

# OPERATIONS AND MAINTENANCE MANUAL

## TEMPLATE INSTRUCTIONS

This document should be utilized in conjunction with the Operations and Maintenance (O&M) Manual Template developed by the Georgia Safe Dams Program (GSDP). This document provides instructions and covers most questions associated with filling out the O&M template. **The O&M template requires the use of Microsoft Word 2007 or newer.** If an older version of Microsoft Word is utilized the built-in functions of the template that make it easier to use will not function properly. If you have any trouble developing your O&M manual please contact your retained Engineer of Record or for additional assistance please contact GSDP at (404) 463-2461.

### Operations and Maintenance Manual

1. On the opening page, add a picture of your dam. This is accomplished by clicking on the picture icon . Choose the file containing the picture of your dam. It is automatically uploaded and centered.
2. Click on “*Type Dam Name Here*” and type the complete name of your dam as listed by the Safe Dams Program, if unsure please contact the GSDP.
3. Click on “*Choose a County*” and click on the county in which your dam resides.
4. Click on “*Type ID Here*” and type your dams ID, either State or NID depending on which box is clicked. Example: State ID # is an 11 digit number as follows: ####-###-#####. NID # starts with GA followed by 5 digits as shown: GA#####.
5. Click on the “*Type Author Here*” text box and type the name of who developed the document.
6. Click on the “*Type Dam Owner Here*” text box and type the name of whom the document was developed for.
7. In the Footer directly below and to the right of “*Type Dam Owner Here*” is the “*Date Published*” text box. Double Click in the Footer Section. This should bring up a dashed line above the mouse cursor. Once in the Footer, click on “*Choose Date Published*” and choose the date corresponding to when the document was finished and ready for distribution.
8. While in the Footer section, click on “*Choose Version #*” and pick the corresponding number depending on which version your O&M Manual is currently on.
9. Double Click on the main body of the document to exit the Footer Section.

### Emergency Action Plan

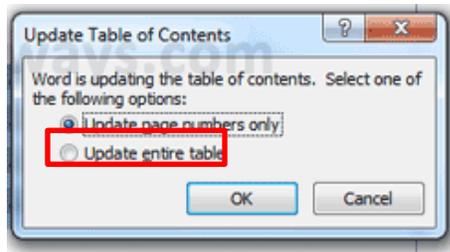
This information must be provided in all O&M Manuals. Do not change or alter this page in any way.

### Table of Contents

The *Table of Contents* page should be updated once the entire document has been filled out. To update the *Table of Contents*, place your mouse over the current text and click. A small icon appears on the top left.



Click on the “Update Table” icon and select “*update the entire table*” from the pop-up box.



## Ownership Information

1. The first step is to determine how many owners there are for the dam. Click on “*Choose a Number*” and choose how many owners are associated with the dam.
2. Begin with the first owner and fill in all appropriate fields.
3. If there are multiple owners, then you will need to add extra fields. Highlight the entire section for Owner #1, right click, and from the drop down list click on copy. Then place the cursor where you wish to place the new Owner section. Right click and click on paste to produce an entire new section for Owner #2 and so on.
4. Once all owners have been added, you will need to do the same for all operators, anyone associated with the dam, and the dam’s engineer of record, if applicable.
5. If a particular section is not necessary, highlight the entire section and delete.

\*The Ownership Information page will require periodic updates to ensure it is up-to-date.

## Revision Tracking

This section should contain details pertaining to any revisions of the O&M Manual. Revision tracking will ensure all individuals associated with the dam have the most up-to-date information of the dam.

1. Type the version number in the “*Version No.*” column.
2. Type the details of what was updated in the current version in the Description of Revision column.
3. Type the name of the editor who updated the O&M Manual in the “*Performed By*” column.
4. Insert the date of the revision into the “*Date*” column.

\*The Revision Tracking page will require periodic updates to ensure it is up-to-date.

## Distribution Tracking

This section should contain details pertaining to the distribution of the O&M Manual. Distribution tracking will ensure all individuals associated with the dam have the most up-to-date information of the dam.

1. Type the version number in the “*Version No.*” Column.
2. Type the location and who received a copy of the O&M Manual into the “*Person/Firm/Agency*” column. Include all recipients who received the corresponding version into the same location cell.

3. Insert the Number of Copies distributed to the corresponding location in the “*No. of Copies*” Column.
4. Insert the date(s) when the O&M Manual was distributed into the “*Date*” column.

**Example:**

Version No.	Person/Firm/Agency	No. of Copies	Date
1.0	EPD - Safe Dams Program John Smith – GEMHSA Jane Smith - Operator	1	01/01/2017

\*The Distribution Tracking page will require periodic updates to ensure it is up-to-date.

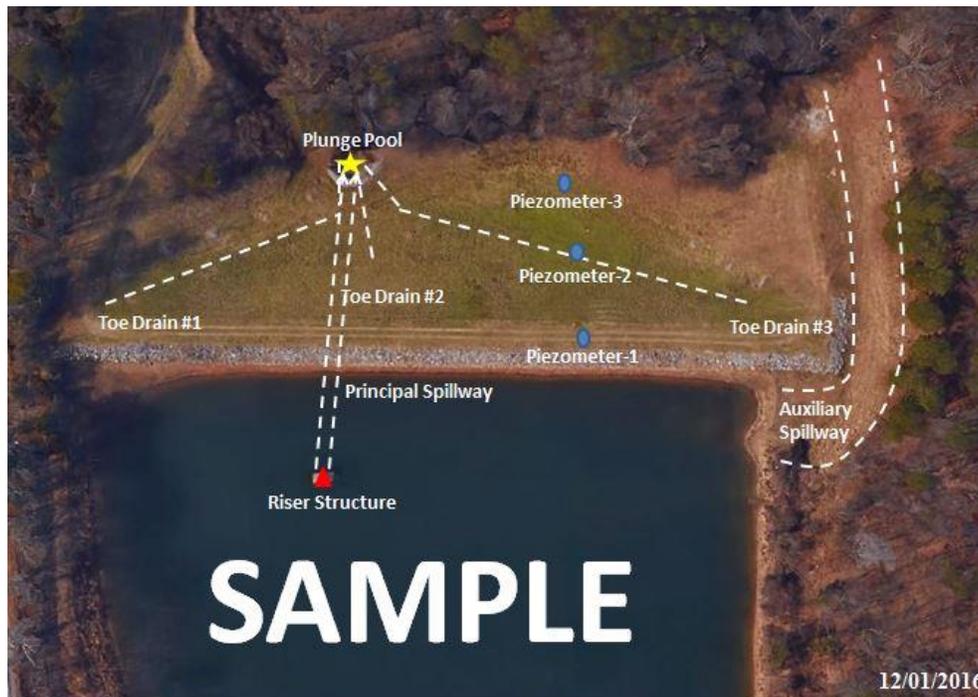
### Dam Data Sheet

This section should contain general information pertaining to the dam. Each section provides a specific text box for required data. Click on the italicized words in each text box and insert the corresponding information. Certain fields contain a drop-down list that should be utilized to add the required information. If particular information is unknown please leave it blank or contact the Safe Dams Program for assistance.

### Aerial Imagery

Insert aerial photo(s) of the dam and surrounding area showing the geography around the dam/lake by clicking on the picture icon “  “ and choosing the corresponding file. Google Earth is a helpful tool to develop this image. Each instrument and/or structure should be labeled with a unique identifier to ensure those not knowledgeable with the dam can easily determine the location of all structures. Add the date the aerial was developed into the bottom right corner.

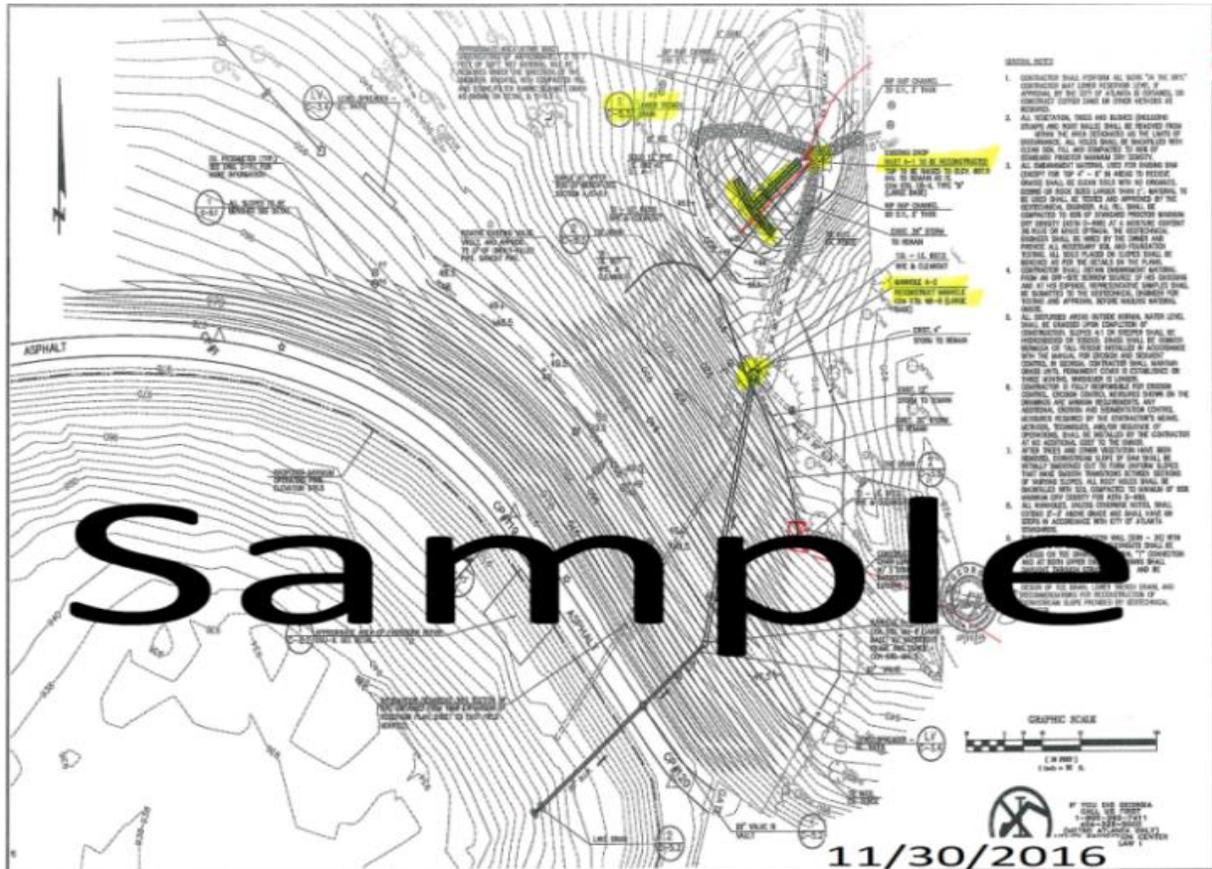
*Example:*



## Dam Layout/Drawing(s)

In this section, insert Dam Design Drawing(s) showing a detailed schematic of the dam and any instrumentation on the dam by clicking on the picture icon “” and choosing the corresponding file. Label all instrumentation with unique identifiers. Include the layout/drawing(s) completion date in the bottom right corner.

*Example:*



## General Information

This section should contain all information concerning the dam's location. Along with whom/when certain operators/owners are present at the dam and how to get in touch with them.

### *Location and Directions*

Provide detailed instructions of how to locate and access the dam and its appurtenant structures. Driving directions should begin from downtown Atlanta, GA. A good tool to aid in providing this information is Google Maps. Utilize GPS coordinates to give the exact location. If a key or other requirement is necessary to access the dam, it should be specified in this section.

### *Attendance and Communications*

This section should detail attendance information pertaining to if the dam is attended or unattended and when/where operators, owners, etc. are located throughout a normal operating

schedule. Communication methods should also be detailed here to provide those less knowledgeable with the dam a set of instructions for contacting operators and owners.

### *Safety and Health*

Safety of the public and all personnel should be a primary concern of all operators/owners. Provide details of how to safely access the dam and how unwanted guests are prevented from entering areas of concern for the dam (i.e. gates, signs, etc.).

### **Operation Procedures**

Provide specific details/directions for operating the dam's valves, gates, instrumentation, etc. The Safe Dams Program suggests adding pictures with directions for this and the related sections. The following examples may not relate to your dam and therefore should only be included if necessary. These sections are shown as *examples* and should be utilized to understand the correct way of implementing this information into your O&M Manual.

#### ***EXAMPLE:***

##### Drains/Gates

The primary outlet for the dam is a 20" conduit running through the embankment. This pipe is connected to a vertical riser located in the middle of the reservoir. The riser has a 20" diameter lake drain valve located on the bottom. This drain should be operated once a year in January to ensure it is functioning properly. In order to operate this drain and ensure proper functioning, perform the following steps:

1. Locate Drain Valve.



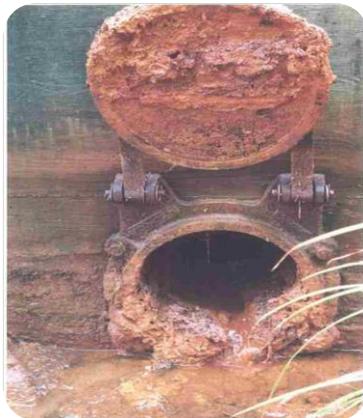
2. Turn the valve clockwise. **Do not over-exert this valve.**



3. Open drain and return to designated location for normal operation.



4. Once drain is closed and if visible, attempt to inspect and ensure there is no debris or build-up that could hinder flow.



***EXAMPLE:***

**Instrumentation**

The dam has three piezometers (monitoring wells) located toward the right side of the crest, downstream slope, and downstream toe. Refer to the dam layout/drawing(s) section above to determine the exact location of the wells. These wells are checked and the water depth is measured during all quarterly inspections performed by the owners/operator. Document the elevations of survey control points, if known, to properly analyze piezometer data. Perform the following steps to ensure the correct measurement of the groundwater level:

1. Locate Piezometers. Remove the bolts and take off the cap.



- Utilizing the water level meter found in the utility room (refer to map in above section), turn on the water level finder, first test that the beeper works, and then slowly lower the metal probe end down the well until the probe touches the top of the water and a beep is heard.



- Be careful to not damage the probe. If it is found that the well is clogged with debris or otherwise obstructed, it will be necessary to flush the well out to remove debris and any obstructions. Refer to the Maintenance Section for cleaning the well.



- Record the depth from the top of the standing pipe (the established reference point) on the inspection sheet in the appropriate field. In addition, record the current lake water level.



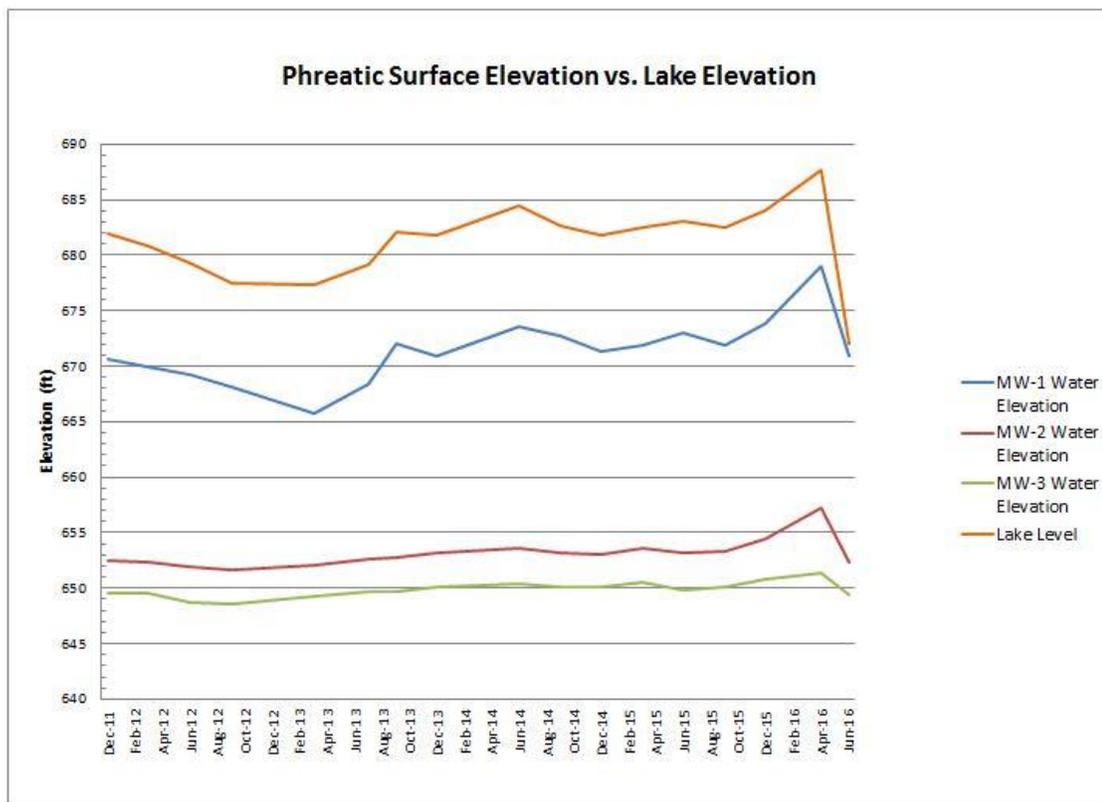
- Replace the cap and bolts.



- Repeat steps for all piezometers.



- Input the measurements into the Piezometer Data Sheet. This data should then be graphed and analyzed in a time series to determine if changes have occurred. Graphs should be at least half a page to ensure it is legible.



### Periodic Maintenance Operations

This section should contain all periodic maintenance activities related to the dam. Below are examples of maintenance items that should be performed on a periodic basis to keep the dam functioning properly. The examples below are not all-encompassing and may not pertain to your dam. Therefore, some of the items will not be included and certain items may need to be added to your O&M Manual. The GSDP highly encourages the use of photographs and additional multimedia sources to accurately portray any and all maintenance operations.

### *Toe/Chimney Drains*

- Ensure drain animal guards are functioning properly and are securely attached.
- When necessary, utilize pressure cleaning methods to completely remove all sediment and debris from the drain pipe. Use extreme care to prevent any damage to the drain.

### *Embankment/ Vegetation Control*

- Maintain adequate and suitable vegetation to prevent erosion of the embankment and earthen spillway for the dam. Collaborate with local landscape professionals to determine the requirements associated with your dam's vegetation.
- Fill erosion gullies with properly-compacted cohesive soil material. Seed with low-growing grass or riprap repaired area to stabilize from future erosion.
- Backfill rodent burrows with soil and seed with low-growing grass.
- Prevent the growth of trees or brush on the dam's embankment and on the spillway system.

### *Outlet Structures*

- Remove the accumulation of debris, obstructions, or other deleterious materials from both spillway systems (primary and auxiliary).
- Ensure all gates, orifices, dissipators, trash racks, and other appurtenances that affect the proper operation of the dam and reservoir are kept in good repair and working order, and that spillway and outlet gates necessary to pass flood flows shall be test-operated at least once each year.
- Test, clean, and lubricate gates and valves. This should be done on the recommended time schedule provided by the manufacturer to ensure proper function.

### *Instrumentation*

- Inspect and maintain instrumentation and gauging equipment based on the manufacturers recommended time schedule.
- Repair and verify calibration of water measurement equipment. Set specific time frame for calibration and record the date, time, and who performed the calibration.

## **Monitoring & Inspections**

The provided information in this section should remain a constant for all Category I dams in Georgia. There are potentially other issues that are specific to your dam that need to be included in this section. Add these items to the end of the section to which they pertain. If you are developing an O&M Manual for a Category II or exempt dam, then this section should be changed to reflect the dam's inspection schedule.

### **Appendix A**

This section has been added to provide additional space for larger documents (11x17) or any supplemental information that is required/necessary for the O&M Manual.

### **Appendix B**

This section should be utilized to maintain copies of any prior inspections. Adding additional inspection reports does not necessitate revising the entire document.

## **Appendix C**

This section should be utilized to hold the Construction and Operation Permit issued by the Director of the Environmental Protection Division. Scan the Permit and insert the document into the O&M Manual by clicking on the picture icon “” and choosing the corresponding file.

\*Additional appendices should be added as needed.