



## GUIDANCE DOCUMENT ON NEW PROBABLE MAXIMUM PRECIPITATION (PMP) IMPLEMENTATION

(Approved March 23, 2016; revised March 29, 2018)

### **Summary:**

This guidance document specifies the decision process to be utilized by impounding structure owners and their engineer in determining when a dam break inundation zone map, emergency action/ emergency preparedness plan, and hazard potential classification need to be updated to reflect Virginia's new Probable Maximum Precipitation (PMP) values that became effective on March 23, 2016.

### **Electronic Copy:**

An electronic copy of this guidance in PDF format is available on the Regulatory Town Hall under the Virginia Soil and Water Conservation Board at <http://townhall.virginia.gov/L/GDocs.cfm>.

The study entitled "Probable Maximum Precipitation Study for Virginia (November 2015)", the PMP Evaluation Tool, the *Virginia PMP 2015 Watershed Calculation Spreadsheet*, and related information may be found on the Department's website at <http://www.dcr.virginia.gov/dam-safety-and-floodplains/>.

### **Contact Information:**

Please contact the Department of Conservation and Recreation's Division of Dam Safety and Floodplain Management at [dam@dcr.virginia.gov](mailto:dam@dcr.virginia.gov) or by calling 804-371-6095 with any questions regarding the application of this guidance.

### **Disclaimer:**

This document is provided as guidance and, as such, sets forth standard operating procedures for the Department of Conservation and Recreation in administering the Dam Safety Program on behalf of the Virginia Soil and Water Conservation Board. This guidance provides a general interpretation of the applicable Code and Regulations but is not meant to be exhaustive in nature. Each situation may differ and may require additional interpretation of the Dam Safety Act and attendant regulations. This guidance is not intended and cannot be relied on to create any rights, substantive or procedural, on the part of any person or entity.

## **PMP Implementation Procedures**

### **I. Background:**

Chapters 475 and 489 of the 2014 *Virginia Acts of Assembly* directed the Department of Conservation and Recreation (Department), on behalf of the Virginia Soil and Water Conservation Board (Board), to conduct a study that would result in a set of new Probable Maximum Precipitation or PMP values for Virginia. The legislation further stated that "[s]uch PMP revisions shall be adopted by the Board if it finds that the analysis is valid and reliable and will result in

*cost savings to owners for impounding structure spillway construction or rehabilitation efforts*". The study entitled "Probable Maximum Precipitation Study for Virginia (November 2015)", was completed on December 1, 2015.

At the Board meeting on December 9, 2015, the Board found that the PMP analysis was valid and reliable and would result in cost savings to many owners for impounding structure spillway construction or rehabilitation efforts. The Board also:

- Recognized that the 2015 Virginia PMP values upon the effective date of the regulations shall replace the current PMP values provided in Hydrometeorological Reports (HMRs) and accepted the new values as sound engineering practices for use in the design of impounding structures;
- Recognized that owners of impounding structures with spillway design inadequacies who were under a moratorium on spillway rehabilitation shall now again be required to rehabilitate the spillway of their impounding structures utilizing the new PMP values upon the effective date of the regulatory action; and
- Adopted the Study, the PMP values, and authorized an exempt final regulatory action to effectuate the values.

The Board approved regulatory action amended 4VAC50-20-50 titled *Performance standards required for impounding structures* and incorporated by reference the Probable Maximum Study for Virginia (and associated PMP Evaluation Tool and Database) (November 2015). The regulatory action became effective on March 23, 2016.

This Guidance serves to specify the decision process to be utilized in determining when a dam break inundation zone map and emergency action/ emergency preparedness plan needs to be updated to reflect Virginia's new probable maximum precipitation (PMP) values.

## **II. Definitions (pursuant to 4VAC50-20-30):**

"Dam break inundation zone" means the area downstream of a dam that would be inundated or otherwise directly affected by the failure of a dam.

"Design flood" means the calculated volume of runoff and the resulting peak discharge utilized in the evaluation, design, construction, operation and maintenance of the impounding structure.

## **III. Authority:**

The 2014 *Virginia Acts of Assembly* contained the following Section 1 authorities applicable to this Guidance:

### **CHAPTER 475/ CHAPTER 489**

*An Act directing the Department of Conservation and Recreation to utilize a storm-based approach in updating the Probable Maximum Precipitation (PMP) for locations within or affecting the Commonwealth.*

[H 1006]/ [S 582]

Approved April 1, 2014

Be it enacted by the General Assembly of Virginia:

1. § 1. *That the Department of Conservation and Recreation, on behalf of the Virginia Soil and Water Conservation Board, shall utilize a storm-based approach in order to derive the Probable Maximum Precipitation (PMP) for locations within or affecting the Commonwealth. The PMP revisions shall be based on accepted storm evaluation techniques and take into account such factors as basin characteristics that affect the occurrence and location of storms and precipitation, regional and basin terrain influences, available atmospheric moisture, and seasonality of storm types. The results shall be considered by the Virginia Soil and Water Conservation Board in its decision to authorize the use of the updated PMP values in Probable Maximum Flood calculations, thus replacing the current PMP values. Such PMP revisions shall be adopted by the Board if it finds that the analysis is valid and reliable and will result in cost savings to owners for impounding structure spillway construction or rehabilitation efforts.*

§ 2. *The development of the methodology shall be completed by December 1, 2015.*

§ 3. *Owners of impounding structures with spillway design inadequacies who maintain coverage under a Conditional Operation and Maintenance Certificate in accordance with the Board's Impounding Structure Regulations (4VAC50-20) shall not be required to rehabilitate the spillway of their impounding structure until the analysis required under § 1 has been completed and reviewed by the Virginia Soil and Water Conservation Board. Such owners shall remain subject to all other requirements of the Dam Safety Act (§ [10.1-604](#) et seq.) and regulations.*

2. That in addition to other sums made available, the Department of Conservation and Recreation is authorized to utilize up to \$500,000 in unobligated balances in the Dam Safety, Flood Prevention and Protection Assistance Fund established pursuant to § [10.1-603.17](#) of the Code of Virginia or the Dam Safety Administrative Fund established pursuant to § [10.1-613.5](#) of the Code of Virginia to contract out for the analysis required under § 1.

3. That an emergency exists and this act is in force from its passage.

Appendix 1 contains the *Code of Virginia* authorities applicable to this Guidance and Appendix 2 contains the *Impounding Structure Regulations* authorities applicable to this Guidance. These include:

§ 10.1-606.2. Mapping of dam break inundation zones.

§ 10.1-606.3. Requirement for development in dam break inundation zones.

4VAC50-20-20. General Provisions.

4VAC50-20-40. Hazard Potential Classifications of Impounding Structures.

4VAC50-20-50. Performance standards required for impounding structures.

4VAC50-20-54. Dam Break Inundation Zone Mapping.

4VAC50-20-105. Regular Operation and Maintenance Certificates.

4VAC50-20-175. Emergency Action Plan (EAP) for High and Significant Hazard Potential Impounding Structures.

4VAC50-20-177. Emergency Preparedness Plan for Low Hazard Impounding Structures.

DOCUMENTS INCORPORATED BY REFERENCE (4VAC50-20)

## **IV. Discussion and Interpretation:**

### **Facts**

Section 10.1-606.2. (Mapping of dam break inundation zones.) of the *Code of Virginia* specifies that an owner of an impounding structure shall prepare a map of the dam break inundation zone (DBIZ) for the impounding structure in accordance with criteria set out in the Virginia Impounding Structure Regulations (4VAC 50-20), that such DBIZ maps shall be filed with the Department of Conservation and Recreation and with the offices with plat and plan approval authority or zoning responsibilities as designated by the locality for each locality in which the dam break inundation zone resides, and that properties identified within the DBIZ shall be incorporated by the owner into the dam safety emergency action/ preparedness plan.

Section 4VAC50-20-54 (Dam Break Inundation Zone Mapping.) of the *Impounding Structure Regulations* specifies that DBIZ maps and analyses, completed in accordance with the requirements set out in the Section, shall be provided to the Department, except as provided for in 4VAC50-20-51 [Special Low Hazard Dams], to meet the requirements set out in 4VAC50-20-40 [Hazard Potential Classifications of Dams], 4VAC50-20-175 [Emergency Action Plans (EAP)], and 4VAC50-20-177 [Emergency Preparedness Plans (EPP)], as applicable. It further states that to meet the EAP/EPP requirements, that all owners of impounding structures shall provide a DBIZ map. It also notes that the hazard potential classification analysis must include the use of both the SDF and PMF in the analysis, both of which may be potentially affected by the new PMP values.

Section 4VAC50-20-40 specifies that to support the appropriate hazard potential classification that a dam break analysis shall be conducted by the owner's engineer utilizing procedures set out in 4VAC50-20-54 and that the resulting hazard potential classification be certified by the owner.

Additionally, in order for an owner to receive or renew a regular Operation and Maintenance Certificate in accordance with 4VAC50-20-105, the certificate application shall include a current EAP/EPP and that it, and the application as a whole, shall be certified by the owner in accordance with this Section and the owner's engineer in accordance with this section and 4VAC50-20-20. The Section also requires the owner to notify the Department immediately of any change in the use of the area downstream that would impose hazard to life or property in the event of a failure.

Further, 4VAC50-20-175 (EAPs) specifies that an EAP shall be maintained by the owner, shall be revised as needed and re-submitted every six years (at a minimum), and that the owner shall update and resubmit the EAP immediately upon becoming aware of necessary changes to keep the EAP workable. This Section requires that the approved DBIZ map(s) to be a part of the EAP/EPP.

### **Issues Summarization**

The new PMP values could affect the impounding structures spillway design flood, hazard potential classification, DBIZ map, and EAP/EPP. As explained above, the owner and the owner's engineer are responsible for assessing the new PMP values and for ensuring that dam break inundation zone maps and the emergency action/ preparedness plans are complete and that the documents reflect any changes in the use of the area downstream of an impounding structure that would impose hazard to life or property in the event of failure. It is also clear that the owner and

the owner's engineer need to assess the impacts that the new PMP values may have upon the impounding structure's hazard potential classification (e.g. see if the hazard classification increases).

With the new PMP values becoming effective on March 23, 2016, through application of this guidance, the Department wants to ensure that the DBIZ map and EAP/EPP adequately protect lives and property of those downstream of an impounding structure while endeavoring to ensure that no unnecessary financial burden is imposed on the owner.

### **Procedures to be Applied**

Procedures for addressing the revised PMP values and for updating DBIZ maps and EAPs/EPPs are as follows:

- 1) For maps not yet produced or produced prior to September 26, 2008:
  - A) When the Department reviews a DBIZ map, it needs to ensure that it was completed in accordance with the current requirements of Section 4VAC50-20-54. In accordance with this item, a map, when required, shall be produced or updated to reflect current requirements. Such updates shall reflect the new PMP values.
  
- 2) For maps produced on or after September 26, 2008:
  - A) If there have been any known changes in the use of the area downstream of an impounding structure that would impose hazard to life or property in the event of failure, the owner shall have their engineer run hydrologic and / or hydraulic models utilizing the new PMP values. If this creates a change in DBIZ maps and/ or EAPs/EPPs, updated maps and plans shall be submitted. Updated hazard potential classification analyses shall also be completed where applicable.
  - B) Upon submission of a regular certificate renewal application after March 23, 2016, the owner's engineer must run the new PMP Evaluation Tool (<http://www.dcr.virginia.gov/dam-safety-and-floodplains/pmp-tool>) and determine the new governing PMP values for the 6-, 12-, and 24-hour durations (for the three storm types; general, local, and tropical). A completed copy of the *Virginia PMP 2015 Watershed Calculation Spreadsheet* and any supporting calculations shall serve as the confirmation record and shall be submitted with the owner's regular or conditional certificate renewal application. With the submission of a conditional certificate renewal application, the owner must provide this information or provide a reasonable schedule for the completion of this analysis.
    - i) If all of the new governing 6-, 12-, and 24-hour PMP values are found and documented to have decreased from previously utilized HMR PMP values, no revisions to the map or EAP's need be conducted at this time, except in response to determinations required to be made in accordance with § 10.1-606.3 which shall be discussed later in this document (see Item 3). It is recognized that if all PMP values have decreased, that for the purposes of EAPs/EPPs and for hazard classification, that the version of the DBIZ map on file is more conservative and therefore adds an additional margin of safety.

- a) It should be noted that if the dam requires rehabilitation due to an insufficient spillway, then new modeling is recommended. However, the Department will accept information that is more conservative than may be needed had the new PMP values been applied to the design.
  - ii) If one or two of the new governing 6-, 12-, and 24-hour PMP values are found and documented to have increased, it must be determined if either of these new increased PMP values have become the controlling storm for the basin in question. Therefore, hydrologic and / or hydraulic models must be run utilizing the new governing 6-, 12-, and 24-hour PMP values to ensure that the hydrograph that creates the largest peak outflow is the one being used to determine hazard classification, SDF, and the capacity for non-failure and failure analysis. Should the controlling storm be the one that has decreased, paragraph (B)(i) set out above shall be followed. If it is found that the PMP value that represents the controlling storm is the one that has increased, revised DBIZ maps and EAPs/EPPs shall be required. The owner and the owner's engineer also need to assess the impacts that the revised controlling storm value may have upon the impounding structure's hazard potential classification (see if the hazard classification increases).
  - iii) If all of the new governing 6-, 12-, and 24-hour PMP values are found and documented to have increased, revised DBIZ maps and EAPs/EPPs shall be required. Updated hazard potential classification analyses shall also be completed where applicable.
- 3) Section 10.1-606.3 requirement for re-mapping
- A) In accordance with § 10.1-606.3 of the *Code of Virginia*, for any development proposed within the boundaries of a dam break inundation zone that has been mapped in accordance with § 10.1-606.2, the locality shall, as part of a plan review, review the dam break inundation zone map on file with the locality for the affected impounding structure, and within 10 days forward a request to the Department of Conservation and Recreation to make a determination of the potential impacts of the proposed development on the spillway design flood standards required of the dam. The Department will utilize the map on file for the purposes of this review, but if it is known that the map has not been updated in response to the new PMP values, the Department shall note such in our response and require the owner to immediately initiate efforts to update the DBIZ map so that a refined impact of the development may be assessed regardless of whether the new PMP values increased or decreased for the impounding structure in question.
- 4) Certifications
- A) Where an owner and owner's engineer based on their assessment determine that updates to DBIZ maps produced on or after September 26, 2008 and EAPs/EPPs are not necessary in accordance with this guidance, they shall each complete and submit with the owner's renewal application the following certifications in addition to any other certifications that may be required.

**B) Certification by Owner's Engineer**

I certify that I have evaluated the new probable maximum precipitation (PMP) values, and have found that one of the following conditions has occurred: (1) each of the governing PMP values for the 6-, 12-, and 24-hour durations have decreased from previously utilized HMR PMP values or (2) the PMP value for the controlling storm has decreased from previously utilized HMR values and still results in the largest outflow from the dam when compared to the other two durations. I therefore find that the original dam break inundation zone map and the emergency action plan/ emergency preparedness plan on file remain protective of public safety. I have attached a completed copy of the *Virginia PMP 2015 Watershed Calculation Spreadsheet* and my supporting calculations to serve as the confirmation record. Further, I have notified the impounding structure owner of my findings.

**C) Certification by Owner**

I, as the Owner of the impounding structure, certify that my engineer has evaluated the new probable maximum precipitation (PMP) values and advised me of the findings. I recognize that one of the following conditions has occurred: (1) each of the governing PMP values for the 6-, 12-, and 24-hour durations have decreased from previously utilized HMR PMP values or (2) the PMP value for the controlling storm has decreased from previously utilized HMR values and still results in the largest outflow from the dam when compared to the other two durations. In addition, I also certify that the original dam break inundation zone map and the emergency action plan/ emergency preparedness plan on file remain protective of public safety. I agree that should an evaluation be required in accordance with § 10.1-606.3 of the *Code of Virginia* to assess any development proposed within the boundaries of the dam break inundation zone below this impounding structure, that I shall upon notification from the Department of Conservation and Recreation immediately initiate efforts to update the dam break inundation zone map for my impounding structure so that a refined impact of the development may be assessed.

(Please see Appendix 3 for the Probable Maximum Precipitation Certification Form.)

**V. Adoption, Amendments, and Repeal:**

This document will remain in effect until rescinded or superseded.

## Appendix 1

### Applicable Code of Virginia Authorities

The *Code of Virginia* contains the following authorities applicable to this guidance:

#### **§ 10.1-606.2. Mapping of dam break inundation zones.**

A. An owner of an impounding structure shall prepare a map of the dam break inundation zone for the impounding structure in accordance with criteria set out in the Virginia Impounding Structure Regulations (4VAC 50-20). Existing maps prepared by the locality in accordance with these regulations may be used for this purpose.

B. All maps prepared in accordance with subsection A shall be filed with the Department of Conservation and Recreation and with the offices with plat and plan approval authority or zoning responsibilities as designated by the locality for each locality in which the dam break inundation zone resides. ...

D. All properties identified within the dam break inundation zone shall be incorporated by the owner into the dam safety emergency action plan of that impounding structure so as to ensure the proper notification of persons downstream and other affected persons or property owners in the event of an emergency condition at the impounding structure.

#### **§ 10.1-606.3. Requirement for development in dam break inundation zones.**

A. For any development proposed within the boundaries of a dam break inundation zone that has been mapped in accordance with § 10.1-606.2, the locality shall, as part of a preliminary plan review pursuant to § 15.2-2260, or as part of a plan review pursuant to § 15.2-2259 if no preliminary review has been conducted, (i) review the dam break inundation zone map on file with the locality for the affected impounding structure, (ii) notify the dam owner, and (iii) within 10 days forward a request to the Department of Conservation and Recreation to make a determination of the potential impacts of the proposed development on the spillway design flood standards required of the dam. The Department shall notify the dam owner and the locality of its determination within 45 days of the receipt of the request. Upon receipt of the Department's determination, the locality shall complete the review in accordance with § 15.2-2259 or 15.2-2260. If a locality has not received a determination within 45 days of the Department's receipt of the request, the Department shall be deemed to have no comments, and the locality shall complete its review. Such inaction by the Department shall not affect the Board's authority to regulate the impounding structure in accordance with this article.

If the Department determines that the plan of development would change the spillway design flood standards of the impounding structure, the locality shall not permit development as defined in § 15.2-2201 or redevelopment in the dam break inundation zone unless the developer or subdivider agrees to alter the plan of development so that it does not alter the spillway design flood standard required of the impounding structure or he contributes payment to the necessary upgrades to the affected impounding structure pursuant to § 15.2-2243.1.

The developer or subdivider shall provide the dam owner and all affected localities with information necessary for the dam owner to update the dam break inundation zone map to reflect any new development within the dam break inundation zone following completion of the development.

The requirements of this subsection shall not apply to any development proposed downstream of a dam for which a dam break inundation zone map is not on file with the locality as



of the time of the official submission of a development plan to the locality.

B. The locality is authorized to map the dam break inundation zone in accordance with criteria set out in the Virginia Impounding Structure Regulations (4VAC 50-20) and recover the costs of such mapping from the owner of an impounding structure for which a dam break inundation zone map is not on file with the locality and a map has not been prepared by the impounding structure owner.

C. This section shall not be construed to supersede or conflict with the authority granted to the Department of Mines, Minerals and Energy for the regulation of mineral extraction activities in the Commonwealth as set out in Title 45.1. Nothing in this section shall be interpreted to permit the impairment of a vested right in accordance with § 15.2-2307.

## Appendix 2

### Applicable *Impounding Structure Regulations* Authorities

The *Impounding Structure Regulations* contain the following authorities applicable to this guidance:

#### **4VAC50-20-50. Performance standards required for impounding structures.**

B. The spillway design flood (SDF) represents the largest flood that need be considered in the evaluation of the performance for a given project. The impounding structure shall perform so as to safely pass the appropriate SDF. Reductions in the established SDF may be evaluated through the use of incremental damage analysis pursuant to 4VAC50-20-52. The SDF established for an impounding structure shall not be less than those standards established elsewhere by state law or regulations, including but not limited to the Virginia Stormwater Management Program (VSMP) Regulation (9VAC25-870). Due to potential for future development in the dam break inundation zone that would necessitate higher spillway design flood standards or other considerations, owners may find it advisable to consider a higher spillway design flood standard than is required.

C. PMF: Probable Maximum Flood is the flood that might be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region. The PMF shall be calculated from the probable maximum precipitation (PMP) derived from the Probable Maximum Precipitation Study for Virginia (and associated PMP Evaluation Tool and Database) (November 2015). The owner's engineer must develop PMF hydrographs for 6-, 12-, and 24-hour durations. The hydrograph that creates the largest peak outflow is to be used to determine capacity for nonfailure and failure analysis. Present and planned land-use conditions shall be considered in determining the runoff characteristics of the drainage area. ...

H. PMP: Probable maximum precipitation means the theoretically greatest depth of precipitation for a given duration that is meteorologically possible over a given size storm area at a particular geographical location at a particular time of year with no allowance made for future long-term climatic trends. In practice, this is derived by storm transposition and moisture adjustment to observed storm patterns. In Virginia, the 0.9 PMP is meant to characterize the maximum recorded rainfall event within the Commonwealth.

#### **DOCUMENTS INCORPORATED BY REFERENCE (4VAC50-20)**

Probable Maximum Precipitation Study for Virginia (and associated PMP Evaluation Tool and Database), Prepared for the Virginia Department of Conservation and Recreation by Applied Weather Associates, LLC, November 2015

#### **4VAC50-20-54. Dam Break Inundation Zone Mapping.**

A. Dam break inundation zone maps and analyses shall be provided to the department, except as provided for in 4VAC50-20-51, to meet the requirements set out in 4VAC50-20-40, 4VAC50-20-175, and 4VAC50-20-177, as applicable. In accordance with subsection G of this section, a simplified dam break inundation zone map and analysis may be completed by the department and shall be provided to the impounding structure's owner to assist such owner in complying with the requirements of this chapter. All analyses shall be completed in accordance with 4VAC50-20-20 D.

B. The location of the end of the inundation mapping should be indicated where the water surface elevation of the dam break inundation zone and the water surface elevation of the spillway design flood during an impounding structure nonfailure event converge to within one foot of each other. The inundation maps shall be supplemented with water surface profiles showing the peak water surface elevation prior to failure and the peak water surface elevation after failure.

C. All inundation zone map(s) shall be signed and sealed by a licensed professional engineer.

D. Present and planned land-use for which a development plan has been officially approved by the locality in the dam break inundation zones downstream from the impounding structure shall be considered in determining the classification.

E. For determining the hazard potential classification, an analysis including, but not limited to, those hazards created by flood and nonflood dam failures shall be considered. At a minimum, the following shall be provided to the department:

1. A sunny day dam break analysis utilizing the volume retained at the normal or typical water surface elevation of the impounding structure;

2. A dam break analysis utilizing the spillway design flood with a dam failure;

3. An analysis utilizing the spillway design flood without a dam failure; and

4. A dam break analysis utilizing the probable maximum flood with a dam failure.

F. To meet the Emergency Action Plan requirements set out in 4VAC50-20-175 and the Emergency Preparedness Plan requirements set out in 4VAC50-20-177, all owners of impounding structures shall provide dam break inundation zone map(s) representing the impacts that would occur with both a sunny day dam failure and a probable maximum flood with a dam failure.

1. The map(s) shall be developed at a scale sufficient to graphically display downstream inhabited areas and structures, roads, public utilities that may be affected, and other pertinent structures within the identified inundation area. In coordination with the local organization for emergency management, a list of downstream inundation zone property owners and occupants, including telephone numbers may be plotted on the map or may be provided with the map for reference during an emergency.

2. Each map shall include the following statement: "The information contained in this map is prepared for use in notification of downstream property owners by emergency management personnel." ...

#### **4VAC50-20-20. General Provisions.**

... D. All engineering analyses required by this chapter, including but not limited to, plans, specifications, hydrology, hydraulics and inspections shall be conducted or overseen by and bear the seal of a professional engineer licensed to practice in Virginia.

E. Design, inspection and maintenance of impounding structures shall be conducted utilizing competent, experienced, engineering judgment that takes into consideration factors including but not limited to local topography and meteorological conditions. ...

#### **4VAC50-20-40. Hazard Potential Classifications of Impounding Structures.**

... C. To support the appropriate hazard potential classification, dam break analysis shall be conducted by the owner's engineer or the department in accordance with one of the following alternatives and utilizing procedures set out in 4VAC50-20-54. ...

2. The owner may propose a hazard potential classification that shall be subject to approval by the board. To support the proposed hazard potential classification, an analysis shall be

conducted by the owner's engineer and submitted to the department. The hazard potential classification shall be certified by the owner. ...

#### **4VAC50-20-105. Regular Operation and Maintenance Certificates.**

##### Part III. Certificate Requirements

A. A Regular Operation and Maintenance Certificate is required for an impounding structure. ...

C. Any owner of an impounding structure that does not have a Regular Operation and Maintenance Certificate or any owner renewing a Regular Operation and Maintenance Certificate shall file an Operation and Maintenance Certificate Application. A form for the application is available from the department (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures). Such application shall be signed by the owner and signed and sealed by a licensed professional engineer. The following information shall be submitted on or with the application:

1. The application shall include the following required information: ...
  - b. The proposed hazard potential classification; ...
    - i. A statement as to whether or not the current hazard potential classification for the impounding structure is appropriate and whether or not additional work is needed to make an appropriate hazard potential designation; ...
      - k. Certification by the owner's engineer that the Operation and Maintenance Certificate Application information provided pursuant to subdivision 1 of this subsection is true and correct in their professional judgment. Such certification shall include the engineer's signature, printed name, Virginia number, date, and the engineer's Virginia seal; and
        1. Owner's signature certifying the Operation and Maintenance Certificate Application information provided pursuant to subdivision 1 of this subsection and that the operation and maintenance plan and schedule shall be conducted in accordance with this chapter. ...
          3. An Emergency Action Plan in accordance with 4VAC50-20-175 or an Emergency Preparedness Plan in accordance with 4VAC50-20-177 and evidence that the required copies of such plan have been submitted to the local organization for emergency management and the Virginia Department of Emergency Management; ...
            - F. The owner of an impounding structure shall notify the department immediately of any change in the use of the area downstream that would impose hazard to life or property in the event of failure.

#### **4VAC50-20-175. Emergency Action Plan (EAP) for High and Significant Hazard Potential Impounding Structures.**

A. In order to protect life during potential emergency conditions at an impounding structure, and to ensure effective, timely action is taken should an impounding structure emergency occur, an EAP shall be required for each High and Significant Hazard Potential impounding structure. ...

B. It is the impounding structure owner's responsibility to develop, maintain, exercise, and implement a site-specific EAP.

C. An EAP shall be submitted every six years. The EAP shall be submitted with the owner's submittal of their Regular Operation and Maintenance Certificate application (Operation and Maintenance Certificate Application for Virginia Regulated Impounding Structures).

D. The owner shall update and resubmit the EAP immediately upon becoming aware of necessary changes to keep the EAP workable. Should an impounding structure be reclassified, an EAP in accordance with this section shall be submitted. ...

G. An EAP shall contain the following seven basic elements unless otherwise specified in this subsection. ...

5. Dam Break Inundation Maps. The EAP shall include dam break inundation maps developed in accordance with 4VAC50-20-54.

**4VAC50-20-177. Emergency Preparedness Plan for Low Hazard Impounding Structures.**

Low Hazard impounding structures shall provide information for emergency preparedness to the department, the local organization for emergency management and the Virginia Department of Emergency Management. A form for the submission is available from the department (Emergency Preparedness Plan for Low Hazard Virginia Regulated Impounding Structures). The information shall include, but not be limited, to the following:

1. Name and location information for the impounding structure including city or county and latitude and longitude;
2. Name of owner and operator and associated contact information including residential and business telephone numbers and other means of communication;
3. Contact information for relevant emergency responders including the following:
  - a. Local dispatch center or centers governing the impounding structure's dam break inundation zone; and
  - b. City or county emergency services coordinator's name or names;
4. Procedures for notifying downstream property owners or occupants potentially impacted by the impounding structure's failure;
5. A dam break inundation zone map completed in accordance with 4VAC50-20-54 and evidence that:
  - a. Such map has been filed with the offices with plat and plan approval authority or zoning responsibilities as designated by the locality for each locality in which the dam break inundation zone resides; and
  - b. Required copies of such plan have been submitted to the local organization for emergency management and the Virginia Department of Emergency Management; and
6. Certification of the accuracy of the plan by the owner.

Appendix 3



Certification Form: Review of New Probable Maximum Precipitation Values (Effective March 23, 2016) Using the PMP Evaluation Tool

Name of Dam (Print): \_\_\_\_\_; Inventory Number for Dam: \_\_\_\_\_; Dam in County or City: \_\_\_\_\_

CERTIFICATION BY OWNER'S ENGINEER

I certify that I have evaluated the new probable maximum precipitation (PMP) values, and have found that one of the following conditions has occurred: (1) each of the governing PMP values for the 6-, 12-, and 24-hour durations have decreased from previously utilized HMR PMP values or (2) the PMP value for the controlling storm has decreased from previously utilized HMR values and still results in the largest outflow from the dam when compared to the other two durations. I therefore find that the original dam break inundation zone map and the emergency action plan/ emergency preparedness plan on file remain protective of public safety. I have attached a completed copy of the Virginia PMP 2015 Watershed Calculation Spreadsheet and my supporting calculations to serve as the confirmation record. Further, I have notified the impounding structure owner of my findings.

Signed: \_\_\_\_\_ Virginia Number: \_\_\_\_\_
Professional Engineer's Signature Print Name

This \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

Engineer's Virginia Seal:



CERTIFICATION BY OWNER

I, as the Owner of the impounding structure, certify that my engineer has evaluated the new probable maximum precipitation (PMP) values and advised me of the findings. I recognize that one of the following conditions has occurred: (1) each of the governing PMP values for the 6-, 12-, and 24-hour durations have decreased from previously utilized HMR PMP values or (2) the PMP value for the controlling storm has decreased from previously utilized HMR values and still results in the largest outflow from the dam when compared to the other two durations. In addition, I also certify that the original dam break inundation zone map and the emergency action plan/ emergency preparedness plan on file remain protective of public safety. I agree that should an evaluation be required in accordance with § 10.1-606.3 of the Code of Virginia to assess any development proposed within the boundaries of the dam break inundation zone below this impounding structure, that I shall upon notification from the Department of Conservation and Recreation immediately initiate efforts to update the dam break inundation zone map for my impounding structure so that a refined impact of the development may be assessed.

Signed: \_\_\_\_\_
Owner's Signature Print Name

This \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_ .

Mail the executed form to the appropriate Department of Conservation and Recreation Division of Dam Safety and Floodplain Management Regional Engineer