

EMERGENCY ACTION PLAN (EAP)

**Lake Barcroft Dam
On Holmes Run (Cameron Run Watershed)
Fairfax County, Virginia**

National Inventory of Dams ID # 05901



OWNER / OPERATOR:

**Lake Barcroft Watershed Improvement District
3650 Boat Dock Drive
Falls Church, Virginia 22041
Phone: (703)-820-1300
Fax: (703) -820-6657
Email: lbwid@vacoxmail.com**

LBWID Board of Trustees

**Charles de Seve – Chairman
Gerald Mendenhall – Treasurer
George McLennan- Secretary/Engineering Oversight**

LBWID Operations Director/ EAP Coordinator/EAP Preparer

Davis Grant

ISSUE DATE:

January 2012

Participating Agencies

**Lake Barcroft Watershed Improvement District
Fairfax County, Office of Emergency Management
City of Alexandria, Office of Emergency Management**

EMERGENCY ACTION PLAN FOR THE LAKE BARCROFT DAM

Introduction

Lake Barcroft was created in the early 1900s as a reservoir for the City of Alexandria. In the early 1950s it ceased serving as a reservoir and was converted to recreational use. In both cases, its dam was designed and is operated to maintain the pool level at a nearly constant elevation. The lake and its dam have insufficient freeboard to allow significant retention of storm water. Accordingly, the lake and dam operate on a pass-through basis. With a slight delay due to the dynamics of the lake topography, storm water that enters the lake is passed downstream. The downstream effects of storm water passing through Lake Barcroft under normal conditions are nearly the same as if the dam had not been built. In fact, the U.S. Army Corps of Engineers has determined that the slight delay created by Lake Barcroft and its dam, somewhat mitigates downstream flooding in Cameron Run. This is due to delaying the arrival of peak flow from the Holmes Run Watershed so it does not coincide with peak flows from the other branches of the Cameron Run Watershed.

A 12-ft high by 151-ft wide bascule gate is continuously controlled by a computer that responds to inflows of storm water. As storm water enters the lake, the gate is opened only as much as necessary to pass that incoming volume of water downstream. In this way, inflow and outflow are balanced and the pool elevation normally varies by less than six inches.

Recognizing the importance of having control over the gate position, the Lake Barcroft Watershed Improvement District has installed several redundant levels of control. An industrial-grade computer system monitors lake level trends and instructs a hydraulic system which opens or closes the gate to suit the situation. The computer system employs multiple redundant sensors to keep track of lake level, dam gate position, and other key parameters. A complete, fully programmed, second computer is on standby, ready to be installed in the case of failure. There are manual overrides of the computer controls that can also direct the position of the dam gate.

The hydraulic system has duplicate pumps, valves and other key components to enhance the probability of continuous operation. In addition to an automatic diesel generator that is capable of operating the control system and gate in the event of a failure of the main power lines, there is a gasoline-powered hydraulic pump that can raise the gate if all electric power fails. A very comprehensive set of system sensors, monitors and alarms automatically notify staff and other responsible people of any problems, malfunctions, or dangerous water flow conditions that may arise.

The data logging function of the Lake Barcroft dam control system creates a very valuable record of flow conditions in the upper Holmes Run Watershed. This information on discharge volume, bascule gate opening percent, lake level, and rainfall data is shared in real-time with Fairfax County and the City of Alexandria. They use the data along with direct observations throughout the area and data from other sources to evaluate the likelihood of downstream flooding and the need to take emergency action. It should be understood that Lake Barcroft and its dam is not designed for storm water retention and simply releases downstream whatever storm water flows into the lake. Thus, in passing information to Fairfax County and the City of Alexandria, the Lake Barcroft dam operation acts as a useful weather and stream flow monitoring system, but not as a storm protection mechanism.

EMERGENCY ACTION PLAN FOR THE LAKE BARCROFT DAM

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NOTIFICATION FLOW CHART
Potential or Imminent Failure – Stage III conditions (see definitions, page 8)

Observer of Emergency Condition

Lake Barcroft Watershed Improvement District (LBWID)

Davis Grant, Operations Director Office: 703-820-1300 Cell: 703-209-2080 Home: 540-657-4088	or	Sam Ellis, Dam Manager Office: 703-820-1300 Cell: 703-209-3541 Home: 703 -941-6170	or	Ken Kopka, Project Manager Office: 703-820-1300 Cell: 703-209-3234 Home: 703 -938-3243
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(LBWID 4th call)

(LBWID 1st call)

(LBWID 2nd call)

(LBWID 3rd call)

**24 Hour Emergency Dispatch Center
 Fairfax County**
 Ph: 911
 *(To call from out of area) Ph: 703-691-2131

**Fairfax County
 Emergency Services**
 David McKernan, Coordinator
 Office: 571-350-1000
 Office Direct: 571-350-1003
 Cell: 571-340-0458

**Virginia State Police
 24 Hour Dispatch Center**
 Ph: 703-803-0026

**Virginia Department of Transportation
 Emergency Operations Center**

**24 Hour Emergency Dispatch Center
 City of Alexandria**
 Ph: 703-549-5100

**City of Alexandria
 Emergency Services**
 Mark Penn, Coordinator
 Office: 703-746-5256
 Cell: 571-220-6914
 Cell #2: 571-259-1795
 Home: 703-751-3251

**City of Alexandria
 Transportation and Environmental Services**
 Rich Baier, Director
 Office: 703-746-4025
 Cell: 703-657-4813
 After hours: 703-838-4488

**LBWID
 Board of Trustees**
 Charles de Seve
 (H) 703-941-1520 (C) 703-851-9220
 George McLennan
 (H) 703-354-6351 (C) 703-474-2644
 Gerald Mendenhall
 (H) 703-578-3746 (C) 703-307-5306

Virginia Division of Dam Safety
 Robert Bennett, Director
 (O) 804-786-2871
 Rob Vanlier, Regional Engineer
 (O) 540-351-1587

Whitman, Requardt , and Associates
 Bill Wagener, Lead Engineer
 (O) 443-224-1543 (H) 410-757-0468
 Brian Gresehover, Engineer
 (O) 443-224-1704 (H) 410-707-8243

**At risk persons and property down stream of Lake
 Barcroft Dam will be notified by Fairfax County's
 and the City of Alexandria's emergency officials.**

NOTIFICATION FLOW CHART
Non-Failure Concern – Stage I & II conditions (see definitions, page 8)

Observer of Emergency Condition

Lake Barcroft Watershed Improvement District (LBWID)

Davis Grant, Operations Director Office: 703-820-1300 Cell: 703-209-2080 Home: 540 -657-4088	or	Sam Ellis, Dam Manager Office: 703-820-1300 Cell: 703-209-3541 Home: 703 -941-6170	or	Ken Kopka, Project Manager Office: 703-820-1300 Cell: 703-209-3234 Home: 703 -938-3243
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(LBWID 1st call)

(LBWID 2nd call)

(LBWID 3rd call)

**Staff Duty Officer
 Fairfax County OEM
 Ph: 571-439-4901**

**24 Hour Emergency Dispatch Center
 City of Alexandria
 Ph: 703-549-5100**

**LBWID
 Board of Trustees**
 Charles de Seve
 (H) 703-941-1520 (C) 703-851-9220
 George McLennan
 (H) 703-354-6351 (C) 703-474-2644
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 Transportation and Environmental Services**
 Rich Baier, Director
 Office: 703-746-4025
 Cell: 703-657-4813
 After hours: 703-838-4488

**Virginia Department of Transportation
 Emergency Operations Center**

At risk persons and property down stream of Lake Barcroft Dam will be notified by Fairfax County's and the City of Alexandria's emergency officials.

Emergency Action Plan for the Lake Barcroft Dam

II. STATEMENT OF PURPOSE

The purpose of this Emergency Action Plan (EAP) is to define responsibilities and provide procedures designed to identify unusual and unlikely conditions which may endanger the Lake Barcroft Dam in time to take mitigative action and to notify the appropriate emergency management officials of possible, impending, or actual failure of the dam. An unusually large flood, earthquake, structural malfunction, or malicious human activity such as sabotage, vandalism, or terrorism could cause such an emergency. The plan may also be used to provide notification when discharges from the dam could cause flooding downstream of the dam.

This EAP describes the responsibilities and procedures that will:

- Identify unusual and unlikely conditions that may endanger the Lake Barcroft Dam.
- Initiate remedial actions to prevent a dam failure or minimize the downstream impacts of a dam failure.
- Initiate emergency actions to warn downstream residents and others of impending or actual failure of the Lake Barcroft Dam.

III. PROJECT DESCRIPTION

Official dam name:	Lake Barcroft Dam, NID ID#: 05901
Dam purpose:	Recreation
Stream dammed:	Holmes Run, Fairfax County, VA
Location:	On Holmes Run about 800 feet upstream of SR 244 (Columbia Pike)
Dam owner & operator:	Lake Barcroft Watershed Improvement District 3650 Boat Dock Drive, Fall Church, VA 22041
Type of dam:	Masonry Gravity
Year(s) constructed:	1915 (Bascule gate installed in 1974)
Designed by:	Unknown
Constructed by:	Unknown
Construction Inspection Service:	Whitman, Requardt and Associates, LLP, (WR&A) Baltimore, MD. 1-800-787-7100 (Bill Wagner)
Dam height:	69 feet
Drainage area above dam:	14.5 square miles

Emergency Action Plan for the Lake Barcroft Dam

Type of Watershed: Suburban (highly developed)

VA hazard classification: VA Class I

Principal spillway: 12 ft. tall x. 151 ft. bascule gate

Emergency Spillway: Earthen Fuse Plug (western earthen embankment)

Elevation at top of dam: 211.5 feet mean sea level

Elevation at spillway crest: 208.5 feet mean sea level

Maximum reservoir capacity: 2,500 acre-feet Surface area: 175 acres.

Normal reservoir capacity: 2,100 acre-feet Surface area: 135 acres.

Normal Pool Elevation: 208.5 feet mean sea level

Max Pool Elevation: 211.5 feet mean sea level

Normal Pool Depth: 46 feet

Current SDF capability: 100% PMF

Required SDF capability: PMF

Description of impacted property: See Lake Barcroft Dam inundation mapping

Emergency Action Plan for the Lake Barcroft Dam

IV. EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

Surveillance of the physical structure, systems, and monitoring of instrumentation readings at the Lake Barcroft Dam are the normal methods of detecting potential emergency situations. During usual business hours and when extreme weather is predicted, the staff of the Lake Barcroft Watershed Improvement District perform this surveillance in person/on site. Outside normal business hours, the staff and Trustees are notified by the automatic relay of system malfunction or unusual pool water level warnings by the dam alarm system which is monitored 24/7 by Stanley Security Solutions, Inc. The staff is on call 24 hours a day, seven days a week.

The LBWID staff and Board of Trustees have the ability to remotely monitor the dam's performance and instrument readings via a password-secured internet site. The LBWID also has a web camera for the dam that allows for remote visual observation of the dam at all times. For conditions beyond the normal range of operations, Lake Barcroft Watershed Improvement District Operations Director, Davis Grant, will contact the 24-hour Dispatch Center of Fairfax County and the City of Alexandria. Davis Grant will also contact the Virginia Dam Safety offices in Warrenton (Rob Vanlier) and in Richmond (Robert Bennett) for assistance with evaluation of Stage III Condition.

Each event or situation will be placed on one of the following classifications:

- **Stage I Condition** - This classification indicates that the Lake Barcroft Dam is not in danger of failing and is operating as designed, but flooding may be expected downstream from the dam. Potentially affected residents and businesses need to be notified that flooding may be possible. Fairfax County and City of Alexandria emergency management officials will determine if and when evacuations and/or other measures will be implemented. Condition I is initiated by a 30% opening of the bascule gate (approximate discharge of 1,988 cubic feet per second), or any other situation that raises concern for the dam during a rain or non-rain event.
- **Stage II Condition** – This classification indicates that the Lake Barcroft Dam is operating as designed, but the primary spillway (Bascule Gate) has reached its full discharge capacity and lake level is continuing to rise and may ultimately reach the crest of the emergency spillway (Earthen Fuse Plug). Potentially affected residents and businesses need to be alerted that additional flooding that might threaten life and property is possible. Fairfax County and City of Alexandria emergency management officials will determine if and when evacuations and/or other measures will be implemented. Condition II initiated by a 100 % opening of the bascule gate and lake level elevation is at 209 feet above mean sea level (approximate discharge of 23,000 cubic feet per second), or any other situation that has potential to result in a major failure of the dam during a rain or non-rain event.
- **Stage III Condition** - This classification indicates that the lake level has crested the emergency spillway (Earthen Fuse Plug) and the volume of flood water discharge from the dam is likely to increase substantially. Potentially affected residents and businesses need to be alerted that additional flooding that will threaten life and property is likely. Fairfax County and City of Alexandria emergency management officials will determine if and when evacuations and/or other measures will be implemented. Condition III initiated by a 100 % opening of the bascule gate and lake level elevation is at 211.5 feet above mean sea level.(approximate discharge of 30,000 cubic feet per second), or any other situation that will result or has resulted in a major failure of the dam during a rain or non-rain event, or if the dam has failed.

Emergency Action Plan for the Lake Barcroft Dam

V. GENERAL RESPONSIBILITIES UNDER THE EAP

A. Impounding Structure Owner/Operator and EAP Coordinator Responsibilities

- Owner/Operator: Lake Barcroft Watershed Improvement District
- EAP Coordinator: Davis Grant (LBWID Operations Director)

- a. (Planning) - Develop, maintain, post and distribute the Emergency Action Plan.
- b. (Training) - Conduct annual communication checks to determine that the Notification Flowchart contacts are correct.
- c. (Engineering) - Develop and maintain inundation zone maps (updated every six years).
- d. (Maintenance) - Ensure that the dam is inspected and maintained to protect against deterioration and failure.
- e. (Responding) - Respond to reported conditions at the dam; specify actions to take, and who will take them.

B. Responsibility of Notification and Evacuation

Observer / Operator responsibilities

- a. Activate the Notification Flowchart if conditions warrant.
- b. Keep emergency officials and emergency responders informed of developing conditions.

Emergency Official / Responder responsibilities

- The primary emergency officials/ responders are:
 - Fairfax County Emergency Services (Police, Fire, and Rescue)
 - City of Alexandria Emergency Services (Police, Fire, and Rescue)

- a. Carry out their assigned tasks on the Notification Flowchart when it is activated and determine if conditions warrant their taking other measures, which may include the notification and/or evacuation of residents and businesses.

Emergency Action Plan for the Lake Barcroft Dam

C. Responsibility for Termination and Follow-Up

Owner / Operator responsibilities

- a. The dam owner/operator will contact the Fairfax County and City of Alexandria emergency management officials/responders when it has been determined that the emergency condition at the dam site no longer exist.
- b. Relating to Stage II and Stage III emergency conditions, the dam owner/ operator will coordinate a meeting with the Fairfax County and City of Alexandria emergency management officials/responders within two weeks following the emergency to review the effectiveness of the Emergency Action Plan and to discuss the corrective measures that were implemented at the dam site.

Emergency Management Officials/Responders

- a. Fairfax County and City of Alexandria emergency management officials/responders will notify the dam owner/operator when emergency operations in the inundation zone have been terminated.

VI. DIRECTORY OF ADDITIONAL PERSONNEL WITH OPERATIONAL KNOWLEDGE OF THE LAKE BARCROFT DAM OR DAM SAFETY EXPERTISE.

In addition to people named elsewhere in this Lake Barcroft Dam Emergency Action Plan, the following list identifies other individuals with expertise in dam safety, engineering, hydraulics and hydrology, design, construction, soils, geology etc., who may be consulted about taking specific actions at the Lake Barcroft Dam when there appears to be an emergency situation. The names appear in order of call preference due to their location and/or knowledge.

Name	Telephone No.	Area of Expertise
Luis Fernandez	(703) 658-3080	Structural Engineer
Charles de Seve	(703) 333-3020	LBWID Trustee – Chairman
George McLennan	(703) 354-6351	LBWID Trustee - Engineering
Jerry Mendenhall	(703) 578-3746	LBWID Trustee - Treasurer
Dave Erby	(410) 581-9696	Control System Engineer
Rob Duke	(410)-581-9696	Control System Engineer

Emergency Action Plan for the Lake Barcroft Dam

VII. PREPAREDNESS

Preparedness actions are taken to prevent a dam failure incident or to help reduce the effects of a dam failure and facilitate response to emergencies. The following actions describe some of the steps that could be taken at Lake Barcroft Dam to prevent failure after an emergency is first discovered. **Many of these actions should only be performed under the direction of the Virginia Division of Dam Safety and Floodplain Management or other qualified professional engineer.**

With the exception of a minor equipment malfunction associated with items 7 and 8, a minimum of a Stage I Condition will be activated for each the following occurrences.

ACTIONS TO BE TAKEN IN THE EVENT OF:

- 1. A predicted rain event (by the National Weather Service) that is likely to produce precipitation that would cause the LBWID to activate the Emergency Action Plan**
 - LBWID Operations Director or LBWID Trustees will participate in pre-event planning meetings or telephone conference calls with emergency management officials from Fairfax County and the City of Alexandria.
 - LBWID Operations Director will coordinate with the LBWID staff and assign shifts for constant monitoring of the dam until the rain event no longer warrants such dam monitoring.

- 2. Piping (erosional seepage) through the embankment, foundation, or abutments.**
 - Plug the flow with whatever material is available (hay bales, bentonite, or plastic sheeting) if the entrance to the leak is in the reservoir.
 - Place an inverted filter (a protective sand and gravel filter) over the exit area to hold materials in place.

- 3. A slide appears on the downstream slope of the earthen embankment.**
 - Lower the water level in the reservoir at a rate, and to an elevation, that is considered safe given the slide condition. (Only the bascule gate should be used to lower reservoir level in this situation.)
 - Stabilize slides on the downstream slope by weighting the toe area below the slide with additional soil, rock, or gravel (this will not be possible during a rain event).
 - Contact Vulcan Materials Company (703-813-3760) for rock and gravel.

- 4. Failure of an appurtenant structure such as an inlet, outlet, or spillway.**
 - Implement temporary measures to protect the damaged structure, such as closing the inlet or providing temporary protection for a damaged spillway.
 - Lower the water level in the reservoir to a safe elevation. Pumping, siphoning, or a controlled breach may be required.

Emergency Action Plan for the Lake Barcroft Dam

5. Mass movement of the dam on its foundation (spreading or mass sliding failure).

- Immediately lower the water level in the reservoir until the movement stops.
- Continue lowering the water level until a safe level is reached and continue operating at this reduced level until repairs are made.

6. Excessive settlement of the embankment.

- Lower the water level in the reservoir by pumping, siphoning, or opening the bascule gate in a controlled fashion.
- If necessary, restore freeboard, preferably by placing sandbags where needed.
- Lower the water level in the reservoir to a safe level and continue operating at this reduced level until repairs can be made.

7. Pro-Logic Control (PLC) System failure or sensor failure for Bascule Gate on primary spillway.

- Switch the dam's PLC to manual control (from automatic control) if possible and locate the failed electronic control system component. Turn off the main electrical breaker for the PLC if the PLC cannot be switched to manual control
- Consult Appendix G in Lake Barcroft Operation and Maintenance Manual, Volume 1, for instructions on how to correct the problem(s).
- Contact Dave Erby or Rob Duke at Applied Controls Engineering for further assistance if problem can not be resolved.
 - Dave Erby – Office: (410) 581-9696, ext 112; Mobile: (302) 547-6392
 - Rob Duke – Office: (410) 581-9696, ext 113; Mobile: (302) 598-4705

8. Hydraulic System failure for Bascule Gate on primary spillway.

- Switch the dam's PLC system to manual control (from automatic control) and locate the failed hydraulic system component.
- Consult Chapter 7 in the Lake Barcroft Operation and Maintenance Manual, Volume 1, for instructions on how to correct the problem(s).
- Contact Bill Wagner or Brian Gresehover at Whitman, Requardt & Associates, LLP, for further assistance if problem can not be resolved.
 - Bill Wagner – Office: (800) 787-7100; Home: (410) 757-0468
 - Brian Gresehover – Office: (800) 787-7100; Home: (410) 707-8243

9. Malicious human activity (sabotage, vandalism, or terrorism).

- If malicious human activity that could endanger the Lake Barcroft Dam and consequently public safety is suspected, contact law enforcement officials to help evaluate the situation.
- If the spillway has been damaged or plugged, implement temporary measures to protect the damaged structure. Employ experienced professionals to assess the problem and implement repairs.
- If the water in the reservoir has been contaminated, even though Lake Barcroft is not a water supply reservoir, notify appropriate health and safety authorities as to that possibility. Downstream water users could be affected, as would fish and wildlife.

Emergency Action Plan for the Lake Barcroft Dam

VIII. INUNDATION MAP

A flood caused by a sudden breach of the Lake Barcroft Dam could affect approximately 1700 downstream structures (residential and commercial). A 1 PMF flood event with full spillway activation and without a dam breach could affect approximately 1600 downstream structures (residential and commercial). These structures are marked on the attached inundation maps. The Lake Barcroft Watershed Improvement District has provided inundation mapping for a sunny day failure event, ½ PMF flood event, 1 PMF flood event with spillway activation, and 1 PMF flood event with spillway activation and total embankment failure.

Due to the transient nature of the residents and businesses in the inundation areas, it is near impossible for the Lake Barcroft Watershed Improvement District to maintain an accurate account of names and phone numbers for each person that may be affected by a dam breach or flooding event. To overcome this challenge, the Fairfax County Emergency Services Agency and the City of Alexandria Emergency Services Agency will utilize their Reverse 911 Systems to notify the persons, businesses, and properties located in the projected inundation areas. This system is regularly updated to account for new phone numbers for residents and businesses. In addition to using the Reverse 911 System, Fairfax County and the City of Alexandria will deploy fire and rescue personnel and police officers to start door to door notification and to assist with the evacuations.

(Attach Inundation Maps – see 2008 Lake Barcroft Inundation Mapping Study Report and Maps)

IX. PLAN MAINTENANCE

This Lake Barcroft Dam Emergency Action Plan will be reviewed and updated annually by the Lake Barcroft Watershed Improvement District in cooperation with, Fairfax County Emergency Services personnel, and the City of Alexandria Emergency Services personnel. All parties to this plan should be encouraged to attend this review to assure names and contact information is current. Plan revisions will be provided to all parties promptly (see page 15).

Emergency Action Plan for the Lake Barcroft Dam

X. TRAINING

All people involved in carrying out actions required by this Lake Barcroft Dam Emergency Action Plan, particularly the staff of the Lake Barcroft Watershed Improvement District who will be physically monitoring the condition of the dam on a daily basis, should be trained to ensure they are thoroughly familiar with the elements of the plan, availability of equipment, and their responsibilities and duties in the plan. Personnel shall be trained in problem detection and evaluation, and appropriate corrective measures. This training is essential for proper evaluation of developing situations at all levels of responsibility. The “staff drill” will be a principal method of conducting this training (see page 16).

A “tabletop exercise” shall be conducted at least once every six years. This tabletop exercise involves a meeting of the Lake Barcroft Watershed Improvement District staff, Fairfax County Emergency Services personnel, and the City of Alexandria Emergency Services personnel in a conference room environment. The exercise will begin with a description of a simulated event, and proceeds with discussions by the participants to evaluate the EAP and response procedures, and to resolve concerns regarding coordination and responsibilities, command, control and communications (see page 16).

XI. EMERGENCY ACTION PLAN DISTRIBUTION

Copies of this Lake Barcroft Dam Emergency Action Plan will be provided to all individuals or organizations who are signatory to it (see page 15). Dam breach inundation maps have been provided to the Fairfax County Emergency Services Agency and the City of Alexandria Emergency Services Agency should they be needed for evacuation purposes.

Emergency Action Plan for the Lake Barcroft Dam

**XII. Acknowledgement of receipt of the
Lake Barcroft Dam Emergency Action Plan**

Davis Grant, Operations Director
Lake Barcroft Watershed Improvement District
Falls Church, VA

Date

David McKernan, Coordinator
Fairfax County Emergency Services
Fairfax, VA

Date

Mark Penn, Coordinator
City of Alexandria Emergency Services
Alexandria, VA

Date

Emergency Action Plan for the Lake Barcroft Dam

XIII. REVIEW AND UPDATE OF THE PLAN

This Lake Barcroft Dam Emergency Action Plan (EAP) will be reviewed and updated annually; Lake Barcroft Watershed Improvement District staff drills will be conducted twice a year; orientation seminars will be held annually, tabletop exercises will be conducted every six years. A description of these various exercises or seminars is as follows:

Staff Drill. A staff drill is the lowest level exercise that involves an actual exercise. It tests, develops, or maintains staff skills in a single emergency response procedure. An example of a drill is an in-house exercise performed to verify the validity of telephone numbers and other means of communication during an emergency, along with staff response. It can test the staff's response to the various instrument warnings and physical observations at the dam. A staff drill is considered a necessary part of ongoing Lake Barcroft Watershed Improvement District staff training.

Orientation Seminar. This is a seminar that involves bringing together those with a role or interest in the Lake Barcroft Dam EAP. It will involve Lake Barcroft Watershed Improvement District staff and officials, state and local emergency management agencies, and will discuss and review the EAP and discuss plans for future drills and more in-depth comprehensive exercises. This seminar is not an actual exercise of the EAP, but a meeting that enables each participant to become familiar with the EAP, and the roles, responsibilities, and procedures of those involved.

Tabletop Exercise. The tabletop exercise is a higher level of exercise than the drill. It will involve a meeting with Lake Barcroft Watershed Improvement District staff and officials, and state and local emergency management officials, in a conference room environment. The format is usually informal with minimum stress involved. The exercise begins with a description of the simulated event and proceeds with discussions by the participants in evaluating the EAP and response procedures, and will resolve concerns regarding coordination and responsibilities.

Emergency Action Plan for the Lake Barcroft Dam

EAP review, update, and exercise documentation.

Date of staff drill: _____

Participants: See attached sign in sheet

Date of staff drill: _____

Participants: See attached sign in sheet

Date of staff drill: _____

Participants: See attached sign in sheet

Date of staff drill: _____

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Participants: See attached sign in sheet

Date of orientation seminar: _____

Participants: See attached sign in sheet

Date of orientation seminar: _____

Participants: See attached sign in sheet

Date of orientation seminar: _____

Participants: See attached sign in sheet

Date of tabletop exercise: _____

Participants: See attached sign in sheet

Emergency Action Plan for the Lake Barcroft Dam

XIV. APPENDICES

1. Inundation maps (see 2008 Lake Barcroft Inundation Mapping Study Report and Maps)
 - a. Sunny day failure
 - b. ½ PMF (Probable Maximum Flow)
 - c. 1 PMF with spillway/s activation
 - d. 1 PMF with spillway/s activation and total structure breach/failure