

# **MOUNTAIN REGIONAL WATER REMEDIATION PLAN**

Silver Springs Ponds – Park City, UT  
August 26, 2003

The following is a list of items that will be completed by Mountain Regional Water Special Service District prior to transferring ownership of the ponds to the Silver Springs Master Homeowners Association.

## **1. Drainages**

Open channel drainages will be cleared of debris, tall grass and vegetation to promote a flow of water into and out of the ponds. Also, riprap will be placed as need to prevent erosion. This will probably require divers or drainage of ponds.

## **2. Outlets**

The outlet piping needs to be assessed to determine functionality. This can be done using a robotic camera provided free of charge by dam safety. If it is determined that the outlets are not able to function as designed, they should be replaced. Depending on the amount of corrosion, banding may be an acceptable alternative. Contingencies should be ready so remediation efforts can be implemented.

## **3. Outlet Gate Valves**

The valves need to be inspected to identify working and non-working components. Seized valves need to be broken free and refurbished to working condition or replaced. If needed, screw shafts should be replaced.

## **4. Spillways**

The 48" drop pipe overflows/spillways are in fairly good condition. They should be inspected for leaks and corrosion and can be reinforced or welded to improve integrity.

## **5. Inlets**

Some of the inlets have issues with sediment build-up and may need to be dredged to promote flow and circulation.

## **6. Dam Structure**

Deep-rooted, woody vegetation such as willows and other trees need to be removed from the dam and the remaining holes backfilled. Regrading of the dam back to its original design configuration should be done in cases of encroachment into the 2:1 neat-line slope

# STANDARD OPERATING PLAN

Silver Springs Ponds – Park City, UT

## 1. General Information

The Silver Springs Ponds are located in the Silver Springs Subdivision east of State Road 224 near the town of Park City, UT. The ponds were built as part of the subdivision and were intended to be used for irrigation but were never used for this purpose. Today the ponds are used mainly for recreational purposes. The smaller upper lake is estimated to have a surface area of 4 acres and a capacity of 27 acre-feet. The lower pond is estimated to have a surface area of 16 acres and a storage capacity of 110 acre-feet. Water from East Creek Canyon is diverted through a series of culverts and open channels into the upper pond. The level of both ponds is regulated by two outlet structures consisting of a 24" outlet pipe controlled by a knife gate valve and a 48" drop inlet pipe that serves as an emergency spillway. Water from the upper pond is channeled to the lower pond and then back to the natural drainage downstream. Over the years, the ponds have not been properly operated or maintained and have fallen into a state of disrepair. Mountain Regional Water Special Service District has recently acquired the ponds and intends to transfer ownership to the Silver Springs Master Homeowners' Association. The intent of this Standard Operating Plan is to outline the necessary operation and maintenance routine for the Association.

## 2. Maintenance Schedule and Procedures

Routine maintenance is imperative to the safe operation of a dam. A list of maintenance issues has been compiled to assist the Association. A Sample Maintenance and inspection form is included in Appendix A.

### 2.1. Burrowing Rodents

Rodents such as beaver, muskrat, ground squirrels, mice, etc. can significantly weaken a dam if allowed to burrow. The person(s) in charge of inspecting, operating and maintaining the dam should look for holes in the embankment or mounds of dirt and sand. If rodents become a problem, control measures should be put into place such as trapping or baiting. A professional rodent control company could also be utilized. The Division of Wildlife Resources should be contacted before any rodent control measures are implemented to determine if any permits or special permission is required.

### 2.2. Vegetation Control

Deep-rooted, woody vegetation is prohibited on the dam shell. Roots tend to grow toward the water and can create channels where piping can occur. Larger trees can also be blown down during extreme storm events, creating breaches in the crest and uncontrolled releases of water from the ponds. Any vegetation meeting these criteria should be removed immediately. It is important that after removal, the dam be

repaired and regarded to match the existing embankment. Tall grasses should also be removed from the dam, inlets, outlets and at the fish migration channel as they provide habitat for burrowing rodents. Mowing, spraying with herbicides, and burning are common methods of controlling tall grasses. The Association should decide on a method that best suits the homeowners and the environment.

### **2.3. Floating Debris Removal**

Any floating debris should be removed as it can clog outlets and spillways.

### **2.4. Lubrication**

Any moving parts on the inlets, flow control devices, outlets, etc. should be lubricated with a biodegradable, non-toxic lubricant to ensure proper function.

### **2.5. Grading**

Random regrading of the dam beyond its design configuration is also prohibited since it encroaches in the three feet of freeboard needed to route large rain or snowmelt runoff events. The use of riprap on the upstream side of the embankment is acceptable. Any "cut" into the embankment, either on the upstream or downstream side of the dam is prohibited as it weakens the structural integrity of the dam. If this type of situation is found, the Association should work with the homeowner to resolve the problem. Regrading back to the dam's original design configuration is required.

### **2.6. Riprap Repair**

Riprap along drainage channels and at inlets should be inspected to ensure it is minimizing erosion. If significant erosion is taking place, more riprap will need to be installed.

### **2.7. Erosion Repair**

The upstream side of the dam, inlets, outlets, and drainage channels should be inspected quarterly, or after major storm events, for signs of erosion. If erosion has taken place, efforts should be made to repair the eroded area to original condition. In some cases, it may be necessary to install riprap or other protective armor to decrease the erosion potential.

## **3. Outlet and Spillway Operation and Maintenance**

The outlet and spillways are used to control the water level in the ponds. In a normal situation, the pond should be maintained at a level 3 feet below the crest of the dam. Outlets and spillways are sized to pass the flow during extreme rain and snowmelt events and each pond is equipped with two outlet/spillway

structures for redundancy. Improper operation and/or maintenance can lead to fluctuations in water levels and/or failure of the structure.

### **3.1. Leakage and Corrosion**

The outlet structure and spillway drop pipe should be inspected periodically for leakage and corrosion. If leakage is detected, proper measures should be taken and to the extent possible, the leak should be decreased. Metal bands could be placed around the pipe to decrease or stop the leak. Patches could also be welded onto the existing pipe to replace corroded sections. Welding should be done only by a competent and licensed welder.

### **3.2. Spillway Trash racks**

Trash racks should be inspected for corrosion and should be replaced when the grid loses its ability to effectively stop debris from entering the spillway structure. Trash racks should be inspected weekly for debris. Any debris buildup should be removed and disposed of in a proper waste container. Never dispose of debris in the ponds.

### **3.3. Outlet Screens**

Outlet screens should be inspected monthly and moss, weeds, leaves, and other vegetation and debris removed. It may be necessary to inspect the screens more frequently during times of high flow and in the spring and fall. If screens become damaged and are unable to effectively filter the water, they should be replaced.

### **3.4. Outlet Gate Valves**

Outlet gate valves should be exercised a minimum of once per year. The valve should be exercised through its full range of motion. The threads of the screw shaft should be inspected for corrosion. A biodegradable, non-toxic lubrication may be used to minimize corrosion and seizing.

## **4. Drainages**

Drainages should be inspected and repaired as needed. Riprap should be inspected for proper placement. Replace or re-install riprap if it is missing or is not installed correctly. Check for signs of erosion along the drainage bank and repair using additional riprap. Tall grasses and weeds should be controlled along the drainage bank so as to allow proper flow of water.

## **5. Seepage**

Look for wet spots along the toe of the dam, on the downstream face, on the ground downstream of the dam and along the abutments. You may not see wet spots but there may be a line or spot of vegetation growing all by itself. Any seepage flows that can be seen should be measured (gallons per minute) and

the turbidity of the seeping water should be noted. If the seep is turbid with signs of embankment material mixed in it, there is a possibility of a piping problem. A piping problem can cause a dam failure very quickly. If this condition is noted, the operator should notify dam safety immediately.

#### **6. Cracks, slumps and settlement**

Obviously any movement of the embankment after construction can be serious. A number of reasons could be responsible for embankment movement such as weak foundation conditions, poor compaction in areas, earthquakes, excessive seepage etc. The condition should be monitored closely.

#### **7. Emergency Action**

The outlets and spillways for each pond are designed to pass a large quantity of water and therefore the dam is not likely to be overtopped. However, outlets can become plugged or can be rendered inoperable by debris during an extreme storm event. When water levels reach a mark 2 feet below the crest of the dam operators of the dam should make every effort to warn the person(s) residing downstream of the dams that a possible overtopping or failure of the dam could take place. Operators should remain calm and not portray a sense of emergency. When water levels reach a mark 1 foot below the crest of the dam, operators should advise person(s) residing downstream of the dams to evacuate to higher ground. Again, operators should remain calm and should assist in the evacuation. Local law enforcement should be put on notice and be ready to assist in the event of an evacuation. Operators should, at the earliest opportunity, notify the Office of the State Engineer, Department of Dam Safety of any overtopping or failure of the dam.

Appendix A – Sample Inspection Form

## INSPECTION AND MAINTANENCE FORM

### Silver Springs Ponds

The following list is prepare to assist the operator(s) of the ponds during routine inspections. The Standard Operating Plan should be used in conjunction with this Inspection and Maintenance Form.

Item	Things to look for	Inspection Frequency
Dam Crest	Cracks, slumps and/or settlement. Also check for signs of rodent activity	Monthly
Upstream/Downstream slope	Cracks, slumps, settlement or wet spots on the downstream toe or slope. Check for seepage mixed with material from the dam. Also check for signs of rodent activity	Bi-weekly
Outlet pipes	Check for leakage and corrosion of the pipe. Check the filter screens and remove debris.	Quarterly (may require more frequent inspections during spring and fall)
Gate Valves	Check for freedom of movement. The valve should be excersized from completely closed to completely open. Check the screw shaft for corrosion of threads.	Yearly
Spillways	Check for leakage and corrosion of the pipe. Check the ftrash racks and remove debris.	Yearly (trash racks should be checked bi-weekly)
Drainages	Check for excessive vegetation growth and erosion of drainage bank	Monthly
Vegetation	Check dam embankment for deep-rooted, woody vegetation. Also check for heavy grasses that can provide habitat for rodents	Monthly

\*All items should be inspected after storm events where a minimum of 1 inch of rainfall has accumulated. A complete dam inspection should be completed after any seizmic event.

\*Refer to Standard Operating Plan for addition information on the above items.

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Name(s) of person(s) conducting inspection

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Date of inspection

## Appendix B – Site Maps