Utah Division of Water Rights – Dam Safety

Simplified Emergency Action Plan

For Moderate Hazard Dams

Dam Name: AMERICAN FORK DEBRIS BASIN

Dam Identification Number: UT 00469

Location (Town, County): HIGHLAND CITY, UTAH COUNTY

Owner: AMERICAN FORK CITY, HIGHLAND CITY AND CITY OF CEDAR HILLS

Issue Date: ________________________________

Revision Date: OCTOBER 10, 2018
INTRODUCTION

This Emergency Action Plan (EAP) defines responsibilities and provides procedures designed to:

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

Dam Name: AMERICAN FORK DEBRIS BASIN

Drainage the Dam is Located on: AMERICAN FORK RIVER or □ Off Channel Site


Dam Owner and Operator: AMERICAN FORK CITY, HIGHLAND CITY & CITY OF CEDAR HILLS

Type of Dam: FLOOD CONTROL

Dam Height: 23 FT Hydraulic Height: 11 FT Crest Length: 20 FT Crest Width: 1 FT

Upstream Slope: 1.9% Downstream Slope: 1.8%

Reservoir Capacity at Spillway Crest (Acre-Feet): 100 AC FT

Surface Area of Reservoir at Spillway Crest (Acre): 11.2 ACRES

Nearest Downstream Town: HIGHLAND CITY/CITY OF CEDAR HILLS /AMERICAN FORK CITY

Distance to Nearest Town (Miles): 0.1

Approximate Number of Properties in the Floodplain: See attached map

Downstream Property Description: See attached map
APPROVAL OF THE EMERGENCY ACTION PLAN

The undersigned persons as a member of the governing board of the American Fork River Debris Basin have reviewed this Emergency Action Plan and concur with the proposed notification procedures.

Dam Owner Signature:

American Fork City

By: ___________________________

Name: Brad Frost

Title: Mayor

Date: 06 Oct 2018

(SEAL)

ATTEST:

____________________________

Dam Operator Signature:

American Fork City, Public Works Director: ___________________________

Scott Sensanbaugh, P.E.

Date: 10-10-18

Local Emergency Services Signature:

American Fork City Fire/Rescue: ___________________________

Aaron Brems

Date: 10-10-18
APPROVAL OF THE EMERGENCY ACTION PLAN

The undersigned persons as a member of the governing board of the American Fork River Debris Basin have reviewed this Emergency Action Plan and concur with the proposed notification procedures.

Dam Owner Signature:
Highland City

By: ____________________________

Name: Rod Mann

Title: Mayor

Date: October 15, 2018

ATTEST:

Cindy M. Qualls

Dam Operator Signature:
Highland City, Public Works Director:

Date: Oct. 15, 2018

Todd Trane, P.E.

Local Emergency Services Signature:
Lone Peak Fire Dist. Fire/Rescue:

Date: 11 October 2018

Reed Thompson
APPROVAL OF THE EMERGENCY ACTION PLAN

The undersigned persons as a member of the governing board of the American Fork River Debris Basin have reviewed this Emergency Action Plan and concur with the proposed notification procedures.

Dam Owner Signature:

City of Cedar Hills

By: ________________

Name: ________________ Jenney Rees ________________

Title: ________________ Mayor ________________

Date: ________________ 12/6/18 ________________

Dam Operator Signature:

City of Cedar Hills, Public Works Director: ________________

Jeff Maag

Date: ________________ 12-6-18 ________________

(SIGN)

(ATTEST: ________________

Colleen A. McNeely ________________

Utah Simplified EAP (Rev 06/09)
NOTIFICATION FLOWCHART

If a failure is imminent or in progress, downstream evacuation of the floodplain must be started immediately in accordance with the following:

- Contact local county or city emergency services or Sheriff's office
- Notify persons immediately downstream from the dam of the failure
- Contact Dam Safety and the Utah Division of Homeland Security
- Take preventive actions described on pages 12-13 of this plan

A. County/City Emergency Services or Sheriff

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1   Reed Thompson</td>
<td>Chief</td>
<td>801-330-4380</td>
</tr>
<tr>
<td>Lone Peak Fire Dist</td>
<td></td>
<td>801-763-5365</td>
</tr>
<tr>
<td>2   Aaron Brems</td>
<td>Chief</td>
<td>801-404-6126</td>
</tr>
<tr>
<td>American Fork Fire/Rescue</td>
<td></td>
<td>801-763-3040</td>
</tr>
<tr>
<td>3   Scott Sensanbaugher</td>
<td>American Fork City</td>
<td>801-763-3060</td>
</tr>
<tr>
<td></td>
<td></td>
<td>385-233-7229</td>
</tr>
<tr>
<td>4   Jeff Maag</td>
<td>City of Cedar Hills</td>
<td>801-420-2415</td>
</tr>
<tr>
<td>5   Todd Trane</td>
<td>Highland City</td>
<td>801-756-5751</td>
</tr>
<tr>
<td></td>
<td></td>
<td>801-369-4768</td>
</tr>
</tbody>
</table>

B. Downstream Property Owners Affected by Flood Waters (1st affected, 2nd affected, etc.)

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Highland City</td>
<td>5400 West Civic Ctr. Dr.,</td>
<td>801-756-5751</td>
</tr>
<tr>
<td></td>
<td>Highland, UT. 84003</td>
<td></td>
</tr>
<tr>
<td>2. City of Cedar Hills</td>
<td>3925 West Cedar Hills Dr.</td>
<td>801-785-9668</td>
</tr>
<tr>
<td></td>
<td>Cedar Hills, UT 84062</td>
<td></td>
</tr>
<tr>
<td>3. American Fork City</td>
<td>51 East Main Street</td>
<td>801-763-3000</td>
</tr>
<tr>
<td></td>
<td>American Fork, UT 84003</td>
<td></td>
</tr>
</tbody>
</table>
C. Division of Water Rights, Dam Safety Office

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Marble</td>
<td>Asst. State Engineer, Dam Safety</td>
<td>801-538-7376 Office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>801-580-5128 Mobile</td>
</tr>
<tr>
<td>Bret Dixon</td>
<td>Dam Safety Geotechnical Engineer</td>
<td>801-538-7373 Office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>801-673-5913 Mobile</td>
</tr>
<tr>
<td>Everett Taylor</td>
<td>Dam Safety Hydrologic Engineer</td>
<td>801-538-7372 Office</td>
</tr>
<tr>
<td></td>
<td></td>
<td>801-698-2377 Mobile</td>
</tr>
</tbody>
</table>

D. Utah Division of Homeland Security

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeland Security</td>
<td>Duty Officer</td>
<td>801-538-3400</td>
</tr>
</tbody>
</table>
INUNDATION MAP

Multiple properties and 20 roads could be affected by a major flood caused by a sudden breach of the dam. These are identified on the following inundation/vicinity map.
AMERICAN FORK DEBRIS BASIN DAM
INUNDATION STUDY FOR REQUEST OF HAZARD REDUCTION
SCALE: 1" = 2000'
MAP 2 OF 2
SLOWLY DEVELOPING FAILURE OR UNUSUAL SITUATION

If there is a slowly developing failure or unusual situation, where failure is not imminent, but could occur if no action is taken, dam tending personnel should:

- Notify Local Emergency Services of the potential problem and keep them advised of the situation.
- Contact the Utah Division of Water Rights, Dam Safety Office.
- During these contacts, find out if there are any immediate actions that can be taken to reduce the risk of failure.
- If necessary, implement preventative actions described on pages 8-13 of this plan.
- If the situation deteriorates, be prepared to implement notification flowchart on Page 6 and implement command and control procedures as outlined in the National Incident Management System (NIMS) and using the Incident Command System (ICS).
POSSIBLE EMERGENCY CONDITIONS

Listed below are some, not necessarily all, of the events that can lead directly to the failure of the dam. Included after each one is a brief outline of steps to take in trying to stabilize the situation.

EARTHQUAKE

If an earthquake has been reported in the vicinity, or the responsible individual has felt ground motion:

- Immediately conduct a general overall visual inspection of the dam.

- If the dam is failing, or is damaged to the extent that there is increased flow passing downstream, immediately implement Notification Flowchart procedures found on page 6 then take the appropriate action beginning on page 10.

- If damage has occurred, but is not judged serious enough to cause failure of the dam, quickly observe the nature, location, and extent of the damage, and evaluate the potential for failure. A description of slides, sloughs, new or increased seepage, or sudden subsidence, including the location, extent, rate of subsidence, effects on adjoining structures, springs or seeps, reservoir elevation, weather conditions, and other pertinent facts would also be helpful. Contact Local Emergency services to notify them of the situation, contact Dam Safety, and then take the appropriate action listed beginning on page 10.

- If the dam crest has settled, lower the reservoir pool to an appropriate level. The pool should remain drawn down until the dam can be examined by Dam Safety or other qualified professional engineers and any necessary repairs are made.

- If there is no imminent danger of dam failure the dam owner should thoroughly inspect the following:
  - Faces of the dam for cracks, settlement, or seepage;
  - Abutments for possible displacement;
  - Outlet works, control house, tunnel, and gate chamber for structural integrity;
  - Spillway structure to confirm continued safe operation;
  - Drains and seeps for any turbidity, muddy water or increased flow;
  - Reservoir and downstream areas for landslides;

- Report all findings to Dam Safety and all other agencies that had been contacted earlier during the emergency. Also make sure to keep close watch on the dam for the next two to four weeks, as some damage may not show up immediately after the earthquake.
Actions to be taken in the event of:

REDUCTION IN FREEBOARD AND/OR LOSS OF DAM CREST WIDTH:

- Place additional riprap or sandbags in damaged areas to prevent further embankment erosion.
- Lower the reservoir to an appropriate level.
- Restore freeboard with sandbags or earth and rock fill.
- Continue close inspection of the damaged area until permanent repairs can be made.

MASS MOVEMENT OF THE DAM ON ITS FOUNDATION (SPREADING OR MASS SLIDING FAILURE):

- Immediately lower the reservoir to an appropriate level.
- Continue operation at a reduced level until repairs are made.

EXCESSIVE SETTLEMENT OF THE EMBANKMENT:

- Lower the reservoir level to a safe elevation by releasing it through the outlet or by pumping, or siphoning.
- If necessary, restore freeboard by placing sandbags or earth and rock fill.
- Continue operating at a reduced level until permanent repairs can be made.

FAILURE OF AN APPURtenant STRUCTURE SUCH AS AN OUTLET OR SPILLWAY:

- Implement temporary measures to protect the damaged structure, such as closing an outlet or providing temporary protection for a damaged spillway.
- Employ experienced, professional divers, if necessary, to assess the problem and possibly implement repair.
- Lower the water level to a safe elevation. If the outlet is inoperable, pumping, siphoning, or a controlled breach may be required.
FLOODING

If major flooding is predicted, lower the reservoir to an appropriate level and monitor the following:

- Current reservoir elevation and freeboard;
- Rate the reservoir is rising;
- Seepage from drains.
- Weather conditions
- Discharge conditions of creeks and rivers upstream and downstream;

If flooding occurs, lower the reservoir by gradually increasing the discharge through the spillway and outlet; implement the following procedures:

- Notify downstream residents of the increases in discharge, and increase the discharge in stages to avoid flooding downstream residents.
- Check the downstream toe and abutments for any new seepage, increase in seepage, or any indication of muddy or silty flow.
- Check for cracks, slumping, sloughing, sliding, or other distress signals near the dam abutments, faces, or crest.
- Contact Local Emergency Services and Dam Safety.
- If necessary, take the appropriate action listed below.

Actions to be taken in the event of:

OVERTOPPING BY FLOOD WATERS:

- Open outlet to its maximum safe capacity.
- Place sandbags along the dam crest to increase freeboard and force more water through the spillway and outlet.
- Provide erosion-resistant protection to the downstream slope by placing plastic sheets or other materials over eroding areas.
- Divert floodwaters around the reservoir basin if possible.

SPILLWAY CHANNEL BACK CUTTING THREATENING RESERVOIR EVACUATION:

- Reduce the flow over the spillway by fully opening the main outlet.
- Provide temporary protection at the point of erosion by placing sandbags, riprap, or plastic sheets weighted with sandbags.
- When inflow subsides, lower the reservoir to a safe level.
- Continue operating at a lower water level in order to minimize spillway flow until permanent repairs can be made.
EROSION, SLUMPING/SLOUGHING, OR CRACKING

- Determine the location, size of the affected area (height, width, and depth), severity, seepage discharge, clear or cloudy seepage, and the reservoir level.
- If failure appears likely, implement Notification Flowchart procedures found on page 4 then take the appropriate action listed below.
- Otherwise, contact Dam Safety.

Actions to be taken in the event of:

SLIDE OR SLOUGH ON THE UPSTREAM OR DOWNSTREAM SLOPE OF THE EMBANKMENT:

- Lower the water level at a rate, and to an elevation, that is considered safe given the slide condition. If the outlet is damaged or blocked, pumping, siphoning, or a controlled breach may be required.
- Restore lost freeboard if required by placing sandbags or filling in the top of the slide.
- Stabilize slides on the downstream slope by weighting the toe area with additional soil, rock, or gravel.
NEW SPRINGS, SEEPS, BOGS, SANDBOILS, CLOUDY SEEPAGE, INCREASED LEAKAGE, OR SINKHOLES

If there is an increase in old seeps, an increase in toe drain flow, or if new springs, seeps, or bogs appear:

- Determine the location, size of the affected area, estimated discharge, nature of the discharge (clear or cloudy), and reservoir level (a map of the area may be helpful to illustrate where the problem is located).
- If failure appears likely, implement Notification Flowchart procedures found on page 4 then take the appropriate action listed below.
- Otherwise, report all findings to Dam Safety.

Actions to be taken in the event of:

EROSIONAL SEEPA GE OR LEAKAGE (PIPING) THROUGH THE EMBANKMENT, FOUNDATION, OR ABUTMENTS:

- Plug the seepage inlet with whatever material is available (hay bales, bentonite, or plastic sheeting).
- Lower the water level until the flow decreases to a non-erosive velocity or until it stops.
- Continue lowering the water level until a safe elevation is reached.
- Continue operating at a reduced level until repairs are made.

EXCESSIVE SEEPA GE AND HIGH LEVEL SATURATION OF THE EMBANKMENT:

- Lower the water to a safe level.
- Continue frequent monitoring for signs of slides, cracking, or concentrated seepage.
- Continue operations at a reduced level until repairs are made.
Sudden Water Releases

In case of sudden, planned or unplanned, large water releases from the outlet works or spillway (e.g. opening gates or valves, pulling stop logs), notify downstream residents and the appropriate agencies of the increased flow.

Abnormal Instrumentation Readings

After taking any instrumentation reading, compare the current readings to previous readings of the same reservoir level. If the reading appears abnormal, determine:

- Changes from the normal readings
- Reservoir level
- Weather conditions
- Other pertinent facts
- Contact the Dam Owner, Project Engineer, and Dam Safety

Other Problems

In case of other problems occurring that might pose a threat to the dam safety, contact Dam Safety and explain the situation as best as possible.
END OF EMERGENCY SITUATION AND FOLLOW-UP ACTIONS

Once conditions indicate that there is no longer an emergency at the dam site and the proper authorities (e.g. Dam Safety or a qualified professional engineer) have declared the dam safe, the Dam Owner or Operator should contact the local emergency management authorities, who will then terminate the emergency situation.
SUPPLIES AND RESOURCES

In an emergency situation, equipment and supplies might be needed on short notice, such as sandbags, riprap, fill materials, equipment, and laborers. The table below lists the supplies and indicates how to access them.

<table>
<thead>
<tr>
<th>Item</th>
<th>Contact</th>
<th>Location</th>
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<tbody>
<tr>
<td>Earthmoving Equipment</td>
<td>801-404-1253</td>
<td>Am. Fork City</td>
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<tr>
<td></td>
<td>801-420-2553</td>
<td>Highland City</td>
</tr>
<tr>
<td></td>
<td>801-420-2243</td>
<td>Cedar Hills City</td>
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<tr>
<td>Sand &amp; Gravel</td>
<td>801-404-1253</td>
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<tr>
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Debris Basin Equipment Availability List

<table>
<thead>
<tr>
<th>Equipment</th>
<th>American Fork City</th>
<th>City of Cedar Hills</th>
<th>Highland City</th>
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<tbody>
<tr>
<td>Loader</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Backhoe</td>
<td>3</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Mini excavator</td>
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<tr>
<td>Trackhoe</td>
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<td>Vac truck</td>
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<td>10 wheeler truck</td>
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<td>Bobtail truck</td>
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<td>Grader</td>
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<td>2&quot; Trash pump</td>
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<td>Portable generator</td>
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<tr>
<td>Sand/Gravel</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
INDIVIDUAL RESPONSIBILITIES

The following list indicates who is responsible for taking specific actions at the dam when there is an emergency situation. In this manner tasks can be well divided so in an emergency no one person is overwhelmed.

<table>
<thead>
<tr>
<th>Name</th>
<th>Telephone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Sensanbaugher, P.E.</td>
<td>801-763-3060/385-233-7229</td>
</tr>
<tr>
<td>Todd Trane, P.E.</td>
<td>801-772-4515/801-369-4768</td>
</tr>
<tr>
<td>Jeff Maag</td>
<td>801-420-2415/801-420-2243</td>
</tr>
<tr>
<td>Ernie John, Water Master</td>
<td>801-471-6576</td>
</tr>
<tr>
<td>Chris Ream, Asst. Water Master</td>
<td>385-223-9880</td>
</tr>
</tbody>
</table>

Responsibility:

In the event of an emergency situation the current Chairman of the American Fork River Debris Basin Oversight Committee will act as the point of contact to disseminate information and workload. The Chairman position rotates on a yearly basis among the first three contacts above who represent the cities that comprise the aforementioned committee.

The above referenced Water Master and Assistant Water Master work in coordination with North Utah County Water Conservancy District in the control of those waters that are released from storage reservoirs in American Fork canyon, namely Silver Lake Reservoir and Tibble Fork Reservoir.