

SOUTH FORK DAM INUNDATION MAPPING
FIGURE 4 - MAIN DAM SUNNY DAY BREACH MAXIMUM DEPTH RESULTS

Emergency Action Plan (EAP)

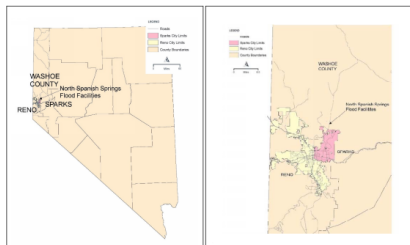
North Spanish Springs Sediment and Detention Basins

National Inventory of Dams (NID) No. NV10653 (Sed. Basin) & NV10654 (Det. Basin)

Nevada State Identification No. J-579 (Sed. Basin) & J-580 (Det. Basin)

Washoe County, Nevada

Washoe County Community Services Department



Emergency Action Plan

What's Inside?

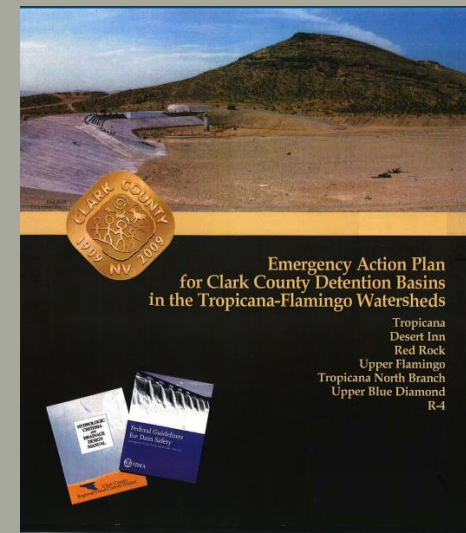
Noel Laughlin, PE – Sr. Water Resources Engineer





What is an Emergency Action Plan?

- An Emergency Action Plan (EAP) is a written document that identifies incidents that can lead to potential emergency conditions at a dam
- Identifies the areas downstream of the dam that can be affected by the loss of the reservoir
- Specifies pre-planned actions to be followed to minimize property damage, potential loss of infrastructure and water resource, and potential loss of life because of failure or miss-operation of a dam
- High Hazard and Significant Hazard dams must have an EAP per NAC 535.320



Emergency Action Plan

- Dam owner is responsible for the development, maintenance, and exercise of the EAP
 - There are guidelines, tools and assistance available to help owners
- Dam owner/operator typically initiates the EAP process and both emergency responders and owner/operator will be users of the EAP



Federal Guidelines for Dam Safety

Emergency Action Planning for Dams

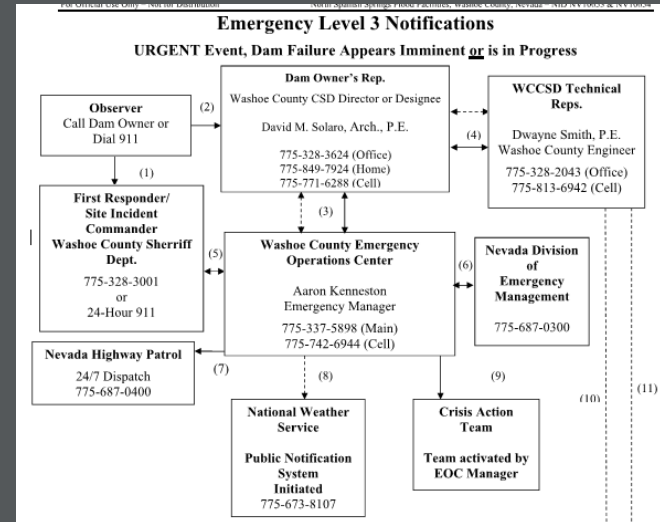
FEMA 64 / July 2013



FEMA

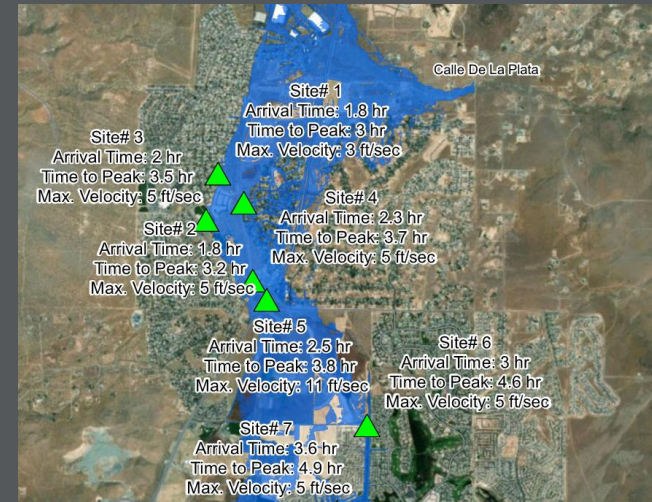
EAP Key Points

- Identifies the dam owner's responsibilities to ensure timely and effective action.
 - Surveillance
 - Notification of emergency response managers



EAP Key Points

- Inundation maps are critical parts of the EAP
 - Delineate areas that may need to be evacuated
 - Show arrival times and flow characteristics for flood waters
 - 2D models can produce more realistic inundation map products



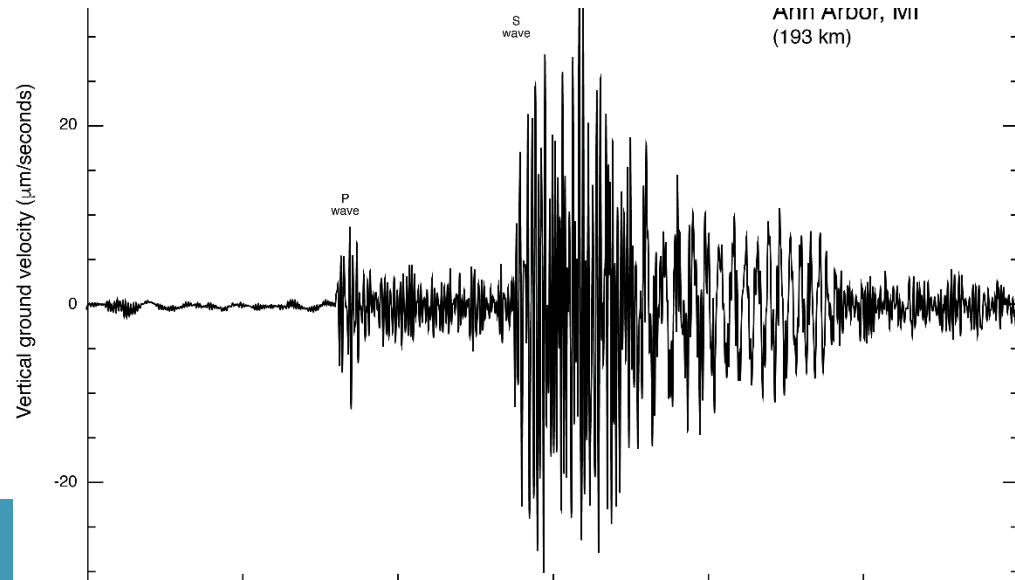
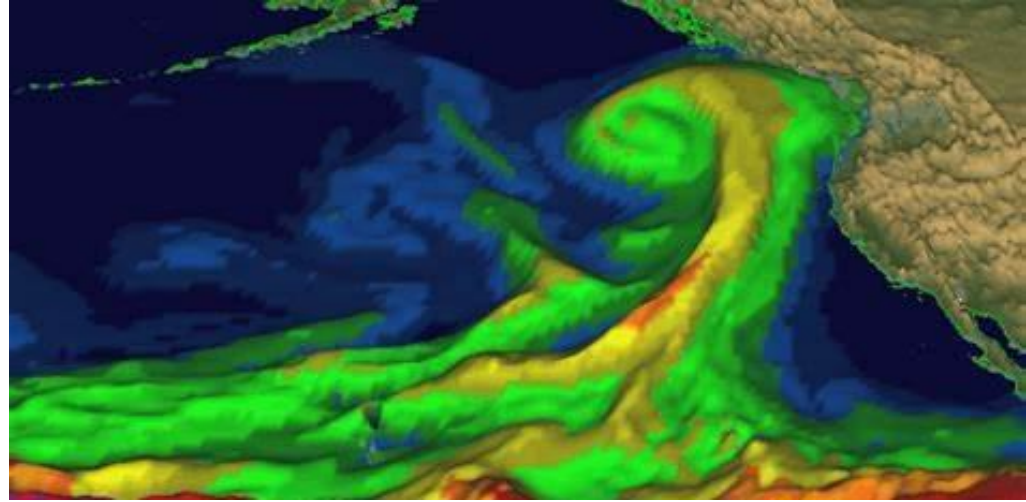
EAP Key Points

- Public awareness is a component of an EAP
 - Most people are not aware they live or work downstream from a dam
 - Can enhance the effective implementation of the EAP



EAP Key Points

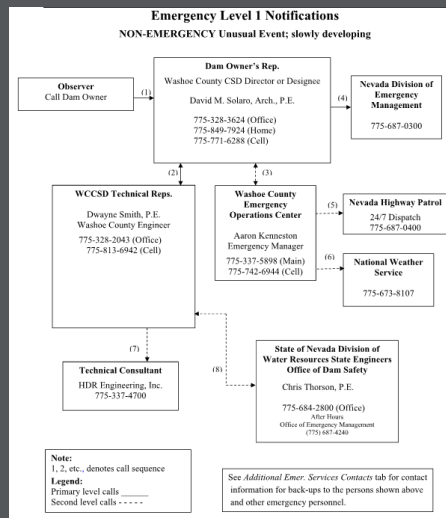
- EAP defines events that trigger emergency actions.
 - Observations
 - Extreme weather forecasts
 - Instrumentation
 - Earthquakes near dam
 - Unusual or emergency events (terrorism, industrial accident)



EAP Key Points

- Notification flow charts
 - Agency, responder contact information
 - Priority of contact

Agency / Organization	Principal Contact	Address	Office Telephone Number	Alternate Telephone Numbers
Washoe County Board of Commissioners	John Slough, Manager	1001 E. 9 th Street Reno, NV 89512	775-328-2000	(C) 775-391-6599
Washoe County Community Services Department (CSD)	David M. Solaro, Arch., P.E. Director	1001 E. 9 th Street Reno, NV 89512	775-328-3624	(C) 775-771-6288
Nevada Office of Water Resources - Dam Safety	Chris Thorson, Engineering & Dam Safety	901 S. Stewart, Ste. 2002, Carson City, NV 89701	775-684-2844	After Hours Office of Emergency Management (775) 687-4280
Washoe County CSD, Operations (Reno)	On-Call Supervisor	3101 Longley Lane Reno, NV 89502	775-328-2180	Fax: (775) 328-2110
Truckee Meadows Fire Protection District	Charles Moore, Fire Chief	1001 E. 9 th Street Reno, NV 89512	775-328-6000	(C) 775-313-8903
City of Sparks Fire Department	Chris Maglio, Fire Chief	1605 Victorian Ave Sparks, NV 89431	775-353-2254	(C) 775-720-7372
City of Sparks Police	Brian Allen, Chief of Police	1701 Potter Way Sparks, NV 89434	775-353-2220	AH, Office 775-353-2231
City of Sparks Community Services	John A. Martin, PE, Community Services Director	431 France Way Sparks, NV 89431	775-353-4080	775-353-1635
National Weather Service	Chris Smallcomb, Warning Coordination Meteorologist	2350 Raggio Pkwy Reno, NV 89512	775-673-8100 Ext. 223	(AH) 775-673-8107
Nevada Department of Public Safety (NDPS)	James M. Wright, DPS Director	555 Wright Way Carson City, NV 89711	775-684-4008	(AH, Office 775-684-4558)
Nevada Dept. of Cons. & Natural Resources	Key Schenck, Interim Director & Jim Lawrence, Deputy Director	901 S. Stewart St., Ste 1003 Carson City, NV 89701	775-684-2700	FAX (775) 684-2715
Nevada Department of Transportation (NDOT)	Ther Dyeon, District Engineer or Mike Funes, Assistant District Engineer	310 Gulletti Way Reno, NV 89431	775-834-8300 775-834-8333 (Main) 775-834-8303	(C) 775-771-2341 (C) 775-846-1587
Nevada Highway Patrol	24-7 dispatch	555 Wright Way Carson City, NV 89711	775-687-0400	-



- Nevada requires periodic updates
- Table top exercises every 5 years

A group of approximately 15 men are seated around a large, dark wood conference table in a meeting room. Several of the men are wearing high-visibility yellow safety vests over their work clothes. They appear to be in a meeting or training session, with some looking at papers or laptops on the table. The room has a plain wall and a blackboard in the background.

Emergency Action Plan

Typical Components

■ Basic EAP Data

- Potential Impacted Area
- Dam Description
- Dam Details
- Directions to the Dam
- Access to Dam Site
- Construction Material Availability

Basic EAP Data

Purpose

The purpose of this EAP is to reduce the risk of human life loss and injury and minimize property damage during an unusual or emergency event at Huffaker Effluent Storage Reservoir.

Potential Impacted Area

See *Inundation Map* tab (behind front cover) and *General Risk* tab (Appendix B-1) for the general locations of neighborhoods, roads, industrial and businesses districts that may be flooded if the dam should fail. The inundation map also provides an estimated time for the flood wave to travel from the dam to these locations:

Dam Description

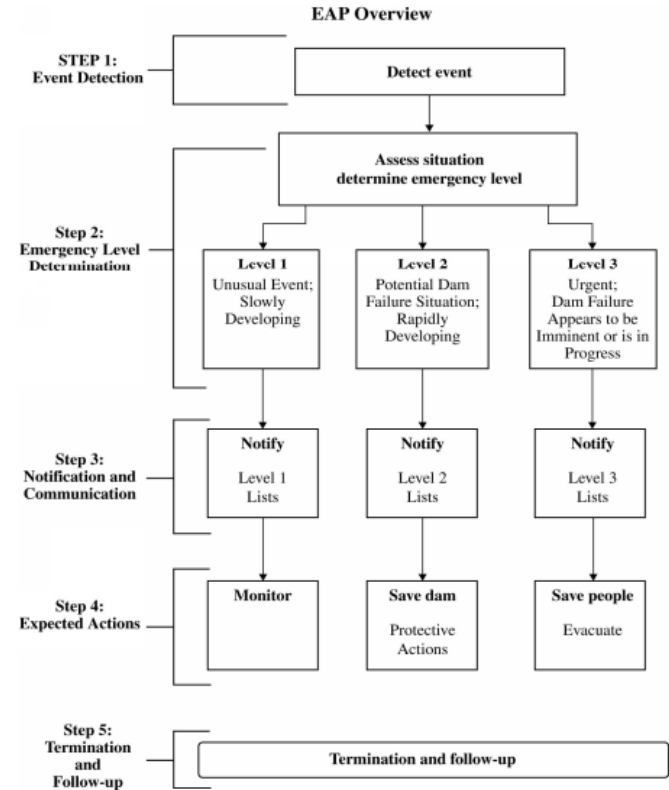
Dam Height:	124 Feet
Dam Structural Height:	138 feet
Crest Length:	1,066 Feet
Crest Width:	16 Feet
Crest Surface:	Gravel
Maximum Volume:	4,000 acre-feet (1,303,404,000 gallons)
Spillway:	None
Primary Outlet:	None
Drainage Area:	0.4 Sq. /Mi.
Built:	1991
Dam Owner:	Washoe County Community Services Department (WCCSD)
Hazard Class:	High
National Inventory of Dams Number:	NV10384
State Identification Number:	J-325
Latitude:	39.4617
Longitude:	-119.7458
Legal Descriptions:	N1/2 NW1/4 Section 4 T18N R20E And SW1/4 Section 33 T19N R20E
Major Property Owner:	Washoe County
Dam Designer:	Harding Lawson Associates and Black and Veatch
Pneumatic Piezometer(S):	Six (6) Located In Dam Foundation, Downstream of Centerline
Pressure Relief Wells:	Five (5) Located At Downstream Toe of Dam

Dam Details

The multiple-zone rock filled dam has a concrete-faced upstream slope (1.6H:1V) that is keyed into a six (6) foot wide, 4-foot thick concrete plinth. The concrete plinth runs along the entire length of the upstream toe. A grout curtain was constructed through the plinth extending vertically to depths up to 100 feet into bedrock. The downstream face of the dam (1.6H:1V) is covered with rock (cobble to boulder size material) and was designed to act as an emergency spillway in the event of overtopping. There is no primary spillway for the reservoir. The crest of the dam is approximately 16 feet wide. A 4 foot tall concrete parapet wall runs along the crest on the upstream side. Opposite the parapet wall and running the full length of the crest is a simple cable barrier. See Appendix B-4 for details.

Emergency Action Plan Typical Components

- EAP Plan Overview



Emergency Action Plan Typical Components

○ Roles & Responsibilities

- Dam Owner
- First Responders
- Emergency Managers
 - » Local Agencies
 - » State Agencies

Roles and Responsibilities

Dam Owner's Representative (WCCSD Director or designee)

- As soon as an emergency event is observed or reported, immediately determine the emergency level (see *Emergency Levels* tab).
 - Level 1: unusual event, slowly developing
 - Level 2: potential dam failure situation, rapidly developing
 - Level 3: dam failure appears imminent or is in progress
- Immediately notify the personnel in the order shown on the notification chart for the event level (see *Notification Charts 1, 2, 3* tabs).
- Provide updates of the situation to the senior first responder/County EOC to assist them in making timely and accurate decisions regarding warnings and evacuations.
- 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.

First Responder (Site Incident Commander)

- Serve as the primary contact person at dam facility and is responsible for coordination of all emergency actions until responsibility is transferred to the County EOC, as anticipated and required, when an emergency reaches Levels 2 and 3.
- When a Level 2 situation occurs:
 - Notify the EOC Emergency Manager and other EOC personnel for possible evacuations that may be needed if a Level 3 situation occurs.
- When a Level 3 situation occurs:
 - Coordinate with the Emergency Manager and other EOC personnel to issue warnings and order evacuation of people at risk downstream of the dam, notify response agencies to carry out the evacuation of people and close roads within the evacuation area (see *Inundation Map* behind the front cover and *Additional Emergency Services* tab).
- Provide recommendations to Emergency Manager regarding when to terminate the emergency.
- Remain at dam facility until the emergency (Level 2 and 3) is over.

Emergency Manager (Washoe County EOC)

- Maintain communication with media.
- When a Level 2 situation occurs:
 - Prepare emergency management personnel for possible evacuations that may be needed if a Level 3 situation occurs.
 - Alert the public as appropriate.
- When a Level 3 situation occurs:
 - Alert the public.
 - Immediately close roads and evacuate people within the affected area (see *Inundation Map* tab Red).
- Participate in an annual review and update of the EAP.

Emergency Action Plan Typical Components

- Event Detection
 - Observations at or near the dam
 - NWS forecast of extreme weather events
 - Earthquakes near the dam
 - Unusual or emergency events (terrorism, industrial accident)



Emergency Action Plan

Typical Components

- Emergency Level Determination
 - Level 1 – Non-Emergency – unusual event, slowly developing
 - Level 2 – Potential Dam Failure – rapidly developing
 - Level 3 – Urgent – dam failure is imminent or in progress

Step 2 *Emergency Level Determination*

After an unusual or emergency event is detected or reported, the WCCSD Director or designee is responsible for classifying the event into one of the following three emergency levels:

Emergency Level 1—NON-EMERGENCY; unusual event, slowly developing:

This situation is not normal but has not yet threatened the operation or structural integrity of the dam, but possibly could if it continues to develop. WCCSD Engineer and/or Consultant should be contacted to investigate the situation and recommend actions to take. The WCCSD Engineer and/or Consultant may contact the state dam safety officials at this time. This situation is also applicable when there is an earthquake in the area. The condition of the dam should be closely monitored, especially during subsequent events such as after-shocks from an earthquake, to detect any development of a potential or imminent dam failure situation. The Incident Commander/County EOC should be informed if it is determined that the conditions may possibly develop into a worse condition that may require emergency actions.

Emergency Level 2—POTENTIAL dam failure situation, rapidly developing:

This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. The Incident Commander/County EOC should be notified of this emergency situation and placed on alert. The dam owner should closely monitor the condition of the dam and periodically report the status of the situation to the Incident Commander. If the dam condition worsens and failure becomes imminent, the Incident Commander/County EOC must be notified immediately of the change in the emergency level to evacuate the people at risk downstream.

If time permits, WCCSD Engineer and/or technical consultant and state dam safety officials should be contacted to evaluate the situation and recommend remedial actions to prevent failure of the dam. The dam owner should initiate remedial repairs (note local resources that may be available—see Appendix B-1). Time available to employ remedial actions may be hours or days.

Emergency Level 3—URGENT; dam failure appears imminent or is in progress:

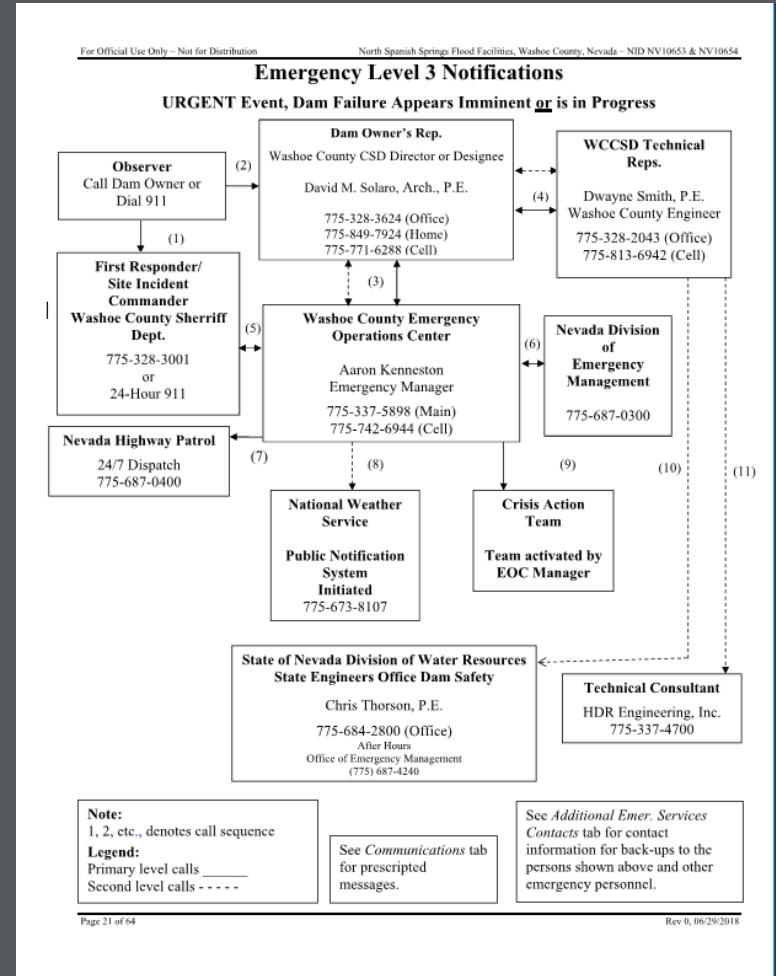
This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. Immediate or flash flooding will occur downstream of the dam. This situation is also applicable when moderate to significant flow through a breach in the dam is causing downstream flooding of people and roads. The Incident Commander/EOC should be contacted immediately so emergency services can begin evacuations of all at-risk people and close roads as needed (see *Inundation Map (Red Tab)* behind the front cover). 911 may have already been called and contacted the County EOC and Incident Commander.

See the following pages for guidance in determining the proper emergency level for various situations.

-Remainder of page blank-

Emergency Action Plan Typical Components

- Notification & Communication Flowcharts



Emergency Action Plan

Typical Components

- Expected Actions for each Emergency Level
 - Level 1 – Non-Emergency – unusual event or a slowly developing event
 - Level 2 – Potential Dam Failure – rapidly developing situation
 - Level 3 – Urgent – Dam failure is eminent or in progress

EMERGENCY LEVEL 1—NON-EMERGENCY, unusual event; slowly developing:

- A. The WCCSD Engineer and/or technical consultant should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also, check the reservoir area, abutments, pressure relief wells, downstream channel and pond for signs of changing conditions. **If increased seepage, erosion, cracking, or settlement are observed, immediately report the observed conditions to the WCCSD Director or designee; refer to the emergency level table for guidance in determining the appropriate event level for the new condition and recommended actions. The State Dam Safety Representative shall be consulted for recommended actions.**
- B. Record all contacts that were made on the *Contact Checklist* (Appendix A-1). Record all information, observations, and actions taken on the *Unusual or Emergency Event Log Form* (Appendix A-2). Note the time of changing conditions. Document the situation with photographs and video, if possible.
- C. The WCCSD Director or designee or WCCSD Engineer should contact the Nevada Office of Dam Safety to request technical staff to investigate the situation and recommend corrective actions.

EMERGENCY LEVEL 2—POTENTIAL dam failure situation; rapidly developing:

- A. The WCCSD Director or designee should contact the WCCSD Engineer to report the situation. If the WCCSD Engineer cannot be reached immediately, the Technical Consultant shall be contacted. If time permits, request technical staff and the State Dam Safety representative to investigate the situation and recommend corrective actions.
- B. The WCCSD Director or designee should contact EOC to inform them that the EAP has been activated and if current conditions get worse, an emergency situation may require evacuation. Preparations should be made for possible road closures and evacuations.
- C. Provide updates to the EOC and emergency services personnel to assist them in making timely decisions concerning the need for warnings, road closures, and evacuations.

EMERGENCY LEVEL 3 - URGENT; dam failure appears imminent or is in progress:

- A. The WCCSD Director or designee shall immediately contact the Incident Commander and EOC and others shown on the notification chart.
- B. The Incident Commander (may be EOC manager or first responder) shall lead the efforts to carry out warnings, close roads, and evacuate people at risk downstream from the dam (see *Inundation Map (Red Tab)* and *General Risk* (page 13)).
- C. Emergency management services personnel shall alert the public and immediately evacuate at-risk people and close roads as necessary.
- D. The WCCSD Director or designee shall maintain continuous communication and provide the Incident Commander and/or EOC with updates of the situation to assist him/her in making timely decisions concerning warnings and evacuations.
- E. The WCCSD Director or designee should record all contacts that were made on the *Contact Checklist* (Appendix A-1). Record all information, observations, and actions taken on the *Event Log Form* (Appendix A-2). Note the time of changing conditions. Document the situation with photographs and video, if possible.
- F. Advise people monitoring the dam to follow safe procedures. Everyone should stay away from any of the failing structures or slopes and out of the potential breach inundation areas.

Emergency Action Plan Typical Components

○ Termination

- Events or conditions leading up to, during, and following the incident
- Significant actions taken; recommendation for future emergencies
- Strengths and deficits found in the incident management process
- Corrective actions and plan for implementation of lessons learned

Step 5 Termination

Whenever the EAP has been activated, an emergency level has been declared, all EAP actions have been completed, and the emergency is over, the EAP operations must eventually be terminated and follow-up procedures completed.

Termination responsibilities

The Incident Commander/EOC is responsible for determining when the emergency has passed, terminating EAP operations, and relaying this decision to the WCCSD Director. It is then the responsibility of each person listed on the pertinent flowchart to contact the same group of people that were alerted during the original event notification process. At that point, the alerted personnel will be informed that the event has been terminated, and directed to stand down.

Prior to termination of an Emergency Level 3 event that has not caused actual dam failure, the WCCSD Engineer and/or technical consultant and/or the State Dam Safety Officer will inspect the dam or require the inspection of the dam to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. If it is determined that conditions do not pose a threat to people or property, the Incident Commander will be advised to terminate EAP operations as described above.

The WCCSD Director or designee shall assure that the *Dam Safety Emergency Situation Report* (Appendix A-3) is completed to document the emergency event and all actions that were taken.

The report should include discussion of the following topics:

- Events or conditions leading up to, during, and following the incident.
- Significant actions taken by each participant and improvements for future emergencies.
- All strengths and deficiencies found in the incident management process, materials, equipment, staffing levels, and leadership.
- Corrective actions identified and a planned course of action to implement recommendations.

WCCSD shall distribute copies of the completed report to the State of Nevada Division of Water Resources and the Washoe County Engineering and Capital Projects Division.

-Remainder of page blank-

Emergency Action Plan Typical Components

- EAP Maintenance Plan
 - Review
 - Updates
 - Periodic EAP Exercise

Maintenance of EAP - Review and Revision

EAP Annual Review

The WCCSD Director or designee will review and, if needed, update the EAP at least once each year. The EAP annual review will include the following:

- Calling all contacts on the three notification charts in the EAP to verify that the phone numbers and persons in the specified positions are current. The EAP will be revised if any of the contacts have changed.
- Contacting the local law enforcement agency to verify the phone numbers and persons in the specified positions. In addition, the WCCSD Director or designee will ask if the person contacted knows where the EAP is kept and if responsibilities described in the EAP are understood.
- Calling the locally available resources to verify that the phone numbers, addresses, and services are current.

Revisions

WCCSD is responsible for updating the EAP document. The EAP document held by WCCSD is the master document. When revisions occur, WCCSD 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.

EAP Periodic Test

WCCSD 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, conducted at the Washoe County Regional EOC office. Attendance should include the WCCSD Director or designee, the WCCSD Engineer, key local agency staff members, at least one representative of the local law enforcement agency, and others with key responsibilities listed in the EAP. At the discretion of the Regional EOC Manager, 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 are encouraged to 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 WCCSD Director or designee should complete an event log as they would during an actual event.

After the tabletop exercise, the five sections of the EAP will be reviewed and discussed. Mutual aid agreements and other emergency procedures can be discussed. WCCSD will prepare a written summary of the periodic test and revise the EAP, as necessary.

Emergency Action Plan Typical Components

- Appendices
 - Contacts
 - Checklists & Reporting Forms
 - Resources
 - Location Maps
 - Dam Plans
 - Evacuation Plans and Emergency Access Routes
 - Critical Facilities
 - Modeling Summaries
 - Various Supporting Mapping Products

Appendices—Forms, Glossary, Maps, and Supporting Data

Appendix A

- A-1 Contact Checklist
- A-2 Unusual or Emergency Event Log Form
- A-3 Dam Emergency Situation Report Form
- A-4 Communication Examples
- A-5 Glossary of Terms

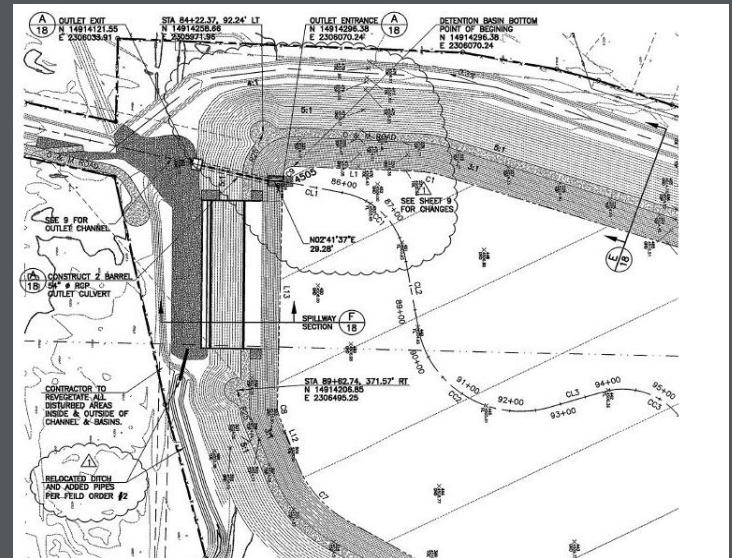
Appendix B

- B-1 Resources Available
- B-2 Vicinity and Location Maps
- B-3 Plan View and Typical Dam Cross Section of Sediment Basin
- B-4 Plan View and Typical Dam Cross Section of Detention Basin
- B-5 Area Map with Cascading Breach Secondary Emergency Access Routes
- B-6 Area Map with Detention Basin Sunny Day Breach Secondary Emergency Access Routes
- B-7 Cascading Breach General Risk Table
- B-8 Detention Basin Sunny Day Breach General Risk Table
- B-9 Reservoir Elevation-Volume Curve
- B-10 HEC-RAS Model Summary
- B-11 National Inventory of Dams (NID) Data
- B-12 Cascading Breach Critical Facilities Table
- B-13 Detention Basin Sunny Day Breach Critical Facilities Table
- B-15 Cascading Breach Critical Facilities Map
- B-16 Detention Basin Sunny Day Breach Critical Facilities Map
- B-16 Cascading Breach Depth Map
- B-17 Detention Basin Sunny Day Breach Depth Map

Who is Responsible?

Dam Owners/Operators

- Operations/maintenance
- Identification of emergency
- Initial notifications
- Repairs



Who is Responsible?

Local Emergency Management and Local Responders

- Public warning
- Possible evacuation
- Shelter plan activated
- Rescue and recovery
- State of Emergency declaration
- Termination of emergency status



Who is Responsible?

State Emergency Management

- Aid affected area when requested
- Coordinate specialized assistance
- Notify appropriate state agencies

