
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
Time

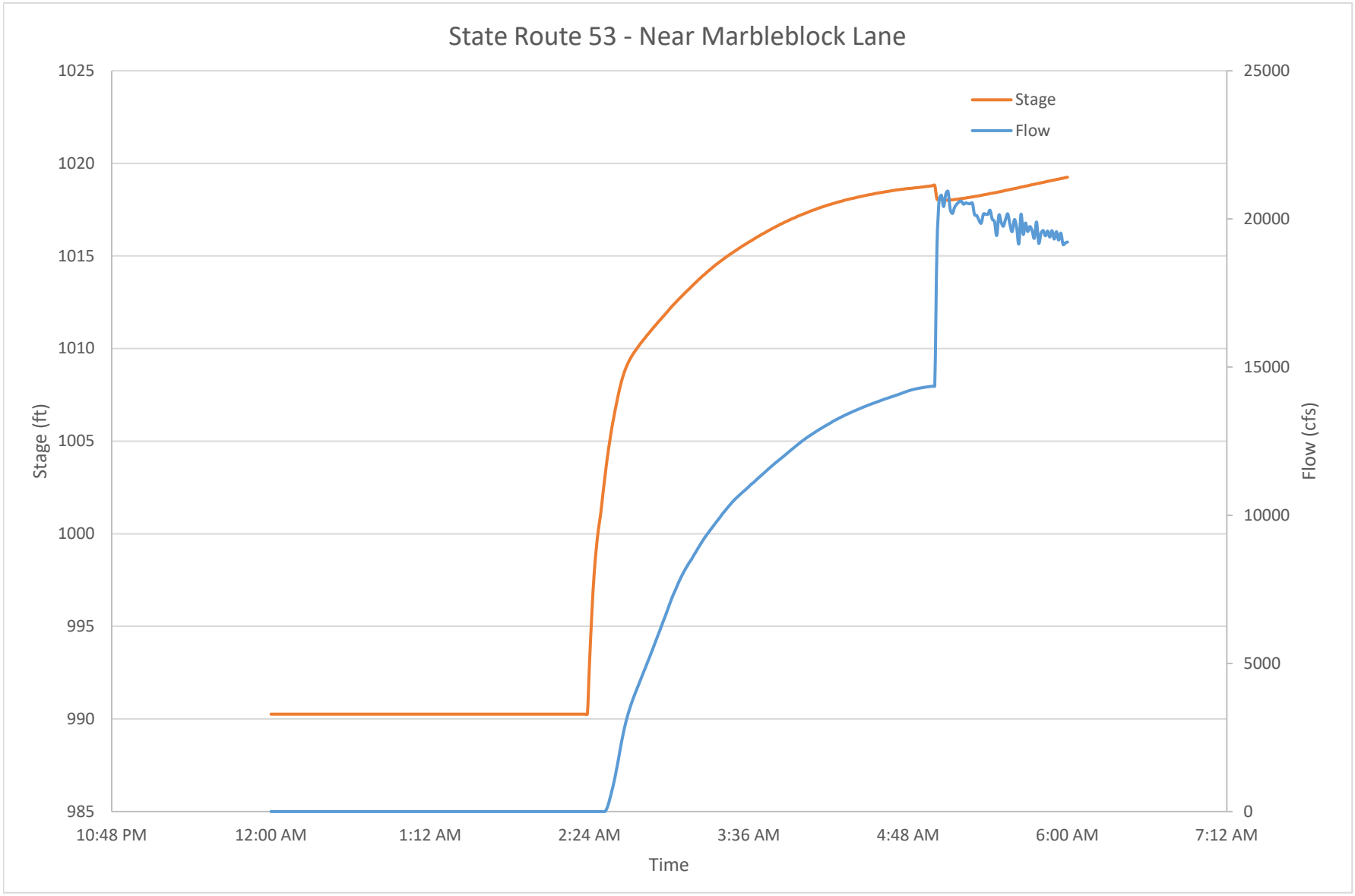

Cove Road
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1350
1340
1330
1320
1310
1300
1290
1280
1270
800000
700000
600000
500000
400000
300000
200000
100000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


Lake Cox Dam
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1340
1330
1320
1310
1300
1290
1280
1270
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


Lake Sconti Dam
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1520
1510
1500
1490
1480
1470
1460
1450
1440
1430
350000
300000
250000
200000
150000
100000
50000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


Imery Entrance Drive
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1065
1060
1055
1050
1045
1040
1035
1030
1025
16000
14000
12000
10000
8000
6000
4000
2000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


State Route 53 - Near Sandy Bottom Road
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1045
1040
1035
1030
1025
1020
1015
1010
1005
35000
30000
25000
20000
15000
10000
5000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM


State Route 53 - Near Marbleblock Lane
Stage
Flow
Stage (ft)
Flow (cfs)
Time
1025
1020
1015
1010
1005
1000
995
990
985
25000
20000
15000
10000
5000
0
10:48 PM
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM

ATTACHMENT K

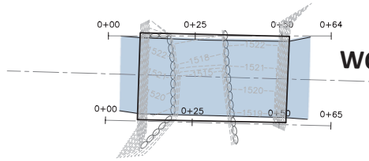
PHOTOGRAPHS OF THE DAM AND POINTS OF INTEREST

SITE 1
WOLFSCRATCH DRIVE

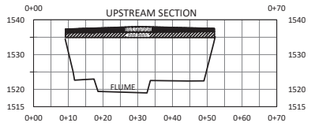
0' 20' 40' 60'
SCALE 1" = 20'

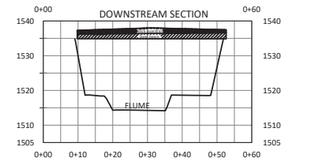
PETTIT CREEK

GRID



WOLFSCRATCH DRIVE

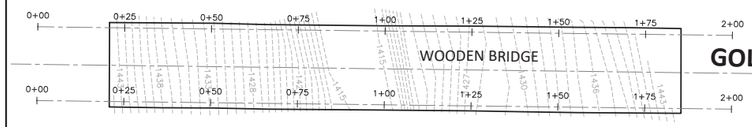




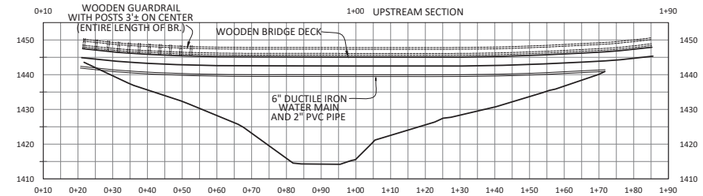
SITE 5
GOLF COURSE ROAD

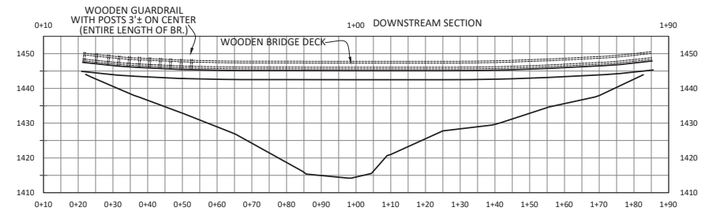
0' 20' 40' 60'
SCALE 1" = 20'

GRID

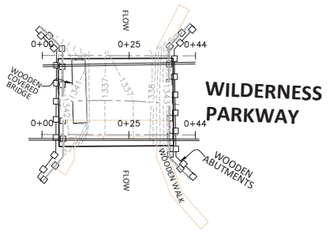


GOLF COURSE ROAD



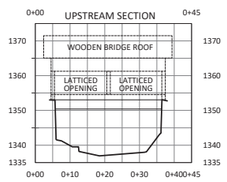


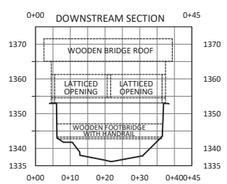
SITE 6
WILDERNESS PARKWAY



WILDERNESS PARKWAY

GRID

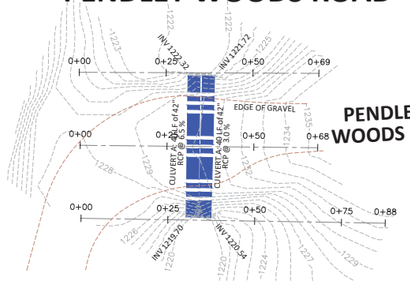




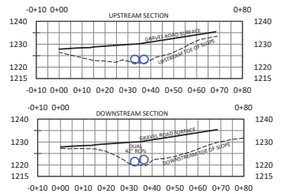
0' 20' 40' 60'
SCALE 1" = 20'

SITE 10
PENDLEY WOODS ROAD

GRID



PENDLEY WOODS RD



0' 20' 40' 60'
SCALE 1" = 20'

JORDAN ENGINEERING
144 N. WARREN ST. MONTICELLO, GA. 31064
TELEPHONE (706) 468-8502
Land Planning ◆ Surveying ◆ Soils Classification

SITES:
1 - WILDERNESS PARKWAY
5 - GOLF COURSE ROAD
6 - WILDERNESS PARKWAY
10 - PENDLEY WOODS ROAD

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial Issue	XX/XX/XX

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1 of 3

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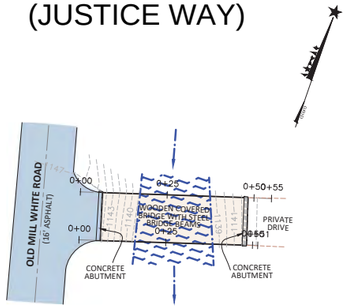
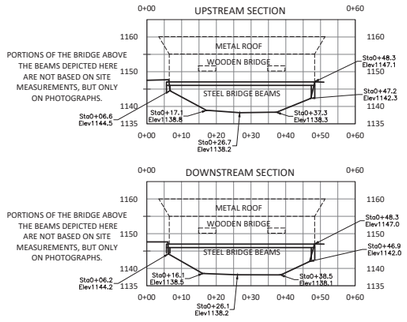
FROM NORTHWEST

SITE 11
OLD MILL WHITE ROAD
(JUSTICE WAY)

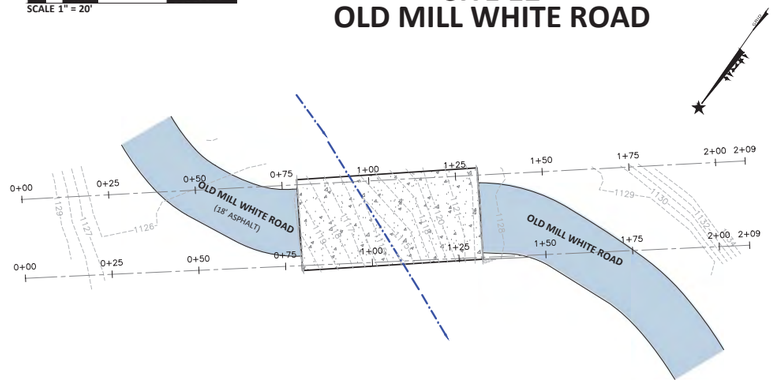


FROM SOUTHWEST

FROM NORTH



SITE 12
OLD MILL WHITE ROAD



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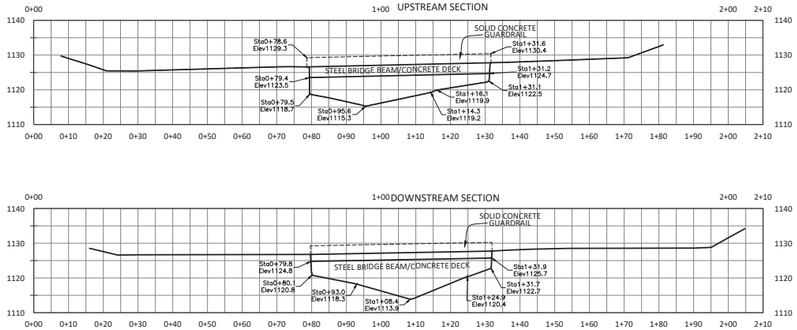
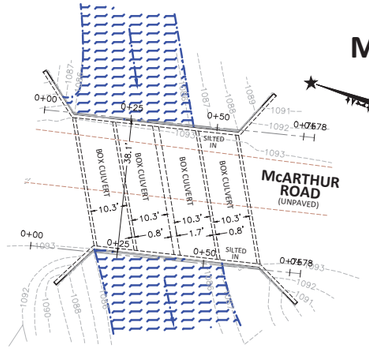
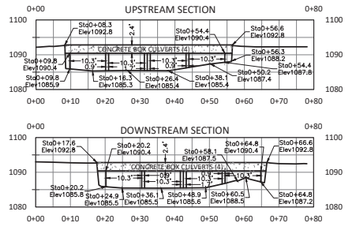


FROM EAST

FROM NORTHEAST

SITE 13
McARTHUR ROAD

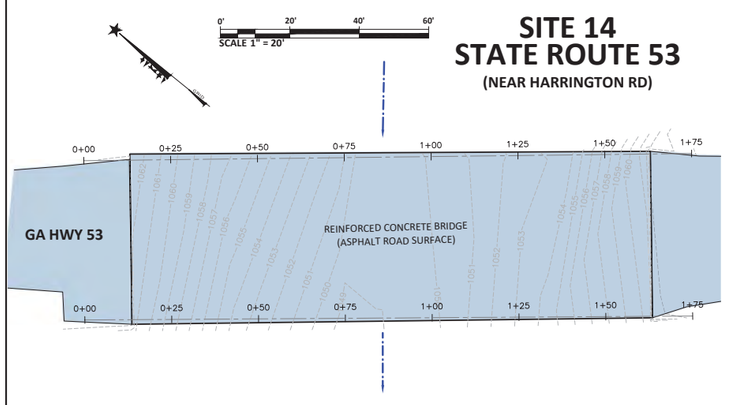




FROM NORTHWEST

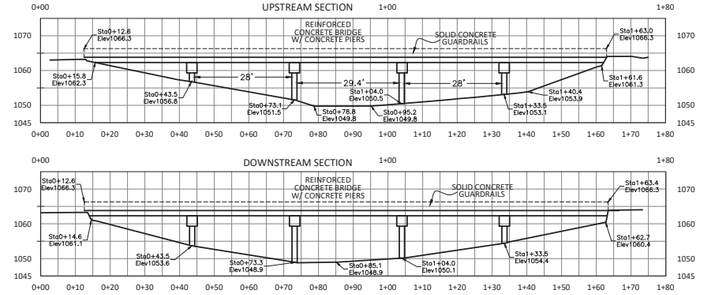
FROM NORTH

SITE 14
STATE ROUTE 53
(NEAR HARRINGTON RD)



FROM NORTHWEST

FROM WEST



FROM EAST

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Land Planning ◆ Surveying ◆ Soils Classification

GEORGIA REGISTERED No. 2902 LAND SURVEYOR ROBERT G. JORDAN

SITES:
11 - OLD MILL WHITE ROAD
12 - OLD MILL WHITE ROAD
13 - McARTHUR ROAD
14 - STATE ROUTE 53 (HARRINGTON RD)

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial issue - sheet 1	01/22/21

Sheet No.
2 of 3

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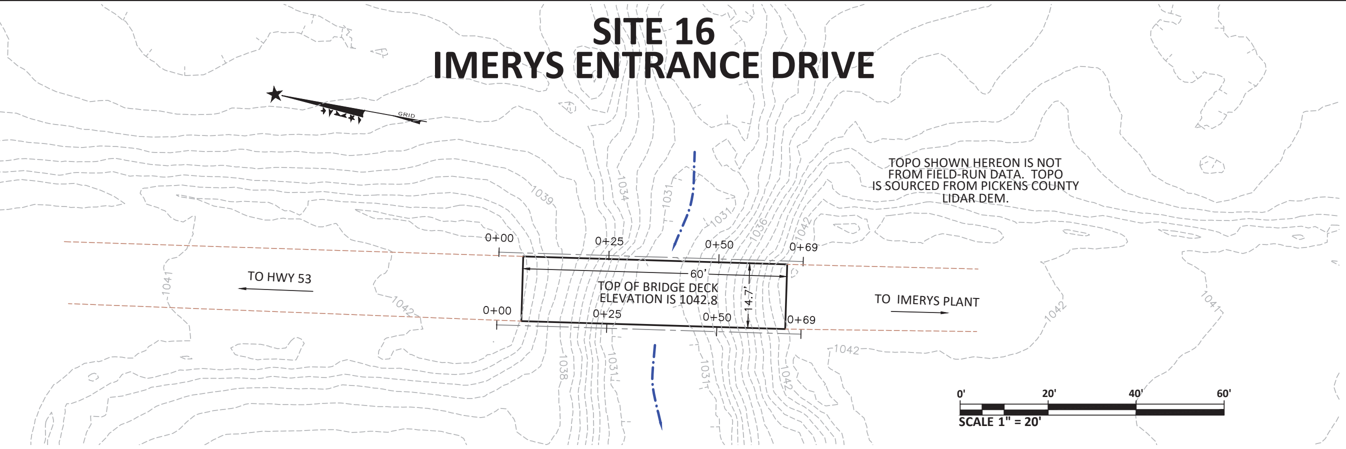
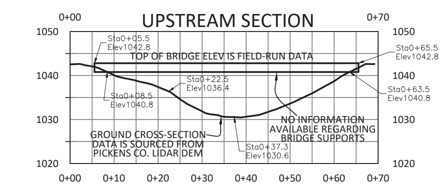
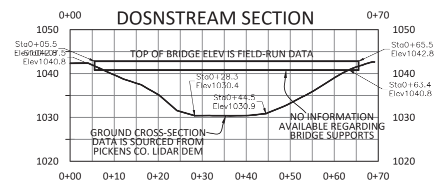
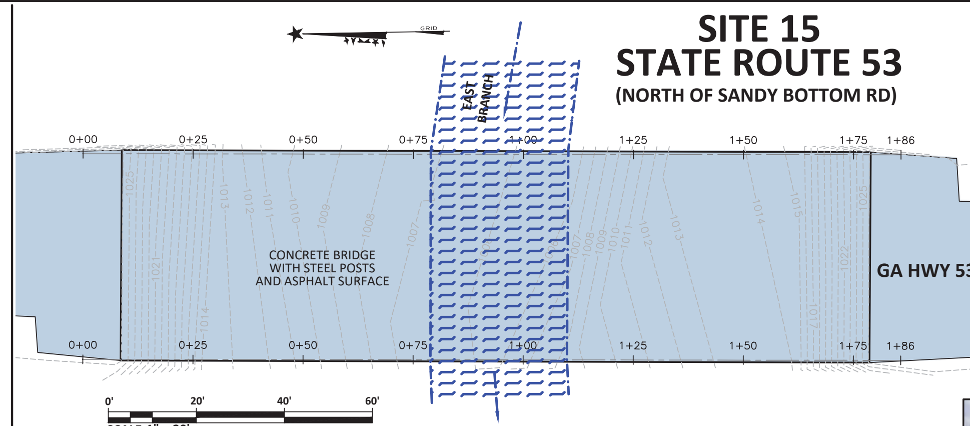
SITE 16
IMERYS ENTRANCE DRIVE

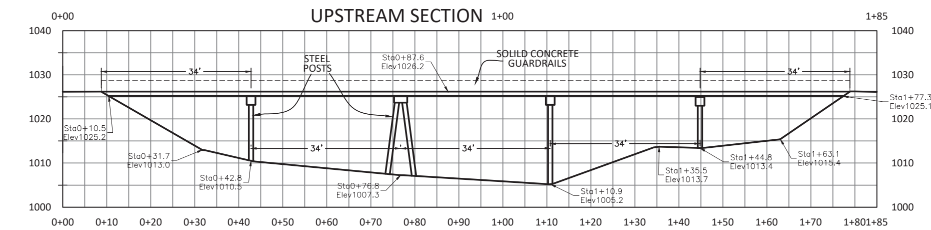


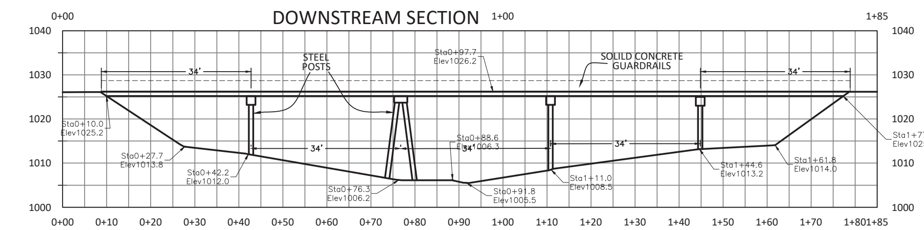


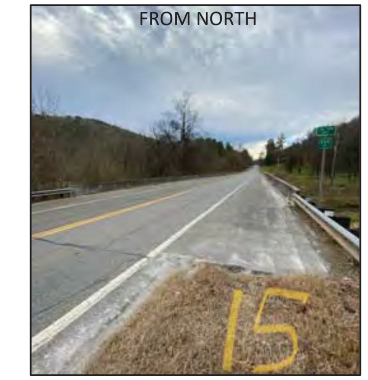


SITE 15
STATE ROUTE 53
(NORTH OF SANDY BOTTOM RD)

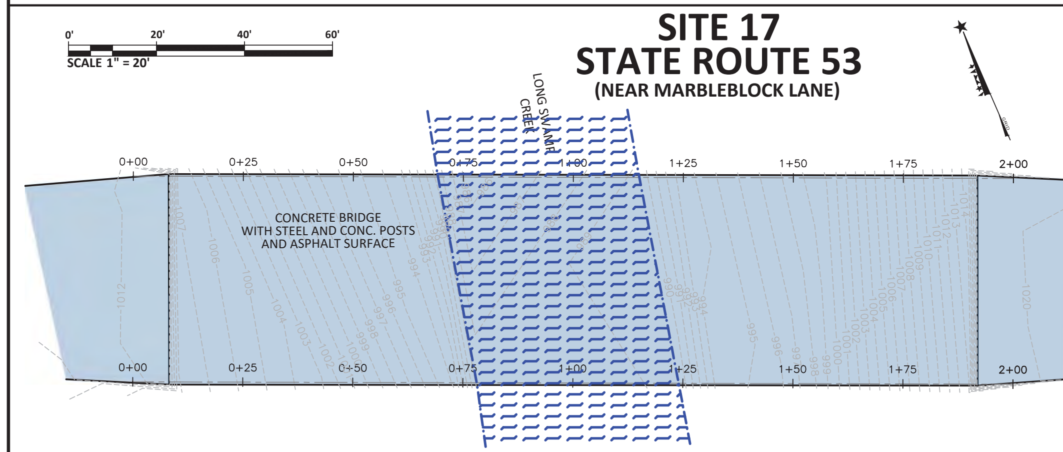


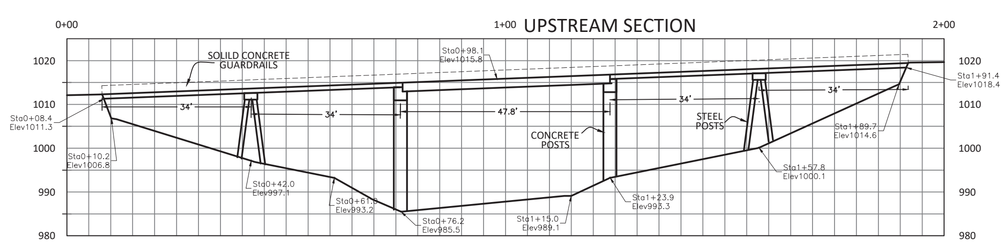


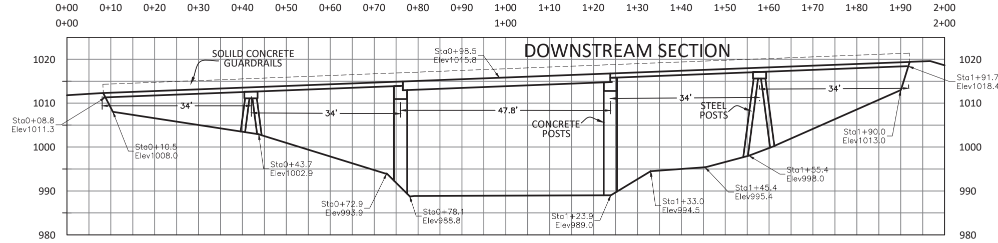


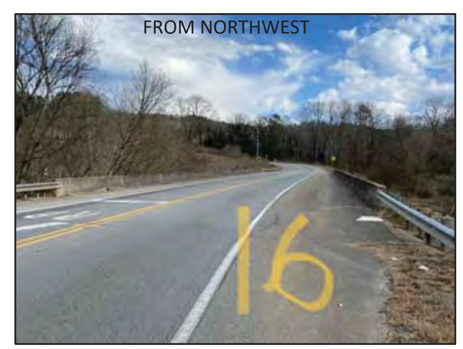


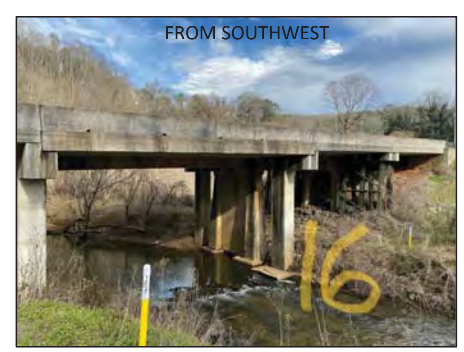
SITE 17
STATE ROUTE 53
(NEAR MARBLEBLOCK LANE)











JORDAN ENGINEERING
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TELEPHONE: (706) 468-9999
Land Planning • Surveying • Soils Classification

GEORGIA REGISTERED No. 2902 LAND SURVEYOR ROBERT Q. JORDAN

SITES:
16 - IMERYS ENTRANCE DRIVE
15 - STATE ROUTE 53
17 - STATE ROUTE 53

Big Canoe Stream Sections
Pickens County, Georgia

Rev	Revision Description	Date
0	Initial Issue - sheet 1	01/22/21
1	Initial Issue - sheets 2 and 3	01/28/21

Sheet No.
3 of 3

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ATTACHMENT L

AERIAL PHOTOS OF POINT OF INTERESTS

Lake Petit Dam

Wolfscratch Drive

Lake Sconti Dam

Golf Course Road

Wilderness Parkway

Cove Road

Lake Cox Dam

Pendley Woods Road

Old Mill White Road (Upstream) – Left and Old Mill White Road (Downstream) - Right

McArthur Road

State Route 53 (Near Harrington Road)

Imerys Entrance Drive

State Route 53 (Near Sandy Bottom Road)

State Route 53 (Near Marbleblock Lane)

APPENDIX D
Definitions

APPENDIX D – DEFINITIONS

The following definitions are frequently used when discussing the physical characteristic of the Dam.

ABUTMENT	The part of the valley side against with the dam is constructed. Right and left abutments are those on respective sides as an observer when looking downstream.
ACRE-FOOT	A unit of volumetric measure that would cover 1 acre to a depth of 1 foot. One acre-foot is equal to 43,560 cubic feet or 325,850 gallons.
APPURTENANCES	Structures around a dam that are necessary to the operation of the dam project (i.e., spillways).
BERM	A nearly horizontal step (bench) in the upstream or downstream sloping face of the dam.
BOIL	A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring around the disruption.
BREACH	An opening through the dam resulting in partial or total failure of the dam.
CATEGORY I DAM	A dam that is either 25 feet tall or impounds 100 acre-feet of water and where improper operation or dam failure would result in the probable loss of human life.
COMPREHENSIVE EAP EXERCISE	An in-depth exercise of an EAP that involves the interaction of the dam owner with the state and local emergency management agencies in a stressful environment with time constraints. Functional and full-scale EAP exercises are considered comprehensive EAP exercises.
CONDUIT	A closed channel (round pipe or rectangular box) that conveys water through, around, or under the dam.
CONTROL SECTION	A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.
CROSS SECTION	A slice through the dam showing elevation vertically and direction of natural water flow horizontally. Also, a slice through a spillway showing elevation vertically and left and right sides of the spillway looking downstream.
DAM	An artificial barrier generally constructed across a watercourse for the purpose of impounding or diverting water.

DAM FAILURE	Catastrophic type of failure characterized by the sudden, rapid, and uncontrolled release of impounded water. It is recognized that there are lesser degrees of failure and that any malfunction or abnormality outside the design assumptions and parameters which adversely affect a dam's primary function of impounding water is properly considered a failure. Such lesser degrees of failure can progressively lead to or heighten the risk of a catastrophic failure. They are, however, normally amendable to corrective action.
DAM OPERATOR	The person(s) or unit(s) of government with responsibility for the operation and maintenance of dam.
DRAIN, TOE, FOUNDATION, OR BLANKET	A water collection system of sand and gravel and typically pipes along the downstream portion of the dam to collect seepage and convey it to a safe outlet.
DRAINAGE AREA (WATERSHED)	The geographic area on which rainfall flows into the dam.
DRAWDOWN	The lowering or releasing of the water level in a reservoir over time or the volume lowered or released over a particular period of time.
EMBANKMENT	Fill material, usually earth or rock, placed with sloping sides.
EMERGENCY	A condition that develops unexpectedly, endangers the structural integrity of the dam and/or downstream human life and property, and requires immediate action.
EMERGENCY ACTION PLAN (EAP) EXERCISE	An activity designed to promote emergency preparedness; test or evaluate emergency action plans, procedures or facilities; train personnel in emergency management duties; and demonstrate operational capability. Exercises consist to the performance of duties, tasks or operations very similar to the way they would be performed in a real emergency. However, the exercise performance is in response to a simulated event.
EMERGENCY MANAGEMENT AGENCY	The State and local agencies responsible for emergency operations, planning, mitigation, preparedness, response, and recovery for all hazards.
EMERGENCY OPERATIONS CENTER	The location or facility where responsible officials gather during an emergency to direct and coordinate emergency operations, to communicate with other jurisdictions and

	with field emergency forces, and to formulate protective action decisions and recommendations during an emergency.
EVACUATION MAP	A map showing the geographic area downstream of a dam that should be evacuated if it is threatened to be flooded by a breach of the dam or other large discharge.
FILTER	The layers of sand and gravel in a drain that allow seepage through an embankment to discharge into the drain without eroding the embankment soil.
FLOOD ROUTING	A process of determining progressively over time the amplitude of a flood wave as it moves past a dam or downstream to successive points along a river or stream.
FREEBOARD	Vertical distance between a stated water level in the reservoir and the top of dam.
GATE, SLIDE, OR SLUID	An operable, watertight valve to manage the discharge of water from the dam.
GROIND	The area along the intersection of the face of a dam and the abutment.
HAZARD	A situation which creates the potential for adverse consequences such as loss of life, property damage or other adverse impacts. Impacts may be for a defined area downstream of a dam from floodwaters released through spillways and outlet works of the dam or waters released by partial or complete failure of the dam.
HEADWATER	The water immediately upstream from a dam. The water surface elevation varies due to fluctuations in inflow and the amount of water passed through the dam.
HEIGHT	The vertical distance between the lowest point along the crest of the dam and the lowest point at the downstream toe, which usually occurs in the bed of the outlet channel.
INSTRUMENTATION	An arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.
INUNDATION MAP	A map delineating areas that would be flooded as a result of a dam failure or other unusually large spillway release.
NOTIFICATION	To immediately inform appropriate individuals, organizations, or agencies about a potentially emergency situation so they can initiate appropriate actions.
OUTLET WORKS	An appurtenant structure that provides for controlled

	passage of normal water flows through the dam.
OVERTOP	Flow of an embankment dam beyond its spillway capacity and over the top of the dam crest, or containment elevation.
PROBABLE MAXIMUM PRECIPITATION (PMP) OR FLOOD (PMF)	The theoretically greatest precipitation or resulting flood that is meteorologically feasible for a given duration over a specific drainage area at a particular geographical location.
PIPING	The progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.
PROJECT DESIGN FLOOD	The maximum rate of rainfall in which the dam could safely pass or store without overtopping.
RESERVOIR	The body of water impounded or potentially impounded by the dam.
RIP RAP	A layer of large rock, precast blocks, or other suitable material, generally placed on an embankment or along a watercourse as protection against wave action, erosion, or scour.
RISK	A measure of the likelihood and severity of an adverse consequence.
SEEPAGE	The continuous movement of water from the upstream face of the dam toward its downstream face.
SETTLEMENT	The downward movement of the ground due to forces (i.e., buildings and other structures) applied to the surface.
SPILLWAY	A structure over or through which flood flows are discharged.
TAILWATER	The water downstream from the dam.
TOE OF DAM	The junction of the upstream or downstream face of an embankment with the ground surface.

APPENDIX E

E-1: Contact Checklist

E-2: Condition B (Level 2) or C (Level 3) Event Log

E-3: Dam Emergency Situation Report Forms

APPENDIX E-1 – CONTACT CHECKLIST

Lake Petit Dam, Pickens County, Georgia Date: _____

The following contacts should be made immediately after the Emergency Condition (Level) is determined. The person making the contacts should initial and record the time of the call and who was notified for each contact made. See the Notification Flowcharts for critical contact information and Emergency Services Contacts for contact information for other possible emergency services.

Emergency Condition A (Level 1)

	Person Contacted	Time Contacted	Contacted by
___ Dam Owner's Representative	_____	_____	_____
___ Owner's Technical Representative	_____	_____	_____
___ GA Safe Dams Program	_____	_____	_____

Emergency Condition B (Level 2)

	Person Contacted	Time Contacted	Contacted by
___ Dam Owner's Representative	_____	_____	_____
___ Owner's Technical Representative	_____	_____	_____
___ GA Safe Dams Program	_____	_____	_____
___ Pickens County EMA	_____	_____	_____

Emergency Condition C (Level 3)

	Person Contacted	Time Contacted	Contacted by
___ 911	_____	_____	_____
___ GA Safe Dams Program	_____	_____	_____
___ Dam Owner's Representative	_____	_____	_____
___ Owner's Technical Representative	_____	_____	_____
___ Pickens County EMA	_____	_____	_____

APPENDIX E-2 – CONDITION B (LEVEL 2) OR C (LEVEL 3) EVENT LOG

(To be Completed During the Emergency)

Lake Petit Dam, Pickens County, Georgia Date: _____

Water Level Elevation: _____ Freeboard: _____

When and how was the event detected?

_____

_____

Weather conditions:

_____

_____

General description of the emergency situation:

_____

_____

Emergency level determination: _____Made by: _____

Actions and Event Progression

Date	Time	Action/Event Progression	Taken By

Report prepared by: _____

APPENDIX E-3 – DAM EMERGENCY SITUATION REPORT

(To be Completed Following the Termination of the Emergency)

Lake Petit Dam, Pickens County, Georgia Date: _____

National Inventory of Dams (NID) No.: GA00685

Weather conditions: _____

General description of emergency situation:

_____

_____

Area(s) of dam affected:

_____

_____

Extent of dam damage: _____

Possible cause(s): _____

Effect on dam's operation: _____

Initial reservoir elevation: _____ Time: _____

Maximum reservoir elevation: _____ Time: _____

Final reservoir elevation: _____ Time: _____

Description of area flooded downstream/damages/injuries/loss of life:

_____

_____

Other data and comments:

_____

_____

Observer's name and telephone number: _____

Report prepared by: _____

APPENDIX F
Locally Available Resources

APPENDIX F – LOCALLY AVAILABLE RESOURCES

The Pickens County Commissioner indicated the following heavy equipment may be available in the case of an emergency (for use, contact Mark Harris at Pickens County EMA at 706-253-8809 or Kirk Anderson at the Pickens County Public Works Department at 706-253-8873):

- One (1) Caterpillar D6NXL bulldozer
- One (1) Caterpillar 304C excavator
- One (1) Kobelco SK330 LC excavator
- One (1) Kubota KX057 excavator
- One (1) Kubota KX080 excavator
- Two (2) Kubota SVL 95-2S skid steers
- Three (3) Mack tandem dump trucks
- Six (6) single axle box dump trucks
- One (1) single axle flatbed trucks.

Other locally available resources include:

Heavy Equipment Service and Rental	Sand and Gravel Supply	Ready-mix Concrete Supply
Sunbelt Rentals 5290 Lake Pointe Center Drive Cumming, Georgia Main: 770-887-9966 Emergency: 800-667-9328 United Rentals 1151 Northpoint Parkway SE Acworth, Georgia 30102 Main: 770-974-3500 Emergency: 844-873-4948	Martin Marietta Ball Ground Quarry 970 Old Nelson Road Ball Ground, Georgia 30107 Office: 770-735-4783 Vulcan Materials Company 4420 Hightower Road Ball Ground, Georgia 30107 Main: 678-947-3310 GA Services: 770-454-3691	Wayne Davis Concrete 115 River Mill Drive Ball Ground, Georgia Main: 770-345-4454 Ernst Concrete 970 Old Nelson Road Ball Ground, Georgia 30107 Main: 770-422-0103 Argos Ready Mix 829 Univeter Road Canton, Georgia 770-428-7478

Pumps	Diving Service	Sand Bags
Xylem Cartersville 402 Old Mill Road Cartersville, Georgia 30120 770-415-8814 (On call service available 24/7) United Rentals 5260 Truman Drive Decatur, Georgia 30035 Main: 404-439-4322 Emergency: 844-873-4948 Rain for Rent 2330 Burnt Wood Drive Kennesaw, Georgia 30152 678-594-6601	Georgia Department of Natural Resources, Law Enforcement Division, Search and Rescue Team 781 Red Top Mountain Road SE, Acworth, Georgia 30102 770-529-2424 (M-F 8am – 4:30pm) 1-800-241-4113 (After hours) Underwater Construction Corporation 8494 Gulf View Drive Soddy Daisy, TN 37379 423-332-6700	Hanes Geo Components 3105 Sweetwater Road, Shite 200 Lawrenceville, Georgia 30044 Main: 866-961-3565 Emergency: 678-221-7849 SouthScape 790 East Church Street (Hwy 53 Business) Jasper, Georgia 30143 706-253-0033 770-894-7400