



Barton Springs Maintenance Manual



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HISTORY

The Edwards Aquifer

In the Cretaceous, some 100 million years ago, this area was an inland sea containing numerous prehistoric species of marine invertebrates with hard exterior shells. As these invertebrates died, their hard calcified shells sank to the sea bed where, in combination with natural chemical reactions in sea water formed layers of limestone. When the inland seas retreated, the limestone of the Edwards Plateau began to rise, the Colorado River forged a path across it, and groundwater began carving and eroding the stone. This process resulted in permeable water-bearing layers of rock that began emitting cool, clear groundwater through numerous springs into hundreds of creeks and streams both north and south of the Colorado River. This aquifer is what we now know as the Edwards Aquifer.

The Edwards Aquifer is a karst system. A karst aquifer is very porous, containing numerous underground pores, conduits, and caves, and surface sinkholes and springs. Surface water enters the aquifer through fractures and sinkholes in the beds of creeks and enters the aquifer. As this water travels underground through the aquifer it dissolves limestone along the way, creating holes and enlarging conduits, causing some pathways to collapse and new ones to form. These underground features allow the Edwards to store and transmit large volumes of water, sometimes very quickly. The features in the creeks serve as rapid transit highways for surface water to enter the aquifer before soils can filter out any contaminants it might contain. These surface and underground features contribute to the sensitivity and susceptibility of a karst aquifer to pollution.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

(Figure from Hauwert et al. 2002)

The Edwards Aquifer covers a large area of Central Texas, starting from Bracketville in the west, across San Antonio, then swinging northeast through San Marcos, Austin, Georgetown and up to Salado. It is divided into three segments, defined by regional groundwater divides. The Barton Springs segment begins south of Austin near Kyle, Texas, and extends north to the Colorado River. The majority of the water discharged from Barton Springs comes from the surface waters of six creeks, Onion, Little Bear, Bear, Williamson, Little Barton, and Barton.

Barton Springs is a set of four springs in the limestone of the Balcones Fault. The three perennial springs are Parthenia, Eliza, and Sunken Garden (aka Old Mill or Zenobia Spring). The fourth spring, Upper Barton, flows only when the aquifer water table is above average. These springs collectively discharge several millions of gallons of cool, clear spring water daily. On average, the discharge flow from Barton Springs is 54 cubic feet per second (cfs), but it can vary from 125 during wet years, to 10 cfs during extreme droughts. The temperature of the water varies only slightly, from 66 to 72 degrees.

Natural History of Barton Springs Salamanders

About 20 million years ago, the ancestors of the Central Texas lungless salamanders from nearby regions invaded the springs and streams of the newly formed Edwards Plateau. As more springs and streams formed these salamanders began their long history as natives in what would one day become Central Texas. This ancestral lineage survived an ice age about 3 million years ago and then diversified into the numerous species of *Eurycea* salamanders that inhabit the springs of the Edwards Aquifer. These species are members of Plethodontidae, the lungless salamanders, which is a group of amphibians with many species throughout North America and the world. Typically these species have gilled, aquatic juveniles that metamorphose into gill-less and lungless terrestrial adults. However, juveniles of the Edwards Aquifer *Eurycea* never metamorphose; instead they keep their gills, become sexually mature and remain in the clean, cool, clear water of our springs their entire lives. Two of these species, *Eurycea sosorum*, the Barton Springs Salamander, and *Eurycea waterlooensis*, the Austin Blind Salamander, make Barton Springs their home.

The Barton Springs and Austin Blind Salamander are small (<3 inches long), permanently aquatic species that are adapted to the cool, clean, clear, flowing water of Barton Springs. They typically reside beneath rocky substrate in the flowing water of the springs and eat aquatic invertebrates. They not only have gills, they also have very permeable skin that allows them to breathe with their whole body surface. This allows a salamander to obtain more oxygen from the water than through gills alone. The permeable character of their skin also makes these salamanders very sensitive to changes in water quality. Many water-borne contaminants can readily pass through the skin directly into the salamander.

Barton Springs Salamanders dwell in the surface or immediate subsurface waters of the springs, while Austin Blind Salamanders live deeper in the aquifer and only occasionally are seen at the surface. Austin Blind Salamanders are truly blind, with undeveloped eye spots, but Barton Springs Salamanders have well-developed functional eyes. There are other differences between these species that likely reflect where they live. For example, Barton Springs Salamanders vary in color from brown, to pink, to orange, with underlying blotches of melanin and iridescent spots. Austin Blind Salamanders are typically pale lavender without obvious melanin or other pigment. This is a characteristic of many species that live in the blackness of caves; there is no apparent need for color or other pigment for camouflage or protection from light or other purposes. Cave and surface species use different sensory systems for finding food and avoiding predators. Cave species tend to have well-developed sensory systems for touch and smell, while surface species tend to have very good sight. These differences make each species more successful in their own habitat, which reduces competition between them and allow both species to co-exist.

The Barton Springs Salamander, *Eurycea sosorum*, was named for the Save Our Springs Alliance, a group of citizens that were instrumental in the adoption of city-wide regulations to protect the aquatic environment of Barton Springs. The SOS ordinance, approved by Austin voters in 1992, protects quality and quantity of water in Barton Springs by limiting the amount of new impervious cover that can be placed in the recharge zones. Limiting impervious cover helps maintain high water quality and quantity that are two critical requirements for survival of these salamanders.

Human History

From the days that Indians camped along Barton Creek, the history of humans and of their use of the natural springs has been a colorful one. It is said that Robert E. Lee once stopped here at the biggest spring with his troops while fighting the “red man” prior to the Civil War. In 1XXX William Barton purchased/settled the land on banks of Barton Creek near its confluence with the Lower Colorado River just

outside of Austin. (insert info on when Barton settled the land.) His land included what has come to be called Barton's Springs. On December 16, 1839, William Barton agreed to give possession of the stream of water from my "Big Spring" to furnish the power for a sawmill. Barton was one of three families living in this area when an agent of President Lamar chose Austin as the state capitol. Deaths and sales saw this particular piece of land change hands many times.

In 1860, John Rabb purchased the property on the south bank of Barton Creek for \$8000 from a Mr. Toomey. Later Rabb deeded the land to his son, Gail Texas Rabb. In 1886, Gail sold five acres of his property, not including the spring, to Jacob Stern. About this time Gail Texas Rabb built a grist mill just downstream of the "Big Spring" and used the water power to produce flour. Rabb also manufactured the first blocks of ice ever used in Austin with a machine bought from France. In 1907, A. J. Zilker this property from Rabb and another piece of land from Stern.

During the First World War, the Chamber of Commerce, with A. C. Goeth as president, wanted to attract military schools to Austin. To accomplish this, the City had to provide water. Unfortunately, in 1910 and 1917, severe drought had its grip on Central Texas, and the water behind the partially built Austin Dam was released twice to irrigate rice along the Coast. The Military Affairs Committee, headed by H. A. Wroe, suggested that the City buy Barton Springs and use it to provide the necessary water supply. The water from the average daily flow, believed to be 17,000,000 gallons, was to be piped from the springs. Thousands of soldiers stationed at Austin's three military schools bathed in the springs using motor trucks or improved sheer iron shads for dressing rooms.

About 1920, the Chamber of Commerce and the Lions Club built the first bathhouse at a cost of \$8,000 and two years of work.. In 1932, Andrew Zilker agreed to give the military schools an additional 330 acres, joining the 35 acres on the north side of the original tract, if the city would buy the acreage from the schools for \$200,000. The people of Austin approved this purchase in a bond election and the 365 acres of land became Zilker Park. The inadequacy of the former dressing unit was shown during the annual barbeque of the Chamber of Commerce in 1940. An all-day drizzle forced members to be served under five funeral director's tents and their lunch was eaten on the first and second floors of the old bathhouse. The 1,100 citizens began to feel uncertain when the second floor would occasionally shake. and stood until 19XX when damage the structure from flooding of Barton Creek was too severe to save the building. The current bathhouse was erected in 19XX.

World War II delayed construction of the present building, but in 1947, the current bathhouse was completed. It had dressing facilities for 2,700 men and 1,800 women at any one time. In 1974, construction was begun on a floodwater by-pass tunnel to help divert floodwater in Barton Creek around the stretch that contains the Pool. A six-by-ten foot was built the entire length of the pool at a cost of \$285,000.

REST ROOM PROCEDURES

Opening Procedures:

1. At the beginning of the day it is important that certain duties are performed to ensure the facility is safe and inviting for our customers. It is the manager's responsibility to assign and help perform these duties.
2. Unlock the facility:
 - a. Unlock the following gates and doors:
 - i. Office doors.
 - ii. Blaster room.
 - iii. The storage room.
 - iv. South Booth Gate when the south booth opens for the day.
3. Check the deck, pool and grounds:
 - a. Check all hand and safety rails for stability.
 - b. Sweep the stairs.
 - c. Hose the decks.
 - d. Check the trash can liners to make sure they were changed.
1. Check & stock the rest rooms:
 - a. Check that the floors, sinks and toilets were cleaned the previous night.
 - b. Check that the trash can liners were changed.
 - c. Re-stock toilet paper, paper towels and soap.
 - d. Disinfect the baby changing table with Lysol (or Bippy.)
 - e. Check that all sinks and shower facets are functional.
2. Check the office and guard area:
 - a. Sweep and mop the office, lab and guard locker area floors.
 - b. Inventory the first aid supplies
 - c. Check the AED and Oxygen

Mid-day Procedures:

1. To maintain the safety and cleanliness of the facility, the down lifeguards must perform these duties at least once per hour. It is the manager's responsibility to assign and help perform these duties.
 - a. Pick up trash on the south hill, south deck, main hill, main deck, main entry and flowerbeds.
 - b. Change any full trash can liners on the south deck, main deck, office, men's rest room and women's rest room.
 - c. Replenish soap, paper towels and toilet paper in the men's and women's rest rooms.
 - d. Check that all toilets are flushed in both the men's and women's rest rooms.
 - e. Check that all sinks and showers are turned off in the men's and women's rest rooms.
 - f. Log in and place lost and found items in the office.

Closing Procedures:

1. At the end of every workday certain tasks need to be completed to ensure that the pool will be ready to open the following day. Some of these duties can be started before closing. It is the manager's responsibility to assign and help perform these duties.

2. Clear the pool:
 - a. The pool is to be cleared at closing.
 - b. Staff will use one long whistle blast to clear the pool.
3. Final trash run:
 - a. A final trash run will be performed at the end of the day.
 - b. The south & main decks and grass areas need to be checked.
 - c. The trash can liners on the decks must be removed and replaced with new ones.
 - d. The trash can liners in the rest rooms and office also need to be removed and replaced with clean ones.
4. Clean the rest rooms:
 - a. At the end of the day, both the men's and women's rest rooms need to be cleaned.
 - b. Use cleaning solution (pine sol, Lysol) on the floor. Pine-quart is a concentrated form, so use only a small amount: if not sure, read the directions on the container label.
 - c. Hose the floor.
 - d. Clean and scrub toilets and sinks with Bippy.
 - e. Clean showers with pine-quart and clear debris from the drains.
5. Clean the office & guard area:
 - a. Any wet lost and found items need to be laid out to dry.
 - b. Fold all dry lost and found items, write them on the log and store in the appropriate container.
6. Lock up the facility:
 - a. Check that the following gates and doors are locked:
 - i. South gate booth.
 - ii. Blaster room.
 - iii. The storage room.
 - iv. Front gate.
 - v. Office windows.
 - vi. Office doors.

POOL MAINTENANCE & CLEANING PROCEDURES:

Men's & Women's Bathhouse:

1. Check the restrooms hourly for:
 - Cleanliness
 - Toilet paper, paper towel, soap supply
 - Sink faucets and shower heads are working properly
 - Toilets flush
 - Clean the restroom if necessary
1. How to clean the rest rooms:
 - Get a hose and wet down the floors
 - Use diluted Lysol or pine in spray bottles. Directions for diluting are on the Lysol or pine bottles.
 - Spray the content of spray bottles onto the floor and **scrub** into floor with a broom.
 - Hose out the rest room.
 - Use Bippy on sinks, urinals and toilets and scrub till all dirt, mold, algae and debris is gone.
 - Use bleach in the toilets and urinals.

- Use toilet brushes to clean toilets and urinals.
- Spray some diluted Lysol or pine into the toilets and urinals to keep the odor low.
- Pick up and discard any debris that has washed onto the drain covers.

Pool:

1. Algae Control:
 - Use the skimmer net to skim the pool water surface to remove floating, nuisance algae, bugs. Do not skim water surface in salamander habitat (See figure X.)
2. Barton Creek Bypass:
 - Put on closed-toe shoes or boots.
 - Put on gloves.
 - Remove debris from the bypass grate.
3. Upstream Dam:
 -
4. Shallow End Drain:
 - Put on gloves.
 - Remove debris from the drain.
5. Downstream Dam:
 -

Main Grounds:

1. Trash Run:
 - Put on gloves.
 - Walk the deck and pick up trash.
 - Walk the grass area on the main side and pick up trash.
 - Check trashcan liners and change if needed.
2. Lifeguard Stations:
 - Check that the bolts on the foot rests are tight.
 - Check that the umbrella holders are securely attached.

South Grounds:

1. Trash Run:
 - Put on gloves.
 - Walk the deck and pick up trash.
 - Walk the grass area on the south side and pick up trash.
 - Check the trashcan liners and change if needed.
2. Diving Board:
 - Check that all bolts are tight on the diving board.
 - Check that the hinges are in good condition.
 - Check that the fulcrum is straight and locked in position.
 - Check that the hand/safety rails are tight.
 - Wipe down the hand/safety rails.
3. Lifeguard Stations:
 - Check that the bolts on the foot rests are tight.
 - Check that the umbrella holders are securely attached.

Splash! Into the Aquifer exhibit:

1. Trash Run:

- Put on gloves.
- Walk the grounds and pick up any trash not discarded in trashcans.
- Check the trashcan liners and change if needed.

Main Parking Lot:

1. Trash Run:

- Put on gloves.
- Walk the grounds and pick up any trash not discarded in trashcans.
- Check the flowerbeds for trash and pick up any trash.
- Check the trashcan liners and change if needed.

South Parking Lot:

1. Trash Run:

- Put on gloves.
- Walk the grounds and pick up any trash not discarded in trashcans.
- Check the trashcan liners and change if needed.

Office / Guard Area:

1. Trash Run:

- Put on gloves.
- Check the trashcan liners and change if needed.

2. Lost and Found:

- Log any lost and found items.
- Dry any wet lost and found items.
- Fold and put dry lost and found items in the lost and found storage container above the refrigerator.

BATHHOUSE CLEANING PROCEDURES CHECK LISTS

Opening duties checklist

**CITY OF AUSTIN – PARD, AQUATICS
BARTON SPRINGS POOL
OPENING DUTIES CHECKLIST**

WEEK OF: _____

Deck & Grounds:	SU	M	T	W	TH	F	SA
Check all hand & safety rails							
Sweep the stairs							
Check trash can liners and replace if needed							
Hose and sweep the main & south decks							
Clean skimmer drain of debris							
Men's Rest Room:	SU	M	T	W	TH	F	SA
Re-stock toilet paper, paper towels and soap							
Disinfect the baby changing table							
Sweep out hallway entry area and changing stalls if needed							
Check trash can liners and replace if needed							
Check that all sink & shower facets are functional							
Women's Rest Room:	SU	M	T	W	TH	F	SA
Re-stock toilet paper, paper towels and soap							
Disinfect the baby changing table							
Sweep out hallway entry area and changing stalls if needed							
Check trash can liners and replace if needed							
Check that all sink & shower facets are functional							
Office & Guard Area:	SU	M	T	W	TH	F	SA
Inventory first aid supplies							
Check AED & O2							
Sweep & mop office, lab & guard locker area floors							

Hourly checklist

CITY OF AUSTIN – PARD, AQUATICS BARTON SPRINGS POOL HOURLY CHECKLIST

DATE: _____

Deck & Grounds:	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm
South hill pick up trash											
South deck trash can liners changed if necessary											
Main hill trash picked up											
Main deck trash can liners changed if necessary											
Main entry & flower bed trash picked up											
Men's Rest Room:	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm
Pick up trash & sweep leaves											
Empty trash can liners if necessary											
Check toilet paper, paper towels and soap & replenish if needed											
Check that all sinks & showers are turned off if not in use											
Check & flush all toilets											
Log & place any found items in the office											
Women's Rest Room:	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm
Pick up trash & sweep leaves											
Empty trash can liners if necessary											
Check toilet paper, paper towels and soap & replenish if needed											
Check that all sinks & showers are turned off if not in use											
Check & flush all toilets											
Log & Place any found items in the office											
Office & Guard Areas:	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm
Dry any wet lost & found items											
Fold any lost & found items & store in the appropriate container											
Keep the guard area clean & organized											
Keep the office clean & organized											

Closing:

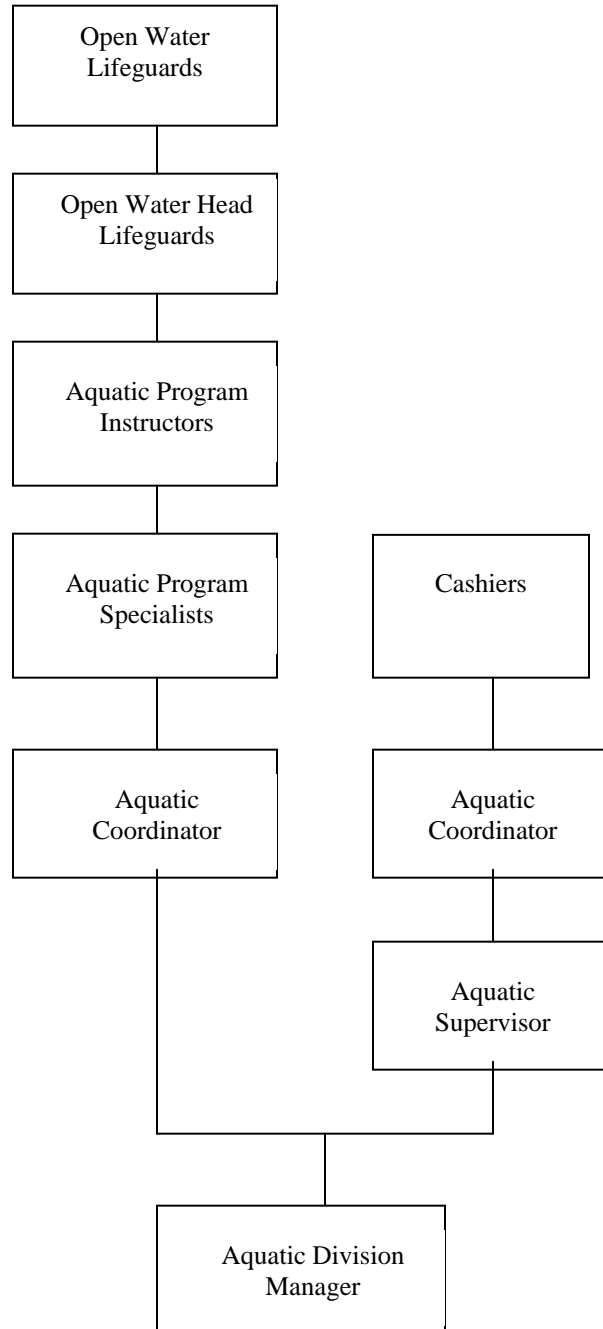
**CITY OF AUSTIN - PARD, AQUATICS
BARTON SPRINGS POOL
CLOSING CHECKLIST**

WEEK OF: _____

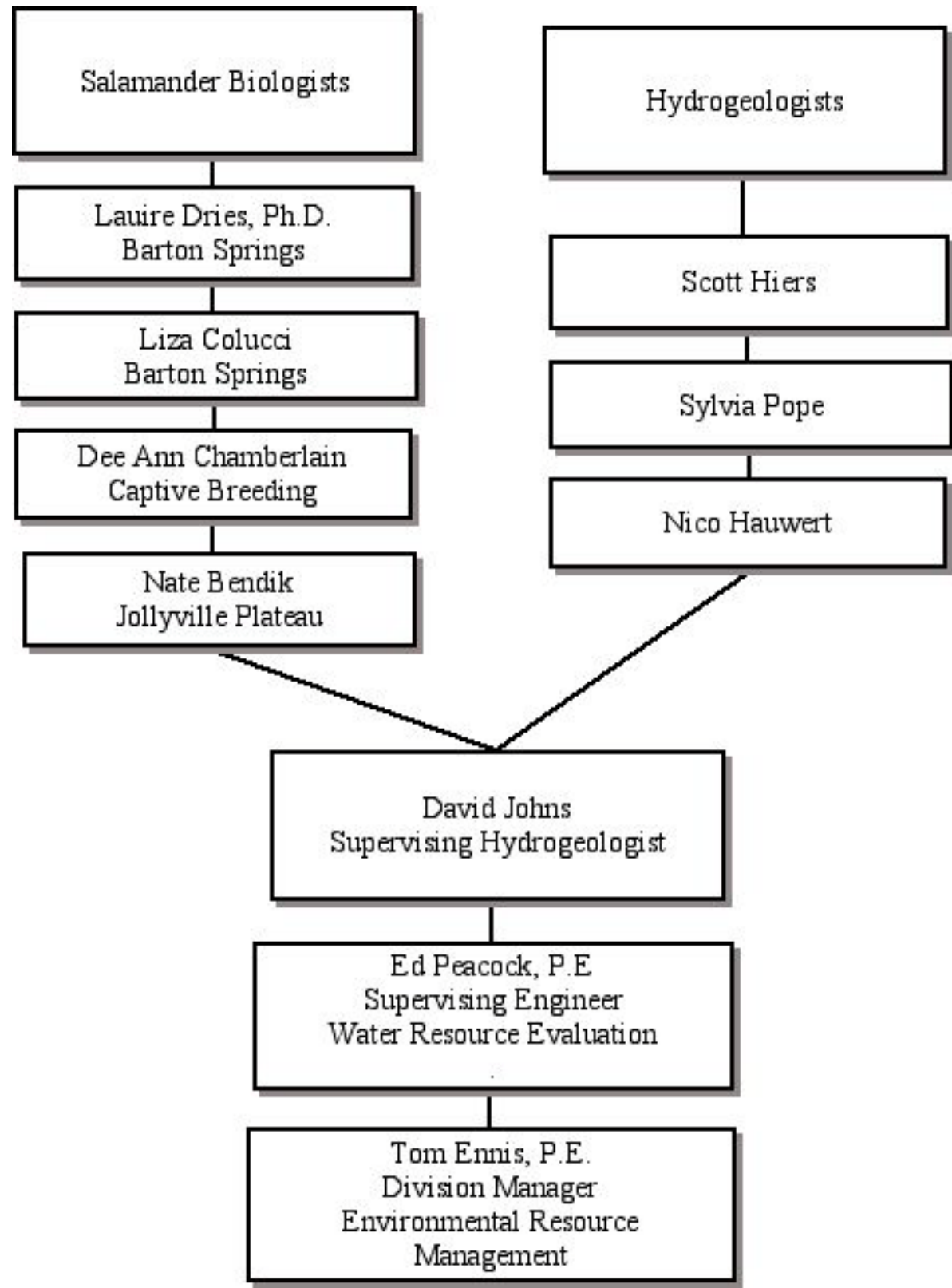
Deck & Grounds:	SU	M	T	W	TH	F	SA
South hill trash picked up							
South deck trash can liners emptied & changed							
Main hill trash picked up							
Main deck trash can liners emptied & changed							
Main entry & flower bed trash picked up							
Check all hand & safety rails							
Men's Rest Room:	SU	M	T	W	TH	F	SA
Pick up lost & found items							
Scrub sinks, toilets, showers							
Sweep & mop tile areas							
Hose changing area							
Clean off all drains							
Empty trash & replace liners							
Clean mirrors							
Wipe off all stainless steel (i.e. shelves, sinks, facets, toilets)							
Women's Rest Room:	SU	M	T	W	TH	F	SA
Pick up lost & found items							
Scrub sinks, toilets, showers							
Sweep & mop tile areas							
Hose changing area							
Clean off all drains							
Empty trash & replace liners							
Clean mirrors							
Wipe off all stainless steel (i.e. shelves, sinks, facets, toilets)							
Office & Guard Areas:	SU	M	T	W	TH	F	SA
Dry any wet lost & found items							
Fold any lost & found items & store in the appropriate container							
Sweep & mop office, lab & guard area floor							
Empty trash & replace liners							

STAFF ORGANIZATIONAL CHARTS

BSP Staff:



Watershed Staff:



SALAMANDER HABITAT PROTECTION AND CLEANING

Endangered Salamander Habitat Protection

The City of Austin holds three permits that dictate how endangered salamanders and their habitat are to be protected. There are two permits from the U.S. Fish and Wildlife Service and one from Texas Parks and Wildlife. The most important permit is the federal 10(a)1(B) permit (PRT-839031) for management and maintenance of Barton Springs Pool and adjacent springs. This permit includes a Habitat Conservation Plan (HCP) that contains 41 rules that the City of Austin must follow in order to keep Barton Springs Pool open to public recreation even though it is endangered species habitat. These rules describe the permitted methods for cleaning and maintaining Barton Springs Pool, restoring endangered salamander habitat, and education the public about the sensitive natural area we know as Barton Springs. Watershed Protection Salamander Biologists and Barton Springs Pool staff are responsible for enforcing these rules. This requires us to communicate with each other about potential problems and to work together to ensure the City is in compliance with our endangered species permits.

The most important rule is that all people working at the Pool must be knowledgeable about Barton Springs and Austin Blind salamanders and the general ecology of the Edwards Aquifer. This will help you understand what activities and events might pose threats, and how to respond.

The most important rules that Barton Springs Pool staff follow or enforce are listed below.

Prohibited Patron Activities

1. No capturing, harassing, or harming any of the aquatic animals in the Pool except by permitted Salamander Conservation Staff.
2. No deliberate disturbance of salamander habitat. This includes dislodging plants, skimming algae, moving rocks on the substrate, or any other activity that could harm salamanders, their prey, or their habitat.
3. No unauthorized SCUBA at any time. City Salamander Biologists and Aquatics management staff are permitted to SCUBA for specific purposes. U.S. Geological Survey staff are permitted to SCUBA to service equipment.

Patrons who violate these rules can be expelled from the Pool by a manager or City Salamander Biologist.....(Obviously this is going to change and have more detail after PARD and WPDRD develop standard operating procedures for these violations.)

Regulated Pool Staff Activities

4. Any activities in salamander habitat must be supervised *on-site* by City Salamander Biologists.
5. Any gasoline-powered equipment must be fueled in specific designated areas, as far away from the water as feasible. Absorbent pads must be used while fueling, operating, and maintaining such equipment.
6. Opening gates in the dam(s) and drawing down water level in the Pool requires explicit permission from City Salamander biologists.
7. High water pressure, such as that from power-washers and fire hoses, and buffers are not to be used in salamander habitat. Hosing in the deep channel must not encroach on the "beach" area along the north sidewalk.

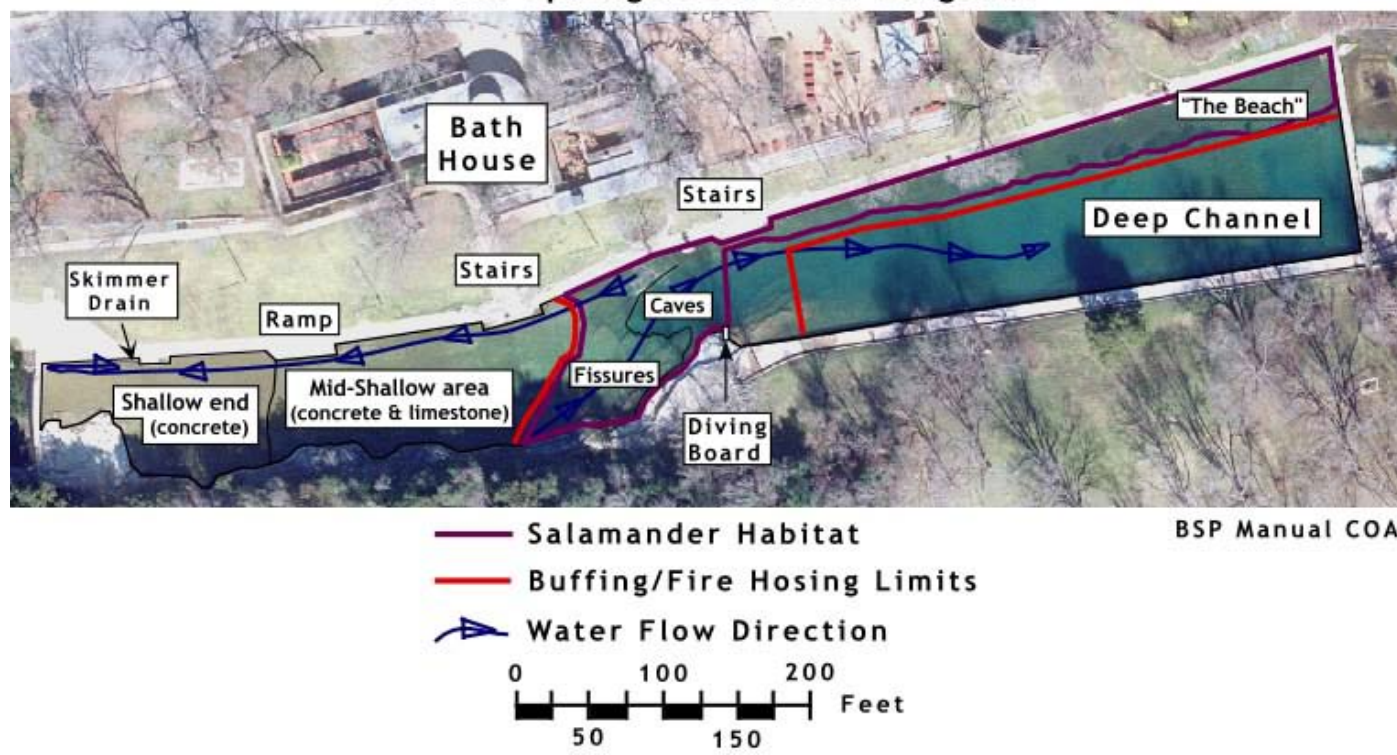
If there are any questions or problems enforcing these rules with patrons, call a member of the Salamander Conservation staff or a Pool manager. Remember, your primary responsibility is patron safety; it is our job to handle patron dissatisfaction with regulatory rules.

Salamander Habitat Cleaning Protocols

All Barton Springs Salamander habitat areas are protected by federal law and cannot be cleaned or disturbed by anyone without permission from, and on-site supervision by, City Salamander Conservation Program biologists. (See Habitat Conservation Plan measure # 28.) Primary salamander habitat (outlined in purple below) is not included in routine cleaning of other areas of the Pool; it is cleaned by City Salamander Conservation Program biologists only. Staff members of Barton Springs Pool are responsible for enforcing these rules and/or informing City Salamander biologists of violations. Cleaning methods used in salamander habitat are strictly regulated by the federal 10(a)1(B) endangered species permit for Barton Springs held by the City of Austin.

Management of the protection and recovery of the Barton Springs Salamander is an ongoing process that changes with variation in environmental conditions. Habitat and species management activities for Barton Springs Pool are developed and implemented by staff of the City’s Salamander Conservation Program with oversight from U.S. Fish and Wildlife Service and the Barton Springs Scientific Advisory Committee. Any questions about salamander habitat and cleaning responsibilities can be directed to one of the City’s salamander biologists.

Barton Springs Pool Area Diagram



SPRING CLEANING PROTOCOLS

***Please note that the duration of the cleaning process is subject to change as determined by the City of Austin Parks & Recreation Department (PAR) Director or City of Austin Watershed Protection Salamander Conservation Program staff.**

ALL BARTON SPRINGS EMPLOYEES ARE REQUIRED TO PARTICIPATE IN CLEANING THE POOL!!!

Draw Down Clean:

WEEK 1

1. Prepare to draw down the water level in the Pool by following these instructions.
 - a. Confirm that Barton Springs discharge is at least 54 cubic feet per second (cfs). This information can be found on the U.S. Geological Survey web site (http://waterdata.usgs.gov/tx/nwis/uv?cb_00060=on&site_no=08155500).
 - b. Verify with onsite Pool manager that SCP staff have given permission for the drawdown; this is a requirement of the U.S. Fish and Wildlife Service endangered species permit for Barton Springs Pool. If permission cannot be verified, gates cannot be opened until SCP staff have been contacted.
 - c. Ensure City SCP staff are present and prepared to supervise the draw down and rescue stranded salamanders. Federal regulation requires at least 2 City Salamander biologists to be present during a drawdown of the Pool.
 - d. Confirm with SCP staff that Eliza Spring is properly prepared and/or assist in preparation as requested.
 - e. Begin opening dam gates when SCP staff indicate everything is ready.
2. Remove ladders, rails, PVC, and diving well markers.
3. Set up silt fence with bottom strip of unattached cloth on substrate facing upstream. Place sand-filled fire hoses on top of this strip of cloth to ensure that dirty water from upstream cannot pass through silt fence to downstream salamander habitat. This must be completed before any cleaning of the shallow end begins.
4. Run Bobcat through shallow area.
5. Sweep top of nature trail.
 - 6. Blast shallow end, including walls (DAILY for 1 week). 5 staff members will work side by side in a line. The manager will be conducting quality control throughout the shallow end blasting.
 - We will begin at the dam on the south side of the expansion joint and work to the drop off.
 - After completing the south side of the expansion joint, the staff will move to the dam and begin blasting the main side of the expansion joint and work to the drop off.
 - After completing the top section the staff will then move to the south side of the expansion joint beginning at the drop off and work to the pond.

- After completing the south side of the drop off, the staff will move to the main side to begin at the drop off and blast to the ponded dirty water, excluding salamander habitat in the fissures (Figure 1).
- After all blasting has been completed the staff will use a fire hose to rinse the entire shallow end.

9. Blast SR and S1 steps, and ramp during the blasting of sections 2 and 4.
10. Set up trash pump, clean the ponded dirty water upstream of silt fence (DAILY).

WEEK 2

1. Continue cleaning the ponded water upstream of silt fence (DAILY.)
2. Scrub or blast the rails.
3. Fire hose the deep end; repeat the run (DAILY.)
4. Consult Salamander staff to obtain approval for cleaning the shallow “beach” along the north side of the Pool. This area is endangered species habitat where all cleaning activities must be approved and supervised by City of Austin Salamander staff prior to implementation. Using high-pressure water emitted by fire hoses to clean the “Beach” is explicitly prohibited by the City’s federal endangered species protection permit. If approval is given, use submersible water pumps and garden hoses to clean the beach of sediment and free-floating algae. Do not remove algae attached to the rocks until the rocks appear white; do not remove rooted aquatic plants; do not remove leaves and other woody debris.
5. Blast the side of the pool from the diving board to the dam.
6. Blast the main side of the pool from the main staircase to the dam.
7. Clean out before hosing out the bathhouse roof gutters.
8. Clean out before hosing out the main entrance roof gutters.
9. Clean main entrance light fixtures, replace bulbs.
10. Painting projects:
 - A. Bathhouse blinds
 - B. Bathhouse pipes
 - C. Bathhouse stall doors
 - D. Bathhouse benches
 - E. Top deck black poles and rails
 - F. Top benches
 - G. Lifeguard seats and foot rests
 - H. Office window frames and door frames
 - I. Trash can poles and tree supports
 - J. South booth

WEEK 3

1. Blast D1, D3, lower dam, D4 steps and diving well
2. Continue firehosing the deep end (DAILY.)
3. Dust the bathhouse ceilings.
4. Pull weeds.
5. Replace and re-number the north and south dam fences.
6. Dig out gravel in the fence holes at the south booth.
7. Set the VCRs to function.
8. Clean the bathhouse lockers.

9. Remove the silt fence and close the drain.
10. Replace the ladders, rails, PVC and diving well markers (LAST.)
11. Clean and stock the restrooms (LAST.)
12. Empty the trash (LAST.)
13. Hose the top deck, staircases, main deck and south deck (LAST.)

Non – Draw Down Clean:

WEEK 1

1. If the water flow is below 54cfs the pool will not be drained.
2. Scrub or blast the rails.
3. Fire-hose the deep end, repeat the run (DAILY.)
4. Fire-hose the side beach.
5. Blast the side of the pool from the diving board to the dam.
6. Blast the main side of the pool from the main stair case to the dam.
7. Clean out before hosing out the bathhouse roof gutters.
8. Clean out before hosing out the main entrance roof gutters.
9. Clean main entrance light fixtures, replace bulbs.
10. Dust the bathhouse ceilings.
11. Clean the bathhouse lockers.
12. Pull weeds.
13. Dig out gravel in the fence holes at the south booth.

WEEK 2

1. Continue fire-hosing the deep end (DAILY.)
2. Painting projects:
 - A. Bathhouse blinds
 - B. Bathhouse pipes
 - C. Bathhouse stall doors
 - D. Bathhouse benches
 - E. Top deck black poles and rails
 - F. Top benches
 - G. Lifeguard seats and foot rests
 - H. Office window frames and door frames
 - I. Trash can poles and tree supports
 - J. South booth.
3. Scrub or blast the rails.
4. Buff the shallow end of the pool (should take about 3 days).
 - The manager will be conducting quality control throughout the shallow end buffing.
 - Staff will begin buffing at the drop off, finishing both the south and main sides of the expansion joint.
 - After completing all of the lower shallow end section, staff will then move to the top section beginning at the north dam and buffing to the drop off.

Both the south and main sides of the expansion joint will be cleaned.

APPENDIX E

WEEKLY CLEANING PROTOCOL

ALL BARTON SPRINGS EMPLOYEES ARE REQUIRED TO PARTICIPATE IN CLEANING THE POOL!!!

Monday (clean day)

- 9:00am Manager and guard walk to the blaster room and grab one of the “R4” units and some blaster hoses. When the “R4” unit is on the deck, the manager will go to the guard room and grab a water hose. With the help of a guard the manager will then grab the buffer and take it down the ramp to the pool.
- 9:30am The manager and guard if available will then put together the buffer and hoses. After all the equipment is put together the manager will then plug the buffer up to one of the electric outlets on the pole.
- 10:00am At this time the manager or guard will start buffing parts of the shallow end. More than likely staff will start at the 1/8th mark and work their way to the shallow end dam. Staff will buff the shallow end until the number of patrons in the water requires more guards on stand or until around 1:00pm
- 1:00pm Lifeguards, head guards and managers will start putting up all of the cleaning equipment. The water hoses will need to be drained and then rolled up before they are stored in the guard room. The buffer will need to be carried to the guard room at this time also. The “R4” unit and blaster hoses need to be put in the blaster room. When disassembling the “R4” unit, make sure that the water filter is taken off and dump the water in the grass.

Tuesday (clean day)

- 9:00am Manager and guard walk to the blaster room and grab one of the “R4” units and some blaster hoses. When the “R4” unit is on the deck the manager will go to the guard room and grab a water hose. With the help of a guard the manager will then grab the buffer and take it down the ramp to the pool.
- 9:30am The manager and guard if available will then put together the buffer and hoses. After all the equipment is put together the manager will then plug the buffer up to one of the electric outlets on the pole.
- 10:00am Whoever is buffing will need to start where the group left off on Monday. Staff will buff the shallow end until approximately 1:00pm or when the number of patrons in the water requires guard to protection of their safety.

1:00pm

Lifeguards, head guards and managers will start putting up all of the cleaning equipment. The water hoses will need to be drained and then rolled up before they are stored in the guard room. The buffer will need to be carried to the guard room at this time also. The “R4” unit and blaster hoses need to be put in the blaster room. When disassembling the “R4” unit, make sure that the water filter is taken off and dump the water in the grass.

Wednesday (non-clean day)

The manager working that day will assess the current situation and decide whether or not to clean the pool that morning or wait until Thursday. If there is enough staff working the manager will have staff push brooming or blasting the shallow end.

Push-Brooming

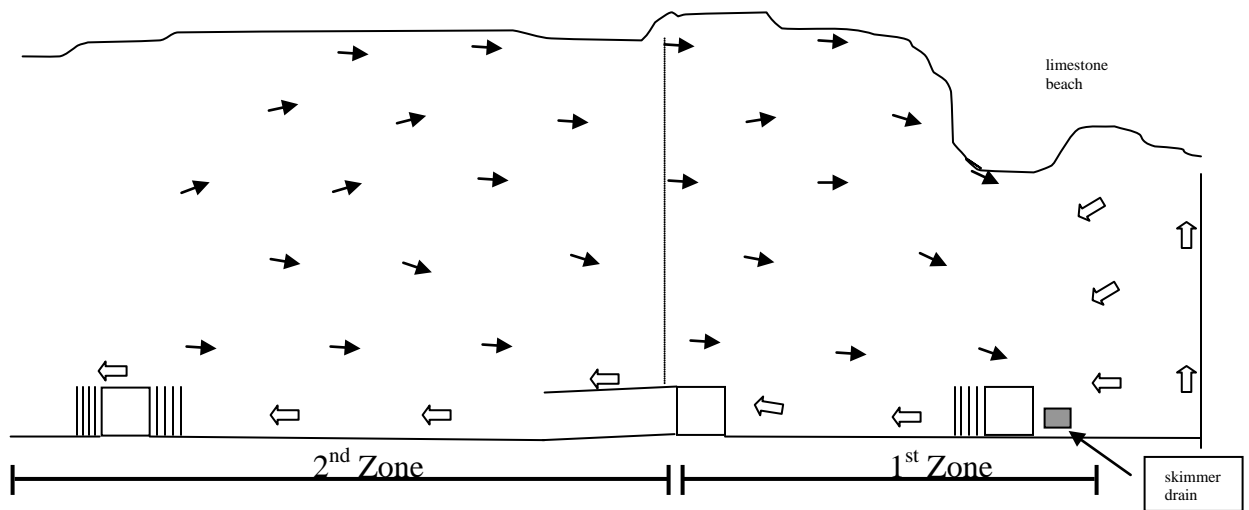
A. Strategy

Not to be confused with sweeping the deck by using a push broom, “push-brooming” is a technique that is used to control algae or sedimentation in the shallow areas of the pool, that is, in areas where people wade or where children usually swim. Push-brooming is performed either to loosen algae from the bottom or to direct sedimentation strategically away from previously cleaned areas and toward a confined area, such as the skimmer drain in the shallow end of the Pool.

Understanding that the water current flows in different directions, depending on your location in the pool, is key to push-brooming. Water current in the shallow end is imperceptible for the most part, but it does exist and it can either aide or impede progress. You can work most efficiently by utilizing the current. The area you clean will have more luster if you do, whereas ignoring the current will diminish your results and may even cause that which you push-broomed to drift back over the cleaned area.

In general, the current in the shallow end tends to flow toward the skimmer drain, except along the wall on main side (see diagram below). (There are minor areas that do not adhere to this trend). Although the current alongside the main deck tends to flow away from the skimmer drain, you will need to work against it since the main objective is to direct debris into the drain.

In the area that you are assigned to clean, start in the spot farthest away from the skimmer drain. For example, if you are assigned to clean the entire 1st tier of the shallow end, then begin push-brooming where the 1st tier drops off into the 2nd tier. If you start closer or somewhere in the middle, then you will have to go back later and move the debris you missed over the area that you already cleaned.



LEGEND

Open Arrows = Direction water flows
 Dark Arrows = Direction to push broom

When cleaning the 1st tier, save the section between the skimmer drain, the limestone beach, and the upper dam for last. The reason for this is that turbid water from the rest of the 1st tier will drift into this area, so saving this area until the end will spare you the hassle of having to do it twice.

If there is an area of the pool that has been cleaned, or if someone is operating a buffer in the vicinity, then be mindful to steer away from these areas. Work away from the cleaned area. Remember: keep the clean part behind you and the dirty part in front of you.

B. Technique

1. In the area that you are cleaning, start on a spot farthest away from the skimmer drain.
2. Stand in place. Push your broom down and forward against the pool bottom.
3. At the end of your motion forward, *lift the broom out of the water before you pull it back toward you* to continue with the next sweep. This keeps you from pulling turbid water back toward you.
4. Take a small step to the side, either right or left.
5. Repeat cycle (Steps 2 – 5).

Work from one side to the other, allowing debris to drift forward then settle so that you can see exactly where you need to sweep again. If you do it right there should be a well-defined line where algae or sedimentation lies ahead of you and none is behind you.

Minimize the amount of walking around that you do. Limiting your movement in the water will help to avoid misdirecting the course of debris to the skimmer drain. Some people occasionally walk their brooms from far away all the way to the skimmer drain which gives them the false impression of efficiency. In fact, that method is perhaps the least efficient since half of their time is spent walking back to the beginning point without any actual push-

brooming taking place. Furthermore, walking away from the skimmer drain causes the turbid water in their path to pick up and float in the opposite direction which can be counterproductive. If you see someone repeatedly walking the broom back and forth up to the skimmer drain, politely try to correct his or her technique.

There are many different types of algae that may grow in the pool. Some are easier to remove than others, and a few types are nearly impossible to remove by mere push-brooming alone. No matter how resistant the algae may or may not be to push-brooming, progress will require a certain level of strength. Some people elect to add a weight to the broom head to minimize the amount of effort required to push the broom downward, but the added weight increases the amount of effort needed to lift the broom out of the water before you draw it back toward you. Using extra weight is a matter of personal preference and can be equally effective either way so long as it is done properly.

Thursday (clean day)

Objective: to provide a clean, safe and healthy environment for all patrons to enjoy.

- ◆ Every Thursday Barton Springs will close from 9am until 7pm for maintenance. During the summer a clean will also be scheduled on Monday and Tuesday mornings from 8am until noon or until people begin using the very shallow area.
- ◆ On Wednesday gas cans should be filled and ready for use during the clean. The assigned manager should check all blasters to be sure they are ready for the clean. Any maintenance concerns should be reported to the Supervisor as soon as possible.
- ◆ At 8am the opening manager will begin setting up for the clean by setting out the hoses, blasters, and any other equipment to be used during that clean.
- ◆ The manager will also set the assignments up for that day according to how many guards are available. See example on the next page.

Men's and Women's Restroom	Lifeguard	
Fire Hose	Specialist	Lifeguard
Blast Dam 3 to Beach	Groundskeeper	
Blast Diving Well and Stand 4 Stairs	Groundskeeper	
Buffing	Lifeguard	Lifeguard

7:00am The manager will open up the office and do a pool check and check the restrooms.

7:30am The manager will then head to the barn and pick up the bobcat and armada. When the manager gets the bobcat they should check to see if the bobcat needs gas. **The bobcat uses diesel fuel only.**

- 8:00am The manager will go into the blaster room and fill up the blasters with gas and set them up in front of the guard room. Three to four blasters are the right amount of blasters that should be setup. The managers also need to grab the booms and set them up around the blasters. The last things that the managers need to get are the blaster wand, blaster hoses and water hoses. All of the supplies for the blasters can be set next to the blasters until the staff comes in and sets up.
- 8:45am Staff comes in and gets ready for cleaning. At this time the manager will write assignments on the board so the staff will know what they are suppose to clean. Lifeguards and head guard will then disperse and grab the equipment needed for their designated tasks.
- 9:00am Staff will let patrons know that it is time for them to clear the Pool and then staff will begin their cleaning duties for the day. Cleaning duties last for most of the day until late that evening.
- 6:00pm Staff will begin to put away all of the blasters in the blaster room and put away the remaining fire hoses next to the fences. The guards and managers will then put up the Armada and associated cleaning equipment.

- ◆ During the clean lifeguards must do their best to complete tasks in a timely fashion. Please refer to the information about blasters for helpful tips.
- ◆ In addition to cleaning the pool, both bathrooms will be cleaned and the grounds maintained.
- ◆ Extra Lifeguards can also sweep and hose decks and stairs.
- ◆ Scrub algae off the rails and ladders if needed.
- ◆ Lifeguards can push broom the shallow end or buff the shallow end.
- ◆ During the winter, lifeguards can rake up leaves and pick clover around the pool area.
- ◆ When the clean is finished, the manager on duty will make sure that all equipment is returned to its correct location.

1. Blasters, booms, quick turns, gas cans, and unused absorbent pads returned to the blaster room and locked.
2. Garden hoses drained, coiled, and hung neatly in guard room.
3. Nozzles removed from hoses and returned to the issuing manager.
4. All tools returned to appropriate place.
5. GFI box, vacuum pump, and square vacuum returned to blaster room.
6. Equipment carriage returned to barn. (Take barn gate key if after hours.)
7. Close all drain gates and hose connection covers.

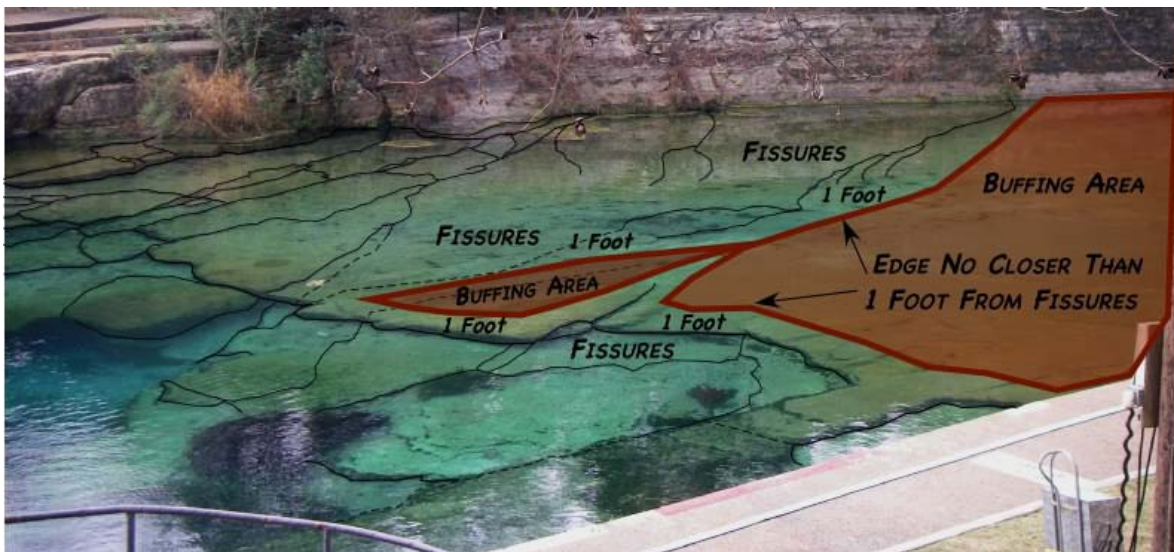
Blaster/Power Washer Information

- (1) Wipe blaster down with absorbent pad and check for any leaks.
- (2) Fill blaster with gasoline before taking it to the Pool deck. Use absorbent pad to wipe up any drips. *The City's federal endangered species permit requires that blasters be fueled and re-fueled as far away from Pool as possible to protect the aquatic environment from toxic material spills.*
- (3) Transport blaster, boom, extra absorbent pads, hoses, wand, and quick turn (if necessary) to the area of the Pool that you are assigned to blast.
- (4) Attach hoses to correct connections. (Please refer to the pool map.)
- (5) Wrap blaster with boom around the bottom to catch any possible drips.

- (6) Turn on water and check for any leaks. Do not let water spray on engine! Get an 'o' ring from the office to prevent leaks and make sure that you have on all safety equipment.
 - (7) Turn on blaster and begin blasting.
 - (8) Steps 1-7 apply for the electric blasters with the exception of adding gas.
- ◆ If you have to leave your blaster for a significant amount of time, be sure to turn off blaster and water to conserve gas, water and/or electricity.
 - ◆ When a blaster runs out of gas, move it on to the grass as far away from the Pool deck as possible, or bring back up to the guard room to be refueled. *The City's federal endangered species permit requires that blasters be re-fueled as far away from Pool as possible to protect the aquatic environment from toxic material spills.*
 - ◆ When working with the electric blasters please ask for help when moving it if it is too heavy to move by yourself.

Underwater Buffing Information

Underwater Buffing Area Map



Friday (non-clean day)

The manager working that day will assess the current situation and decide on whether or not to clean the pool that morning. If there is enough staff the manager will instruct staff to push-broom or blast the shallow end.

Saturday and Sunday (non-clean days)

On Saturday and Sunday, pool staff does not clean the Pool other than daily duties and skimming floating algae in non-salamander habitat areas if requested by Pool manager. Since Pool usage is high during the weekends, using buffing and blasting equipment may not allow adequate monitoring of patron safety. Consult with Pool managers before attempting to clean with this equipment on a weekend.

APPENDIX F

BARTON SPRINGS FLOOD PREPARATION PROTOCOL

In the case that Travis County is under a flash flood watch or when heavy rains are constant, staff at Barton Springs Pool need to begin flood preparations as soon as possible. The following are steps that staff are required to perform when preparing for a flood.

1. Check USGS web-site for the water level on Barton Creek at Oak Hill, Loop 360 and above Barton Springs.
2. Managers and Head guards must ensure that flood preparation staff is properly equipped with boots, and gloves if necessary.
3. When staff is properly equipped, everyone will begin flood preparation by removing the fence panel from the upstream (shallow end) dam to prevent damage or loss by the flood waters. Removing and storing a fence panel is a two-person job, so staff must be paired up. Once removed, staff will carry fence panels to the perimeter fence at the top of the north hill and lay them in an orderly fashion next to the fire hose rack.
4. When the shallow end fence is done, all staff will proceed to the downstream (deep end) dam and remove those fence panels following the same procedure. These fence panels will be stored on North side the grass at the top of the retaining wall near the dam, or on the south side on the top of the hill.
5. After the fences have been pulled, the two PVC pieces need to be pulled out of the water at the deep end dam and carried to the top of the south hill. Again, this will require two staff members working together for this portion of the flood preparation.
6. After all the fences have been pulled out staff can then start to take apart the diving board including the safety hand rails, diving rules sign and pull out the hand rails and ladders along the edge of the pool deck. All rails, ladders, sign and the diving board need to be put at the top of the hill on both sides of the pool.
7. Last to be done is for the staff to remove all of the lifeguard chairs from the stands and put them at the top of the hill.

Once the water is almost coming over the north dam, when the gage height listed on the USGS web-site is approaching 8 feet, the Manager needs to first call the City's Salamander Biologist to obtain approval to open the gates in the downstream dam and second, the Aquatic Division Manager to communicate that approval. All attempts should be made to open the gates before the water level in the Pool rises above the top of the downstream dam. It is very important to have the gates open while flood waters are traveling through the Pool because it will help prevent settlement of gravel, rock and sediment within the Pool confines. After all the flood prepping steps are done then staff needs to wait in the office until it is safe for them to travel. Managers need to stay at the pool until the pool is closed and only keep two to three lifeguards for emergency purposes. If flood waters are high enough in the shallow end, tree limbs and trash will be littered along the grass. Once the water has dropped below the shallow end wall, staff should then begin to pick trash and tree limbs that are on the grass. When the water goes below the decks staff should then start to hose the decks as soon as possible. When it is safe to walk across the deep end dam, managers should start opening the flood gates to lower the water. Depending on the severity of the flood the division manager will let staff know how long the pool will be closed for cleaning and what needs to be done first.

Flood Cleaning Protocol

1. **Blasting the shallow end bottom and walls.** Since time is critical during a flood clean managers need to make sure that staff is blasting thoroughly. If areas are not blasted thoroughly then staff will have to get back to the area and do it again. If you have to blast that day, get with the manager to find out where you need to start.
2. **Fire hosing various areas around the pool.** Fire hosing will be done in the shallow end when blasting is done and when the bobcat is used. The day before the pool is about to open fire hosing should be done one last time in the shallow end to make sure that everything is washed down. Deep water fire hosing will be done several times depending on how long the pool is scheduled to be closed. Some parts of the beach will be fire hosed depending on what is allowed from the City biologists.
3. **Removing debris, sweeping and hosing.** Depending on how bad the flood is some parts of the pool will need to have mud, limbs and trash removed from the area. This can be done by shovels, brooms, water hoses and water nozzles.
4. **Cleaning the “beach” area.** The “beach” is Barton Springs Salamander habitat and is federally protected. The area cannot be cleaned by anyone without permission from City Salamander Conservation Program staff and on-site supervision by Salamander biologists or designated Pool management staff. (See Habitat Conservation Plan measure # 30.) Pool or Aquatics management staff will be responsible for consulting with City salamander biologists prior to conducting any cleaning in this area.
5. **Finishing touches.** The day before the pool is suppose to open all trash needs to be taken out and all trash cans need to be replaced. At this time the bathrooms need to be cleaned and all cleaning equipment needs to be picked up and stored. Later that evening the flood gates should be closed.
6. **Last check.** The manager needs make one final walk through to make sure that everything is put up and ready to go for the next day.

The cleaning methods that staff will use will vary depending on the following:

- length and severity of the flood
- drain down has occurred for weekly cleaning during non-drought conditions
- pool has not been drained during weekly cleaning due to drought conditions

Keeping all of these variables in mind, the length of the flood closure is at the discretion of the Aquatic Division Manager.