Pond Survey Summary

The LakeRidge Falls (LRF) Roads & Grounds (R&G) Committee Pond's Crew conducted a physical inspection and prepared an individual survey of 13 stormwater ponds in the community, during the early part of 2023. We did not survey Pond # 7 (by the back gate) as it is not connected to the other 15 ponds, is not maintained as a pond, and has been planted as a wetland. In addition, we did not have sufficient time to complete surveys of Ponds 2 and 16 before late spring rains limited our full access to these two ponds. The Ponds' Crew recommends conducting inspections and preparing surveys of these two ponds during the next dry season in 2024. The 13 individual surveys, for the most part, reflect our observations and are, therefore, the "facts" we found. These individual surveys stand on their own as direct observations, supported by photos and measurements. The recommendations we make, therein, are those that are obvious, such as burying, or redirecting pipes, and adding catch basins.

This summary, and any power point presentation highlighting our findings, are our (Pond Crews') thoughts, interpretations of the facts, and our ideas: particularly in the areas where we are uncertain as to immediate causes, or the overall remediation techniques, these we leave for the decision by the BOD.

What We Found

We start with our understanding that erosion is a natural process that can be exacerbated by the development of the property. We can never eliminate the process but believe we can slow it down and mitigate the worst effects. That said, what did we find? In general, the ponds in the area of the LRF Blvd. and south of that roadway are the most affected areas in the community, but all of our ponds surveyed have problematic erosion on-going.

Some general observations: there appears to be a relationship between the size of our individual lots and the hydro effect of the water runoff from that property.

The deeper the rear yard, the more area to disperse water running off the roofs and the yards. Our property consists of just sand humped up from pond excavation and covered by an impermeable tile roof, and grass that acts like a mat. It appears the runoff eventually gets under the grass and slowly moves the sand into the ponds. The unburied downspouts seem to accelerate that process.

Burying the downspouts properly will make the most impact in slowing the backyard erosion we observed. The runoff between the buildings(swales) can be remediated by the construction of catch basins, as demonstrated in Pond Project #8. We point out in each survey the worst cases of individual downspout-caused erosion, as well as erosion from swales between buildings, and erosion from steep vertical berms adjacent to individual ponds.

What We Also Found

We expected to find erosion directly attributable to unburied downspouts; we found it. We expected to find erosion caused by swales attributable to runoff from steep berms and excess water moving between buildings; we found that. In addition, we found areas where overwatering (irrigation) may be causing erosion; we found areas where wave action could be causing undercuts and we found areas in the same ponds without undercuts. We found areas where we could not detect just what was causing the erosion.

Examples of the Above Findings

In Pond 14 at the south end, we have bank collapse and serious surface erosion from above; this erosion is most likely due to concentrated rain runoff from the very steep berm above, and over-irrigation of that that same berm. The north end of the

pond had a minimal undercut and no other issues. The collapse of the south end followed a deep undercut in the bank. If it were wave action alone, why the disparity? Also, in that pond on the west side, the undercut was serious, on the eastern side, almost undetectable. Why?

On the south side of Pond 9, we have erosion under the south concrete walkway alongside a relatively benign berm; Ponds 11 and 3, and 6 also on the south ends have the same issue; why? Could some of this be over-watering? Why the south end of each pond?

We looked at the aquatic plants along the north end of Pond 3. Rebar was set in the pond at a measured distance from the bank to measure continuing erosion. On inspection, the bank where the plants had been put was receding at the same rate as the areas on either side of the plantings. We did notice a slight area of retained sand behind the plants; it was not clear if this sand was retained or restored by the plants.

We are aware that Pond 13 had aquatic plants inserted, circa 2010, as a part of a Florida Friendly experiment; and that they had been removed by acclimation of the immediate visually affected owners in 2014 or 2015. There was no evidence to suggest these plants had had any effect in retarding erosion in this pond. They just may not have been given enough time to work. Coincidentally, this pond has lost several trees to serious erosion on its south side adjacent to the Blvd.

There are eight (8) ponds that we believe need to be addressed to save adjacent roadways, walkways, and several homes. The majority of these problems are coincidentally on the south side of their respective ponds. Why on the south side? We have no answer.

CONCLUSIONS

We need to prioritize this issue and take action based on our current understanding of best practices. We need to fund a program and lay out a remediation program, based on addressing the most serious areas first and commit funding to move forward at a set pace. Funding should allow us to go back, as well as forward, as we find what works and what doesn't.

The community should understand who is responsible for what. Burying pipes is a homeowners' responsibility, and swales between buildings are the responsibility of owners. It depends on who owns the land. The sandstone owners have zero lot lines; the other sections vary as to who owns the property. The shoring up is primarily on community property and a reserved issue, with the exception of the adjacent owners to a major shoring up involving the members integral to that fix; in that case, it should be a joint remediation shared financially with those few affected owners.

Riprap done properly seems to work in shoring up banks. Strategic catch basins seem to work. Down Spouts need to be PROPERLY buried. (See proper burying techniques)

We need to investigate over watering especially on steep berms.

We need to set up a routine in-house inspection process similar to our sidewalk survey.

We need to obtain proposals for the (8) eight identified problem bank areas.

Pond Crew 2023

Ponds' Map


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Mitigation Area
LAKERIDGE FALLS

Pond#1

Survey was conducted on May 26, 2023, by the LRF R&G Committee

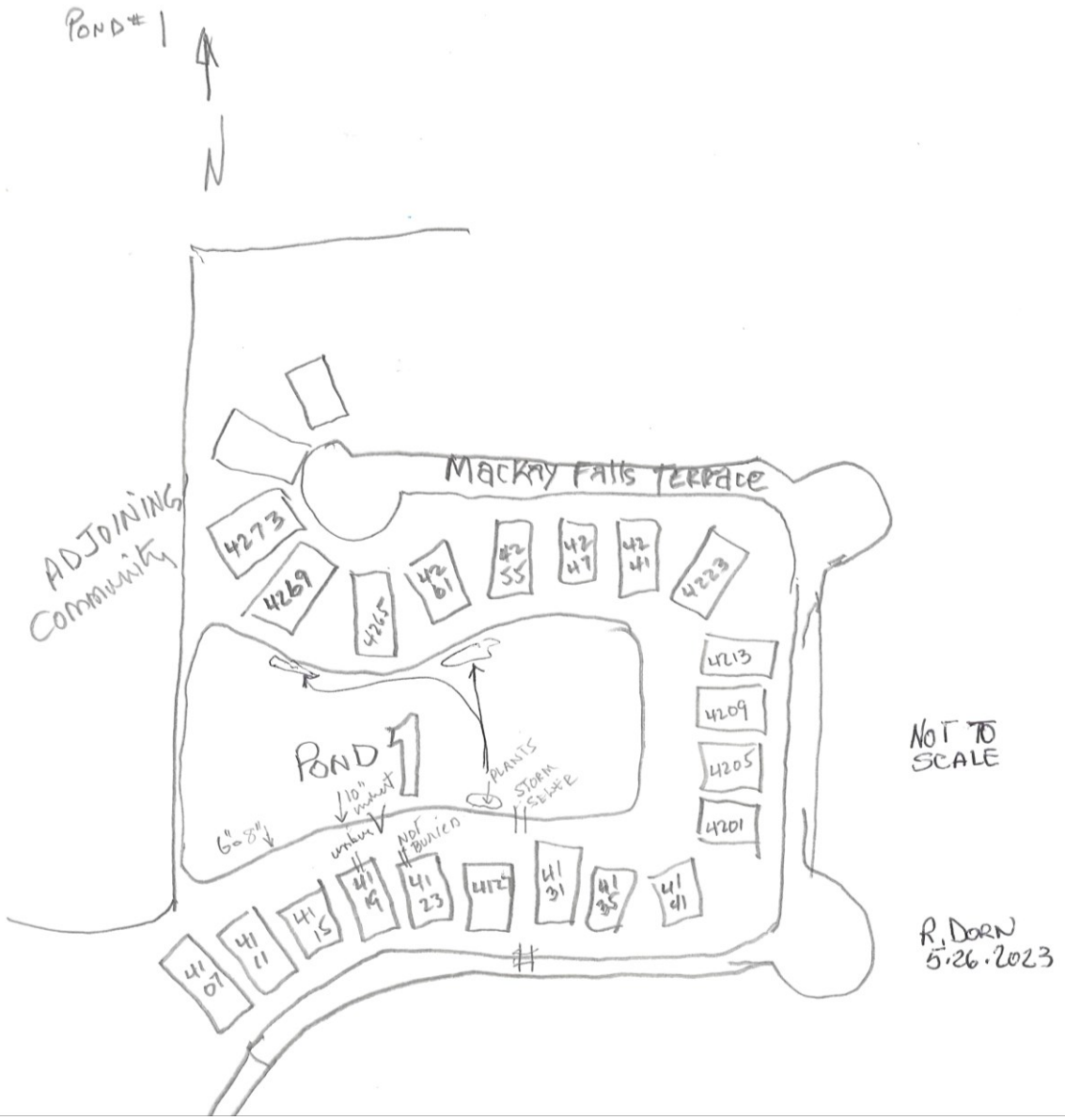
This pond is rectangular in shape, with the two longer sides slightly pinched inward in the center. The pond is located in the northwest quadrant of the community. The pond is surrounded on three sides (north, east, and south) by the abutting rear yards of 19 single-family homes or units, along Mackay Falls Terrace; the fourth or west side borders an adjoining community. The units have deep rear yards that disburse the roof runoff quite well. Most of the units have roof gutters non we observed had Spouts buried.

The south side of the pond, from the west corner evidence of an average bank undercut of 6 to 8 inches. Behind units 4119 and 4123, both of which have gutters and unburied downspouts, the undercut measures ten inches. Due to the present water level not much more of this pond lent itself to the usual access to measure the undercut. Behind units 4119 and 4123, as well, there is a bank cut noticeable, and in our view, caused by roof runoff from these two units.

No other cuts were observed or noted on the balance of the pond rim, including the edge below the berm from the west that adjoins the next community. It was observed that the grass along the pond edge had a waterfall effect, rolling over the edge and seemingly protecting the edge from possible wave motion. There were several areas where it appeared aquatic plants, primarily grasses, had recently taken root along the banks. It was noted that the banks in proximity to these scattered offshore grass areas did not seem to make any perceptible difference with bank loss, in this particular pond. Other than noted previously there were no problems observed.

TO DO: The owners of units 4119 and 4123 should be encouraged to bury their downspouts, possibly joining them and running one pipe into the pond instead of two.

SEVERITY RATING: Well below average



POND #1 **3/26/23**

Top: Several piles of rocks (coral?) located around the pond. Culvert from the street, Note the silt buildup covering the lower portion of the pipe. One of several tree stumps found in the water. Bottom: 6" thick grass "waterfall" over the bank to the water around most of the pond. This, as well as the aquatic plants, would greatly buffer the effects of bank erosion.

POND #1 **3/26/23**

This pond is in good shape as compared to the other ponds. 8" cavity under bank behind 4115 Mackay Falls Terrace. Top right: Tree stumps in the water. Note this pond had far fewer stumps compared to other ponds. Behind 4119/4123 6 – 8" deep cavity under the bank running for approximately 10ft. Also a swale between the houses.

POND #1 **3/26/23**

Grasses and other aquatic plants found all around the pond. Numerous turtles, ducks, and other birds…also, a stump in the water.

bcj | pg 3

Pond #3

This survey was conducted on April 10, 2023, by the LRF R&G Committee.

The pond was surveyed during our dry season. The water was low, allowing a good view of the pond sides of the bank, as well as a close view of the pond bottom.

Pond # 3 is in the shape of a cross: the longer ends run to the north and south, and the shorter ends point east and west. It is by far the largest of the 16 ponds in our community system and is situated approximately in the geographic center of the property. If one were to divide the pond down the center line of the north-south axis, the east side of that line is abutted by the rear of the villas along Victoria and Kariba. The western half of that centerline is abutted by the rear of single-family homes along Mackay and Stirling Falls. It was observed, and should be noted that the villas along the eastern side of the pond are on smaller lots and the buildings are closer to the pond edge, whereas the western single-family units are on larger pieces of property, and the units generally are a greater distance from the adjoining ponds. The Single-family units have more grass area to absorb more run-off and the damage from downspouts is significantly less than on properties with less grass area.

Starting with the south side of the pond that runs along the north side of LRF Blvd, there is considerable ongoing erosion. The pond bank along this side has collapsed for a good deal of its center span, The collapse is most likely from the undercut of the bank eroded from runoff from the berm separating the pond from the roadway and or wave action. The landscapers have begun to fill the area, but to what purpose? Is this an attempt to rebuild the bank at the original pond edge? In November of 2020, a piece of rebar was driven into the bottom of this pond at this location 24" from the bank. The collapse has caused the bank to shrink back and the current measurement from the rebar to the new lip of the bank is 110", or about a 7-foot difference, a dramatic change. (This bank was visited in the summer of 2022 and

no evidence of an imminent collapse was observed at that time.) There are several trees along this south side facing imminent collapse into the pond. We wondered if over-irrigation could be adding to the problem. This is the worst eroding area of this pond found during the survey. It would seem a mechanical solution would be at least part of the solution for this location going forward.

Continuing up the east side of the pond along the rear of the villas on Victoria Falls Circle it is clear that the unburied downspouts are causing washout cuts along the bank. Victoria Falls has 10 buildings up this side with two units apiece, for a total of 20 units. Where possible downspouts can be directed to the street. Three units have buried their pipes, and 17 have not. All 17 units show erosion attributable to the unburied pipes. These Homeowners need to be encouraged to bury now or redirect their downspouts away from the pond. This quadrant of the pond, probably because of the short backyards, shows as much damage from the unburied pipes as the other ¾ of the pond combined. Aside from the erosion directly observed caused by the pipes, there is an average of 9"-13" undercut to the bank, similar to what we observed along the south bank. The bank here is probably going to start collapsing shortly like the southern shore. One unit at 8107 has installed aquatic plants along the bank abutting his property. While we were there the owner came out and explained the benefit of the plants, but it was unclear what effect the plants had as the area was unmown back several feet from the bank by the landscape people, due probably to the soft and/or uncertain conditions at the edge all along that area. Again, it was noted the short backyards in this particular area. One large tree at the rear of 8119 evidenced a 30-inch void below the surface as did a tree similarly situated along Kariba.

As we turned the pond corner and started up Kariba Lake Terr. We found the same problems with the unburied pipes but not as markedly as lower along Victoria. It was noted that very few owners had buried pipes and although erosion was ongoing;

few were aggressively scouring the yards as the lawns were deeper in this area. The hollowing out of the banks (undercut) was very bad, averaging 30", in a few places twice the undercut we found along Victoria. It appears that wave action and/or the runoff from the roofs and yard combined runs under the grass and eventually undercuts the bank and ultimately a bank collapse or even small sinkholes in the lawn. The trees in rear yards have serious voids under them caused by this runoff as well. In the rear of 4351 Kariba a large tree had a void under the tree measured at 30", the only thing supporting the surrounding grass was the roots of the tree. Burying or redirecting pipes can only help by allowing roof runoff to bypass the open areas and not overload the natural process of absorbing more water than necessary by the grass areas.

The north end of the pond runs along the Fire Road between Kariba and Mackay Falls Blvd. In the center of this span there is an area populated by aquatic plants inserted (I believe by ACI after 2017, exact date unknown). There is also a steel rebar driven into the pond bed, just past the planted area. It is believed the stake was driven in by ACI in November 2020 along with 5 others to measure bank erosion. The rebar was set 24" from the pond rim, today it measures 35" from that rim. The plants were noted to be at least 12 to 15" off the bank, and there was a shelf several inches high behind the plants a few inches higher than the non-plant-covered area adjacent to it. It appears that the plants had something to do with retaining this amount of material, but the pond rim appears to have receded (eroded) the same as where the plants were not present. The berm above the planted area experienced a noticeable cut from runoff from the gravel roadbed above; it was unclear if this was before or after the plant material was installed.

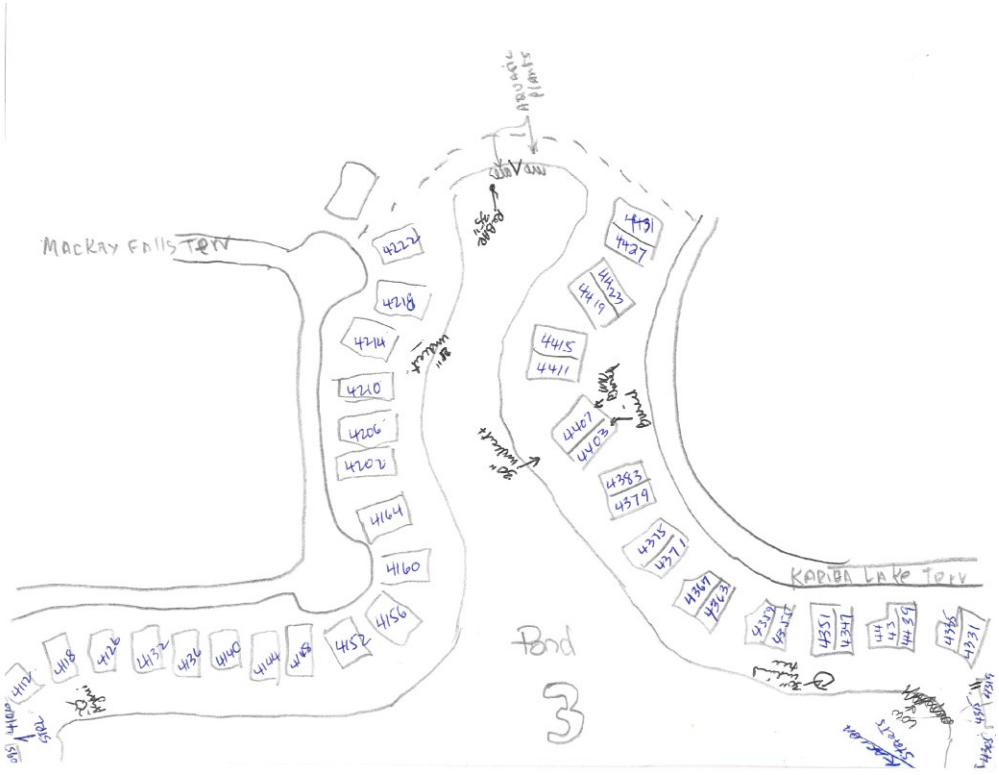
Coming down the west side of the pond along Mackay and Stirling there were similar problems but much less as experienced on the east side. However, the undercut of the banks along the upper Mackay area was far less than along Kariba,

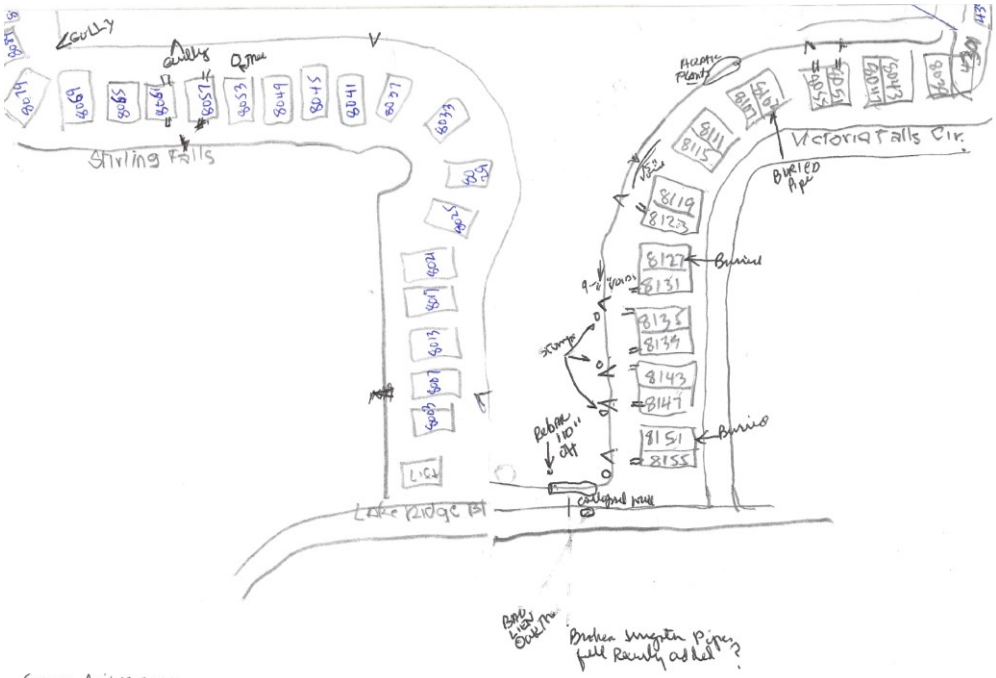
where we measured 28/30" readings. This may be due to larger lots, but the amount of runoff although not channeled by volume could be/or is causing this undercut, which we see eventually leads to sudden bank collapse, like along the Blvd. It is clear that burying pipes will improve the overall erosion problem even here. Along the western side, the pond bends where Mackay meets Stirling; in this area, the homes are bunched and with shorter backyards showing all the problems as Kariba described earlier. Following the pond back to the Blvd several lots are creating specific wash out and should be noticed to bury now. They are listed with the other serious eroders in to do below. All residents with downspouts need to properly bury the pipes.

TO DO: It is obvious that downspouts need to be buried or redirected. Noted during this inspection were units that the unburied downspouts were doing serious damage were Victoria #s 8155, 8147, 8143, 8133, 8135, 8131. 8123, 8055, 8051. Stirling #s 8079, 8051, 8057, 8087. The southern end of this pond along LRF Blvd presents a collapsed pond wall in troubling condition. We need a Mechanical solution proposal.

Also, the live oak trees need to be supported beneath the grass line or removed.

SEVERITY RATING: Average with the exception of the southern rim. This needs to be stabilized sooner than later.





Survey April 10, 2023
R. Dorn

NOT TO Scale
R. Dorn 4/10/23

POND #3 **4/10/23**

Southern side of Pond #3 along LRF Blvd. Bank collapsed. Could have been undercut by wave action, but also a victim of irrigation runoff. Looks like it's been used for dumping landscaping materials as its soggy, full of grass, weeds, and clumps of dirt. Rebar originally placed 24" from bank now measures 9ft from "new" bank due to collapse of original bank. Also visible is one of the numerous tree stumps that can be seen at the water line, or under water, around several ponds. The gentle slope of this Pond would lend itself to using plants to slow erosion.

Southern side of Pond #3 along LRF Blvd. More submerged tree stumps in a line along the southwestern side. Cypress tree sitting halfway beyond the bank has exposed roots on the side from wave erosion and on the top from rain/irrigation. Lower photo shows an exposed sprinkler line.

~bcj |pg. 1

POND #3 **4/10/23**

East side of lower N/S arm Pond #3. Above: Approx 8" deep swale at 8155 Victoria. Downspout not buried.
Below: 2 buried downspouts at 8151 (note the ugly black slime in the pond)

POND #3 **4/10/23**

East side of lower N/S arm Pond #3. Upper: 2 unburied downspouts at 8147 Victoria. Approx 8" deep hole and deep cut in bank (danger area flagged by owner).
Lower: Unburied downspout at 8143 Victoria above an 8-15" gulley in bank.

~bcj |pg. 3

POND #3 **4/10/23**

6 stumps at or under waterline.

9 – 13" undercut cavity from 8139 through to E/W arm to 8055 Victoria

8136 – 8131 Victoria. Unburied downspouts above washout trench & silt build up in pond

POND #3 **4/10/23**

East side of lower N/S arm Pond #3. Bank collapsing at 8131 Victoria. 8127 Stump in water. Silt build-up from collapsed bank

East side of lower N/S arm Pond #3. Dbl buried downspouts. Force of water from buried pipe eroding a trough in littoral shelf. This is an improper way to bury the downspout as it is increasing erosion on pond floor.

~bcj |pg. 5

POND #3 **4/10/23**

Corner of East side of lower N/S arm and south side of eastern E/W arm of Pond #3. 18" cavity at 8123. 24" deep by 20ft long cavity running from 8123 to 8119 (150 – 200 ft?) under a large oak tree.

Corner of East side of lower N/S arm and south side of eastern E/W arm of Pond #3 at 8119/8115 Victoria. 15"x 30" oval shaped hole (possibly a chunk of the bank has separated?) 8" deep hole in the middle of the yard – no cuts or dips around it.

POND #3 **4/10/23**

Corner of East side of lower N/S arm and south side of eastern E/W arm of Pond #3 at 8111/8107 Victoria.
Upper: 22" cavity (L) Close-up looking into the cavity (R) Lower: Aquatic plants on Littoral shelf & no mow zone at 8107

~bcj |pg. 7

POND #3 **4/10/23**

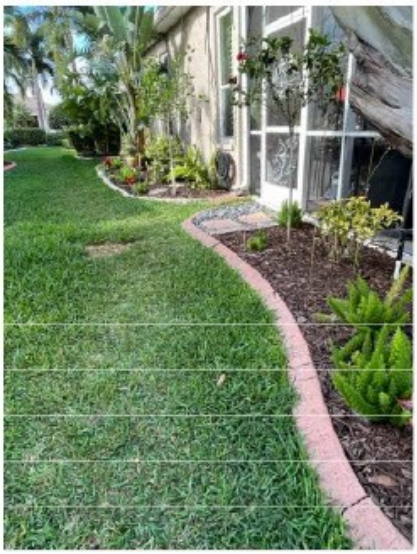
South side of eastern E/W arm of Pond #3 at 8103 Victoria. Buried downspout but the bank is collapsing over the pond exit

South side of eastern E/W arm of Pond #3 at 8103 Victoria. Downspout not buried. Swale leading to a cut in the bank.

~bcj |pg. 8

POND #3 **4/10/23**

South side of eastern E/W arm of Pond #3 at 8051 & 8047 Victoria. Downspouts not buried. 13" deep hole close to 8151 bank edge. 14" deep x 5" high cavity under 8047 bank.



~bcj |pg. 9

POND #3 **4/10/23**

North side of eastern E/W arm of Pond #3 at 4347 & 4351 Kariba. 30"deep x +/- 6" high cavity under large oak tree. Cavity runs approximately 6 ft wide along bank under tree.

East side of upper N/S arm of Pond #3 at 4371 Kariba. Downspout not buried. 30"deep x cavity.

POND #3 **4/10/23**

East side of upper N/S arm of Pond #3 at 4371 Kariba. . Waterline stumps at 4371 & 4403 Kariba (L). Angle of buried downspout at 4407 causing a deep washout rut in pond bottom (R).

North side of upper N/S arm of Pond #3 at crossover. Numerous animal burrows on bank. Loosened soil could lead to erosion.

East side of upper N/S arm of Pond #3 at 4419 Kariba. Buried downspout / 18"deep cavity

bcj |pg. 11

POND #3 **4/10/23**

North side of N/S arm of Pond #3 at crossover. Aquatic plants (L). Rebar stake approximate 35". Original placement was 24". Measurement difficult since there has been some bank collapse.

West side of upper N/S arm of Pond #3. Personal riprap? Or dumping(L)? Gully between 4210 & 4206 Macay; downspouts not buried (C). Waters edge tree stumps (R).

POND #3 **4/10/23**

West side of upper N/S arm of Pond #3 at 4156 Macay. More underwater tree stumps and builder's tiles.

West side of western E/W arm of Pond #3 at 8089 Stirling Falls. Gully.

South side of western E/W arm of Pond #3 Stirling Falls. Row of tree stumps at or below waterline.

POND #3 **4/10/23**

South side of western E/W arm of Pond #3 at 8061/8057 Stirling Falls. 10" hole and gully to cut in bank.

South side of western E/W arm of Pond #3 at 8049 Stirling Falls. Ankle deep holes in yard.

South side of western E/W arm of Pond #3 at 8045/8041. 10" deep gully.

West side of lower N/S arm of Pond #3 at 8037/8033 Stirling. 25" rivulets from bottom of bank to pond. Origin??

POND #3 **4/10/23**

West side of lower N/S arm of Pond #3 at 8033 Stirling Falls. More submerged tree stumps.

West side of lower N/S arm of Pond #3 at 8025/8022 Stirling Falls. Bank collapse

West side of lower N/S arm of Pond #3 at 8013 Stirling Falls. 10" deep and wide gully.

West side of lower N/S arm of Pond #3 at 8007 Stirling Falls. 10" deep holes.

Pond#4

The survey was conducted on May 18, 2023, by the LRF R&G Committee

The pond was surveyed during our dry season. The water was low, allowing a good view of the pond side of the bank, as well as a close in view of the pond bottom.

Pond # 4 is in the shape of a rectangle, with three sides surrounded by single-family units; and the southern side by the mitigation area. On the SE corner of the pond, there is a raised concrete overflow drain that connects the pond directly to the mitigation area and onto the main community drain. The construction documents show a 36" pipe connection. Those documents also show a 36" pipe connection from the north end of Pond 14 via under Stirling Falls Circle into the NW corner of Pond 4. That connection was not observed during this inspection.

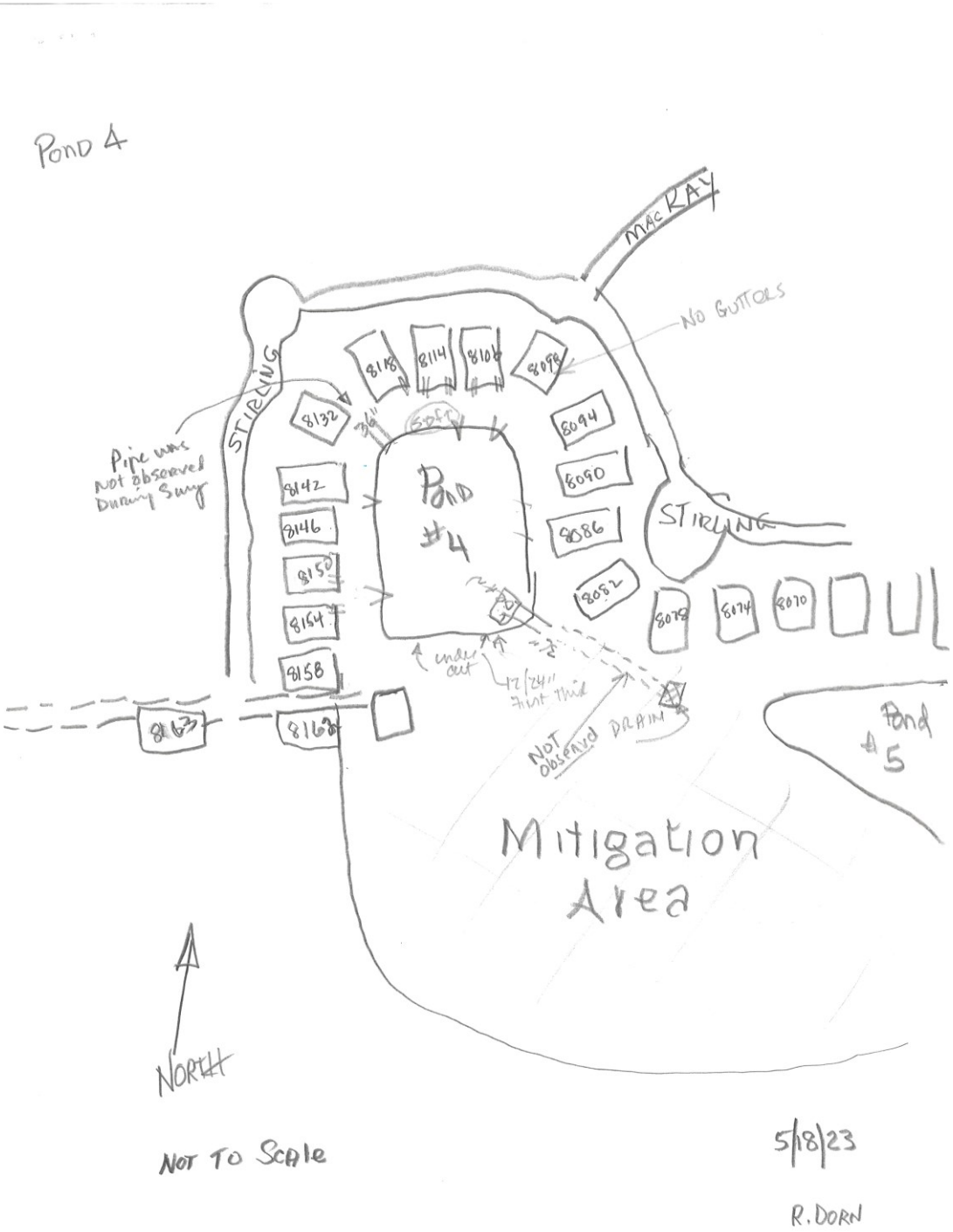
The southern bank, from the SE corner by the concrete drain going west is seriously undercut by from12-24 inches, but only 1/3 of the length of the south bank. The balance of the south bank is only undercut like the rest of the pond less than 10". None of the 13 units surrounding the pond evidences buried pipes, although almost all had gutters and downspouts.

There are bank cuts and erosion damage evident between unit 8150 and 8154, 8146 and 8142, and 8114 and 8106, and finally between 8106 and 8098. Note that 8098 has no gutters or downspouts, but a swale between the two units appears to be feeding the cut, and roof runoff appears to be part of the problem.

TO DO: Encourage the owners of 8150, 8154, 8146. 8142, 8114, and 8106 to bury or redirect their pipes. 8118 and 8114 may also, as an alternative consider re-grading their yards to avoid the present soft spot short of the pond edge.

* The gentle slope of the bank would lend itself to using plants as an inexpensive preventive measure to limit erosion

SEVERITY RATING: Minimal



POND #4 **5/18/23**

The gentle sloping of the pond bank would lend itself to the use of plants as an inexpensive preventative measure to forestall future damage. The area to the left of the overflow culvert has 14 – 24" cavities under the southside bank extending well beyond what is shown in the photo below. This area is of no threat to homes, roads, or sidewalks, therefore a collapse, should it occur would do no harm. Plants could keep it from getting worse.

~ bcj | pg 1

POND #4 **5/18/23**

No holes or cavities found on the southwest or west side but there was a fair stretch of plants along the bank. Also, a tree stump in the water.

POND #4 **5/18/23**

Top: 8046/8042 Unburied drainpipes. Small swale and cut in the bank about 6" deep. Also small divots in the yard.
Bottom: 8018/8014 minor swale hidden by the grass. Multiple small divots throughout the yard.

~ bcj | pg 3

POND #4 **5/18/23**

8014/8006 unburied drainpipes. Minor or developing (?) issues as shown on the previous page. 8098 has a strange cut through the yard with no apparent cause e.g. does not appear to be associated with unburied drainpipes.

~ bcj | pg 4

Pond #5

Survey conducted on May 18, 2023, by LRF R&G Committee

The pond was surveyed during our dry season and fortunately allowed a close-up look at the bottom as well as the lower inside walls of the pond.

The pond is roughly triangular in shape. It is surrounded on the south and west side by the Mitigation Area, and on the other sides, north and east, by the rear of 13 single-family units along Stirling Falls Circle. The western side along the mitigation area contains a weir or dam-shaped structure that is designed to maintain water levels in the protected wetland during the dry season. The weir shows some erosion along the sides where it fits into a berm as well a jumble of loose riprap rocks adjacent to the structure. We should have Eco-Logic advice as to what if anything needs to be done to this feature. The western bank evidences some bank erosion, but no cuts and no undercut of the bank of note.

The north and east sides of the pond that abut the rear of the homes evidences some slight bank undercut of no more than several inches. There are no buried downspouts in evidence and almost all units have roof gutters. There are two bank cuts; one behind units 8070 and 8076, and one behind 8062 and 8055 respectively. Burying pipes here would correct this problem.

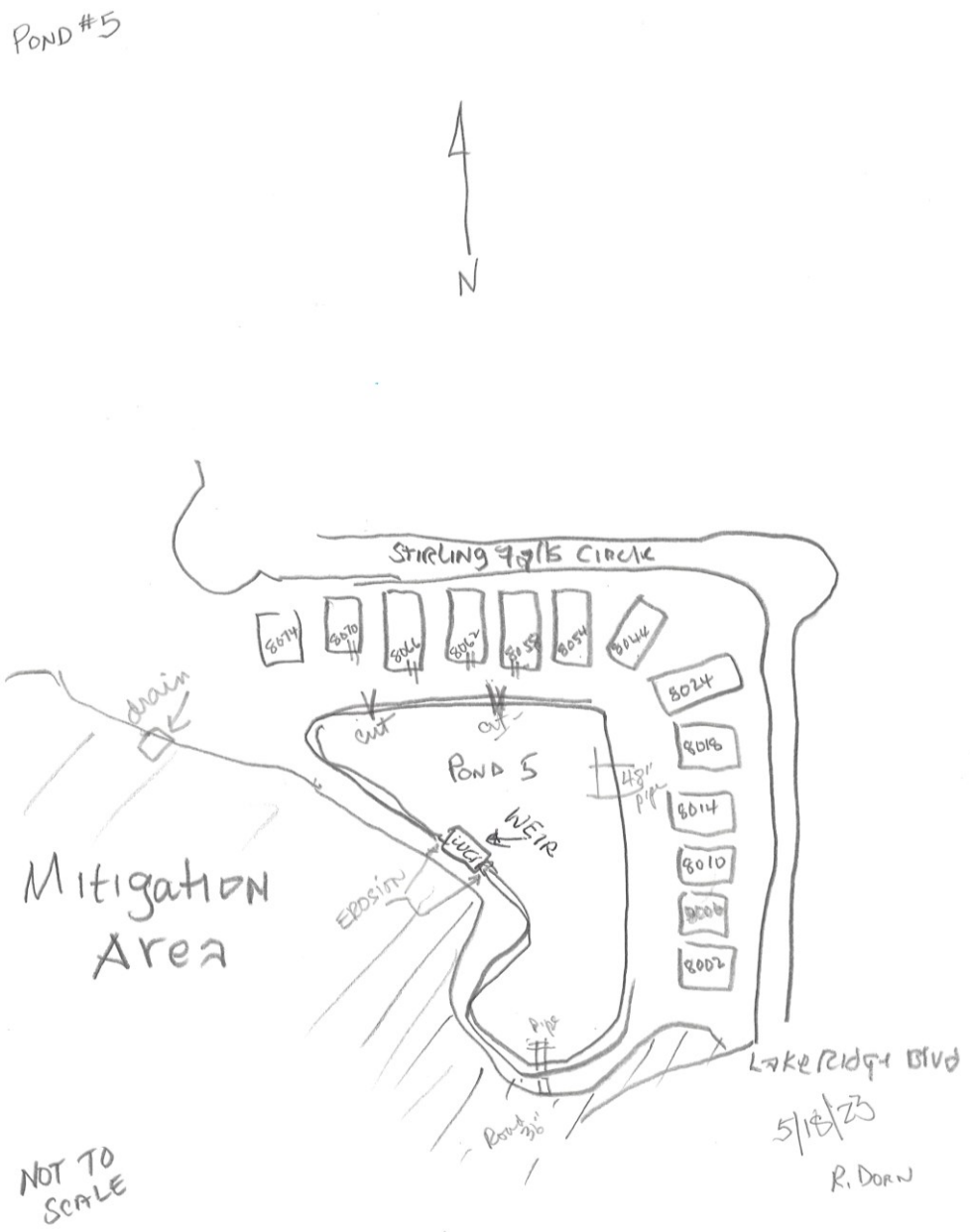
There is a large (48" pipe?) visible in the pond at the junction of units 8014 and 8018: this most probably connects the pond to Pond #3. The connection is difficult to make out from the copy of the original site plan. There is also a 36" pipe that enters the pond from the most southerly point, this most probably connects to a street drain.

TO DO: 1. Encourage owners of units 8070, 8076, 8062, and 8055 to bury or redirect their pipes.

2. Ask eco-Logic advice if anything needs to be done to the weir? (riprap has settled and erosion has made cuts around the out-of-place rocks.)

3. The gentle slope of the bank would seem to lend itself to using more plants as a preventive measure to retard erosion.

SEVERITY RATING: Minimal



POND #5 **5/18/23**

East side: Soil buildup in and around aquatic plants; conduit from street drain on Stirling Falls Cir. 8054 drainpipe is unburied and there's a dip and cut-out in and on top of the bank behind 8054/8058. White pipe behind 8062 possibly connects to pond 3.

~ bcj | pg 1

POND #5 **5/18/23**

Top & middle: Unburied drainpipes at 8062 & 8064 and there's a wide swale and 15" deep cut in the bank. Bottom left: More aquatic plants at northwest corner – soil is captured but weeds are prevalent. Bottom right: border of Mitigation Area on left.

~ bcj | pg 2

POND #5 **5/18/23**

On the northwest side there's frothy scum and a mystery stick; 6 – 8" cavities; soil buildup in and around aquatic plants.

~ bcj | pg 3

POND #5 **5/18/23**

Randomly placed riprap behind overflow gate – or it shifted after installation? Either way, rocks have moved, dirt on the eastside has eroded and channels have developed in the bank which will allow water to bypass the wall and gate. If this is important, it needs to be repaired. Also, there is a 13" cavity under the bank on the east side of the wall.

~ bcj | pg 4

Pond#6

Survey was conducted on May 26, 2023, by the LRF R&G Committee

The pond is rectangular in shape. The south end parallels LRF Blvd. The northeast and west are abutted by the rear yards of 11 buildings, containing 22 units (villas) in the inner loop of Victoria Falls Circle. Due to the water level, we were unable to take undercut measurements; except along the south and a short way on the west and east lower ends. The undercut at the rear of unit 8018 was 18" at unit 8150/8154 the undercut measured 12".

The south bank evidences serious erosion from above; that is runoff down from the berm leading up to the Blvd. Over-watering by the irrigation system may well be acerbating this problem. There is a large Juniper tree on/in the SW corner ready to topple over. The unit at 8154 is adding to this corner's washout. The SE corner is also badly eroded, again partially from above, from runoff from the berm. In this SE corner, there are several Cyprus trees seemingly holding the bank in place.

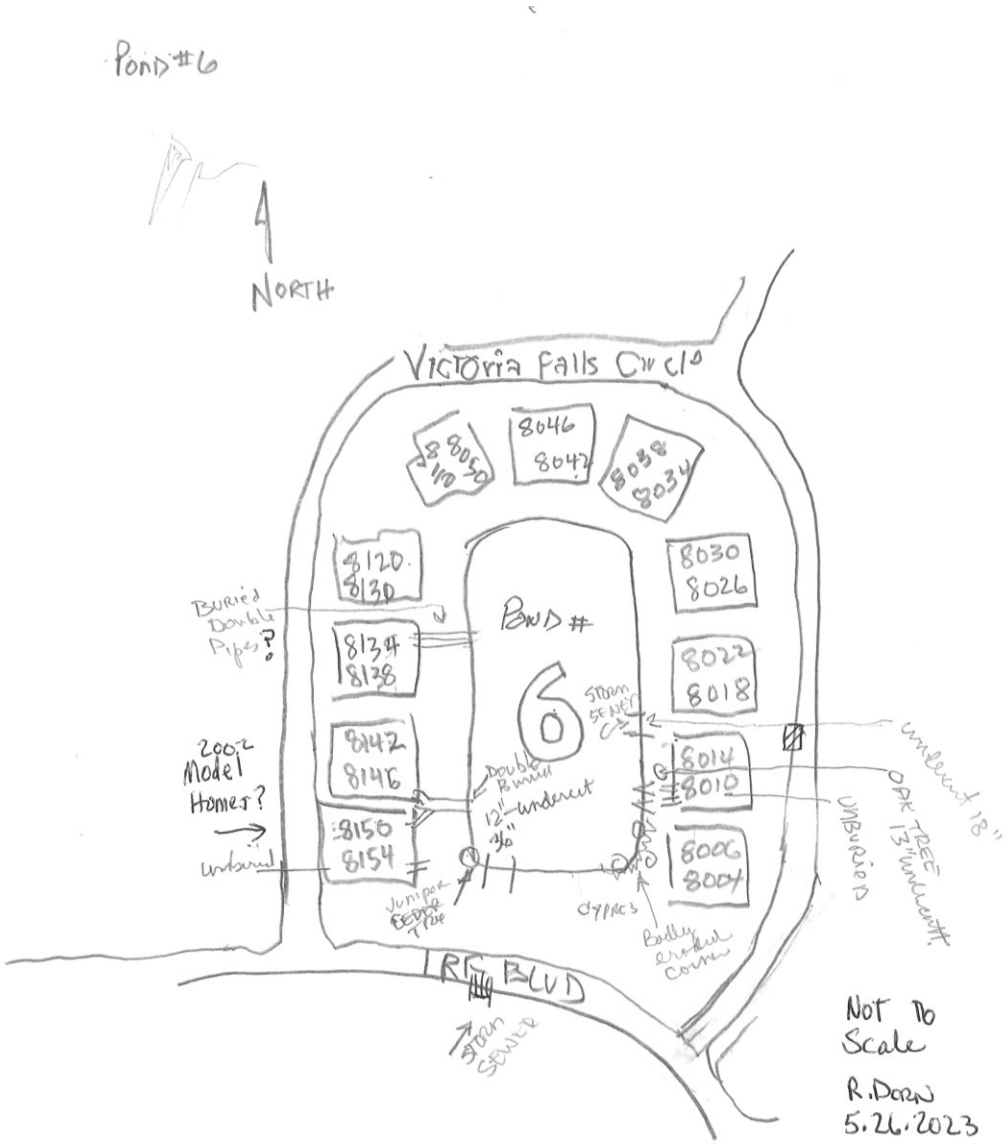
Proceeding up the eastern bank, there are two bank cuts at unit 8010. This unit, like others at this location, have two rear downspouts, one at the outside corner, and the second adjacent to the middle divider wall. No other unit around the pond has cuts directly attributable to the downspouts. Not all units have gutters, and we found that only 2 out of 22 had buried their pipes.

Other than units 8154 & 8010 no other roof runoff seemed problematic. The undercut numbers are troubling but it is not known if the two high numbers are just related to the southern end, or are the same around the entire pond. The south side needs a mechanical solution, which may be as simple as redesigning the irrigation watering at that location. The pond is in reasonable condition except for the southern bank.

TO DO:

1. Encourage Units 8154 and 8010 to bury or redirect their pipes.
2. Get a proposal/plan for a mechanical solution to stop erosion/stabilization at the south bank. We need advice on how to deal with exposed roots on the pond edge without damaging the trees.
3. Evaluate irrigation quantity as well as frequency to determine impact.

SEVERITY RATING: Average except for the south bank, which is serious.



POND #6 **5/26/23**

8 – 12" deep cavities extending 4 or more feet wide undermining the Juniper/Cypress trees on the south side of Pond 6. Lower right picture demonstrates erosion exposing the roots. The erosion is the result of both pond wave action on the side as well as surface erosion due to rain or over-irrigation.

~bcj| pg 1

POND #6 **5/26/23**

Top: Numerous sprinklers (capped?) in the water or at the water's edge and at the base of mature trees. Bottom left: sprinkler (capped) extending 12" past bank edge. Bottom right: Culvert from street drain on Lakeridge Blvd.

~bcj| pg 2

POND #6 **5/26/23**

8010/8014 Victoria Falls Circle: Steep cut and 12" cavity behind 8010; 20" cavity behind 8014

~bcj| pg 3

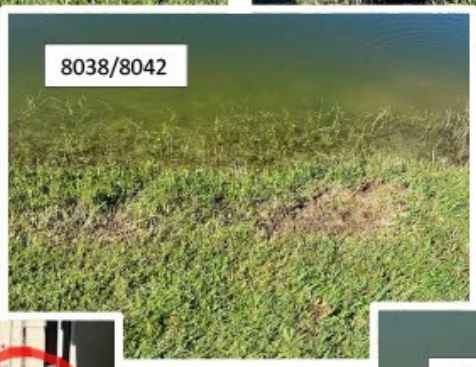
POND #6 **5/26/23**

Top: Two unknown objects in the pond. Bottom left: Possibly Floating Pennywort = invasive. Bottom right: Another example of a thick grass waterfall over the bank edge to the pond. Found in several areas around the edge.

~bcj| pg 4

POND #6 **5/26/23**

Top: Very unusual topography along the pond edge. Littoral shelf very shallow and very wide. Lots of pockets/holes (bottom)? Found on both east and west sides, but most prominent on the east side (below). Middle: Bank destruction of unknown cause (?) between 8038/8042. Bottom: Newly buried double drainpipe behind 8130. Note the poorly reconstructed bank with holes and loose clumps of sod. The soil is sliding into the pond and beginning to cover the pipe.



~bcj| pg 5

POND #6 **5/26/23**

Top left: Buried pipes of undetermined origin behind 8038/8042 whose drainpipes are not buried. Also note the algae. Middle right: Tree stump in the water. Also, more algae. Bottom: Buried drainpipes at 8146/8150 but only one exit pipe could be found the pond. Possibly the homeowners combined drainage to one buried pipe.

~bcj| pg 6

Pond #8

Survey conducted on March 27, 2023, by LRF R&G Committee

The pond was surveyed during our dry season and the water level was low, allowing a close-up look at the bottom and lower side walls of the pond. Photos are attached, taken at the same time they are a good representation of what we found.

The pond is shaped like a lopsided oval. The north and east sides are bordered by the LRF Blvd. The south side cuts off from the Blvd and starts east along an inside loop turning into Cascades Falls Drive. The rear of 4 four-plexs abut the south side of this pond.

This pond was the subject of a project initiated in February of 2022 to begin ripraping what we evaluated as one of the worst eroded ponds on the property. With the exception of 4283 Cascade, all units abutting the pond have buried their downspouts and erosion damage was repaired. The ongoing erosion backfill where repaired is slightly settled but does appear to have at least slowed down the erosion process a full year on.

It was however noted that the riprap was not, we believe, backed by biofabric which will allow some continued erosion past the pond edge in the future. It was also noted the rocks were placed too steeply and some have begun to slide beyond their original placement.

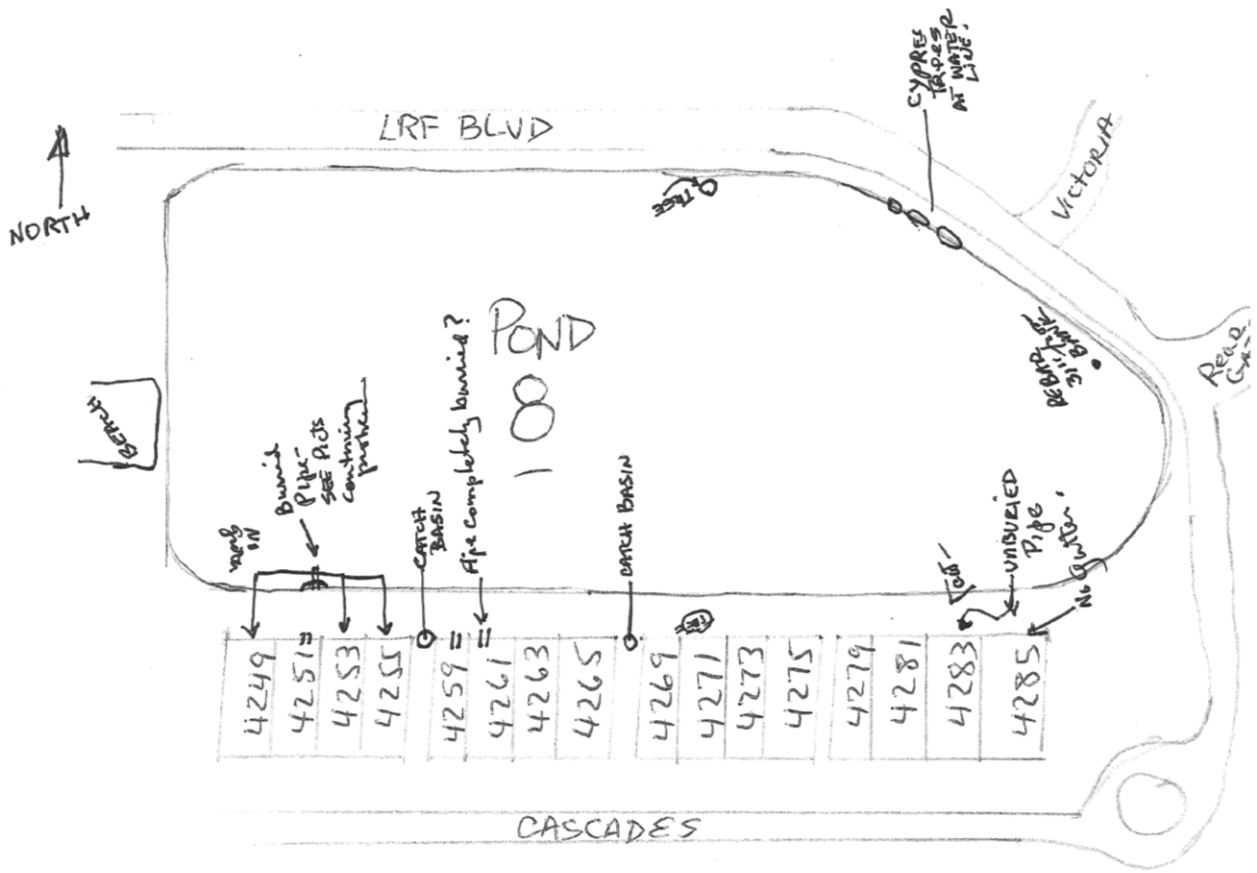
The catch basins between the buildings seem to be helping dispense swale water. Some settlement has occurred since the installation of the riprap and more backfill seems called for to fully restore damaged cut areas.

The west side of the pond is bordered by our own sand beach, and that bank evidences moderate erosion.

The north side of the pond and the east side evidence serious erosion and loss of pond bank, both from runoff down from the roadway, as well as inner wall collapse. The cedar trees along the pond rim are out past the pond edge. A piece of rebar driven into the NE corner of the pond in 2020 evidences 7 more inches of erosion from that date to the present measurement.

TO DO:

1. Continue to monitor the areas addressed.
2. Explore the possibility of extending the riprap to the open gaps along the south side. We need to consider an esthetic mechanical solution for the entirety of the north and east sides of this pond.
3. Invite the owner of 4283 Cascades to bury his downspout.
4. Add additional backfill to the cuts previously repaired.



POND #8 **3/27/23**

South bank behind Cascade multi-units with and without buried drainpipes. Riprap installed in several places several years ago to stave off the erosion. In most places where drainpipes have been buried, including where riprap was installed, continued erosion can be seen evidenced by silt build-up extending into the pond submerging the end of the pipe, and the troughs dug to bury the pipes have continued to erode and sink leaving dips and cuts in the grass. Use of a geotextile fabric under the riprap could reduce or eliminate continued erosion.

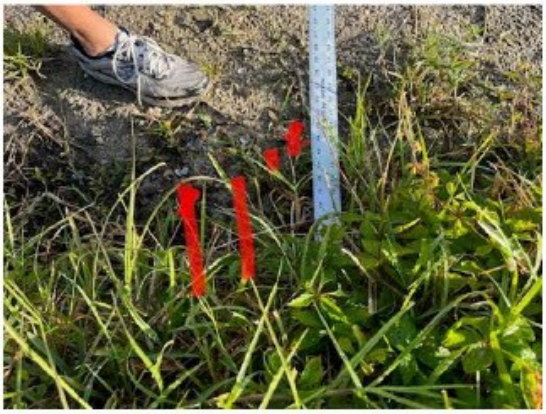
4251 Cascade: Buried drainpipe. Continued erosion has almost covered the drainpipe with silt after the pipe was buried.

Catch basin & riprap added 4255/4259. No geotextile used under riprap. Continued erosion through rocks (silt build-up)

POND #8 **3/27/23**

4259/4261. 2 buried drainpipes. Continued erosion after burying evidenced by silt buildup.

Riprap is crumbling. No geotextile bedding underneath will permit grass and weeds to grow through the riprap. Multiple small holes in the upper bank. 11" cavity under the bank (maybe the cause of the multiple holes on top of the bank). Riprap crumbling after only 2 years possibly indicates it was placed too steeply or not secured in place.



POND #8 **3/27/23**

4263 Buried drainpipe (different contractor?) shows no continued erosion or recurrence of previous cut in the bank pre-burying. We should find out the contractor used and inquire about his methods.

Catch basin installed between 4265/4268, also riprap. Continued erosion from trough through riprap caused bank to sink. Someone filled the hole with decorative white landscape rocks?? The left side of the riprap/bank is collapsing, and pipe is partially buried.

~ bcj | pg. 3

POND #8 **3/27/23**

4269 & 4271 have buried drainpipes, but continued erosion has almost completely blocked their pond exits. To the right of 4269's drain exit is a small furrow carved by water exiting the bank…reason or origin unknown. 4271 has a 12" deep cavity under the bank.

4269

4271

POND #8 **3/27/23**

4273 buried – erosion depositing silt and partially blocking opening.

4275 buried drainpipe

4275 Continued erosion depositing silt, partially blocking opening. Riprap slipping down slope into the pond.

4275 12"deep cavity under bank.

POND #8 **3/27/23**

4275/4279 Catch basin and two buried drainpipes above riprap. Continued erosion through the riprap evidenced by sunken bank above riprap and silt buildup in pond. *Note:* Three separate trenches were dug to the pond; one for each drain and one for the catch basin pipe. Running the drainpipes to the catch basin & digging a single trench to the pond would have been less destructive especially since the bank was already compromised by severe erosion.

4281 buried drainpipe/continued erosion/silt around pipe opening.

4283 buried. 4285 No gutter

POND #8 **3/27/23**

4283/4285/SE corner of Pond 8. Large wash out swale coming from house & street. Multiple holes 8 – 12" deep.

NE corner of Pond 8. Significant erosion around cypress trees both from pond wave action as well as from the top by rain or over irrigation. Closest tree trunk is almost completely off the bank. Rebar placed 24" from the bank several years ago now measures 32" from the bank = 8" lost bank due to erosion.

POND #8 **3/27/23**

North side of Pond 8. Significant erosion around and under many of the trees.

North side of Pond 8 across from 8154 Victoria. 16" deep cavity under the bank with signs of bank collapse below planted bed. Evidence of animal burrows that can increase soil instability and erosion.

POND #8 **3/27/23**

Northeast side of Pond 8 across from Victoria. More trees suffering from topside erosion (rain/irrigation) and wave action below.

My summary note: Based on what's been seen on this Pond 8 survey, homeowners should be encouraged to obtain guidance before burying their drainpipes. Many of the methods used have not proven to be an overwhelming success. There has been continued erosion post burying leading to the reemergence of gully's, swales, and holes. Also, the buried pipes are at risk of becoming buried themselves from the newly deposited silt. Clearly consideration should be given to other methods to minimize erosion from drainpipes. Directing drainpipes, where possible, to existing drains or catch basins, or to the street would lessen the impact on the fragile banks. Asking homeowners to share a drainpipe would also reduce trauma. The fewer cuts or disturbances that can be made in the yards and banks the better.

1. Serious evaluation should be given to the use of geotextile fabric beddings under any new riprap to minimize continued erosion.
2. Contact homeowner's whose buried drainpipes have not led to continued erosion and find out the contractor and methods used so they can be recommended to upcoming homeowners.
3. Investigate fill methods and materials with an eye on increasing stability and reducing secondary erosion.
4. Investigation into irrigation system to insure the amounts of water laid per cycle (especially at the pond edges) is sufficient to maintain the landscaping but does not contribute to topside erosion.

Pond#9

Survey conducted on March 10 and 13, 2023, by LRF R&G Committee

This pond was surveyed during our dry season and fortunately allowed a close-up look at the bottom and lower areas of the pond sides.

The pond is of an odd shape but four-sided. The north side runs along the Cascades Falls Dr., the west side runs along the open side of Ashford Falls Court. These two sides evidence some erosion with cavities 8-13" extending along 20 feet on the north side and including lower wall settlement. The cavity is large enough for a family of 6 ducks to hide under the ledge. Where the rear of Simpson meets Cascade there are multiple deep washouts. The largest is approximately 13" deep x18" wide x 3 feet to the water (photo). There are also areas of collapsed banks. Also, on the west side, there is the entry of a pipe that carries runoff from a catch basin located along Ashford close to the SW end of the street. The basin (located in the center of the road) itself is at a low point and the erosion around the pipe is most likely caused by fast-flowing water after a downpour that is beyond the catch basin's capacity. Some rocks and fill are needed to plug this hole that measured 16" deep.

The south side of the pond runs along the concrete footpath that lines the southern boundary of the community. The bank evidences its share of erosion (up to 16" and 30" cavities) caused by runoff across the pathway and the berm above the walkway, up to the wall between the pond, and Walmart to our south. The source of this runoff is not clearly evident to the survey crew. The impact of the irrigation system needs to be evaluated before we can decide on an appropriate fix here.

The east side of the pond is bordered by the rear of a six-plex, that fronts on the east side of Simpson Falls Court. Each of the six units has gutters and downspouts. Unit 8228 is in the corner and has a downspout on the south side of the building. The 3 middle units have just recently buried their pipes between the units

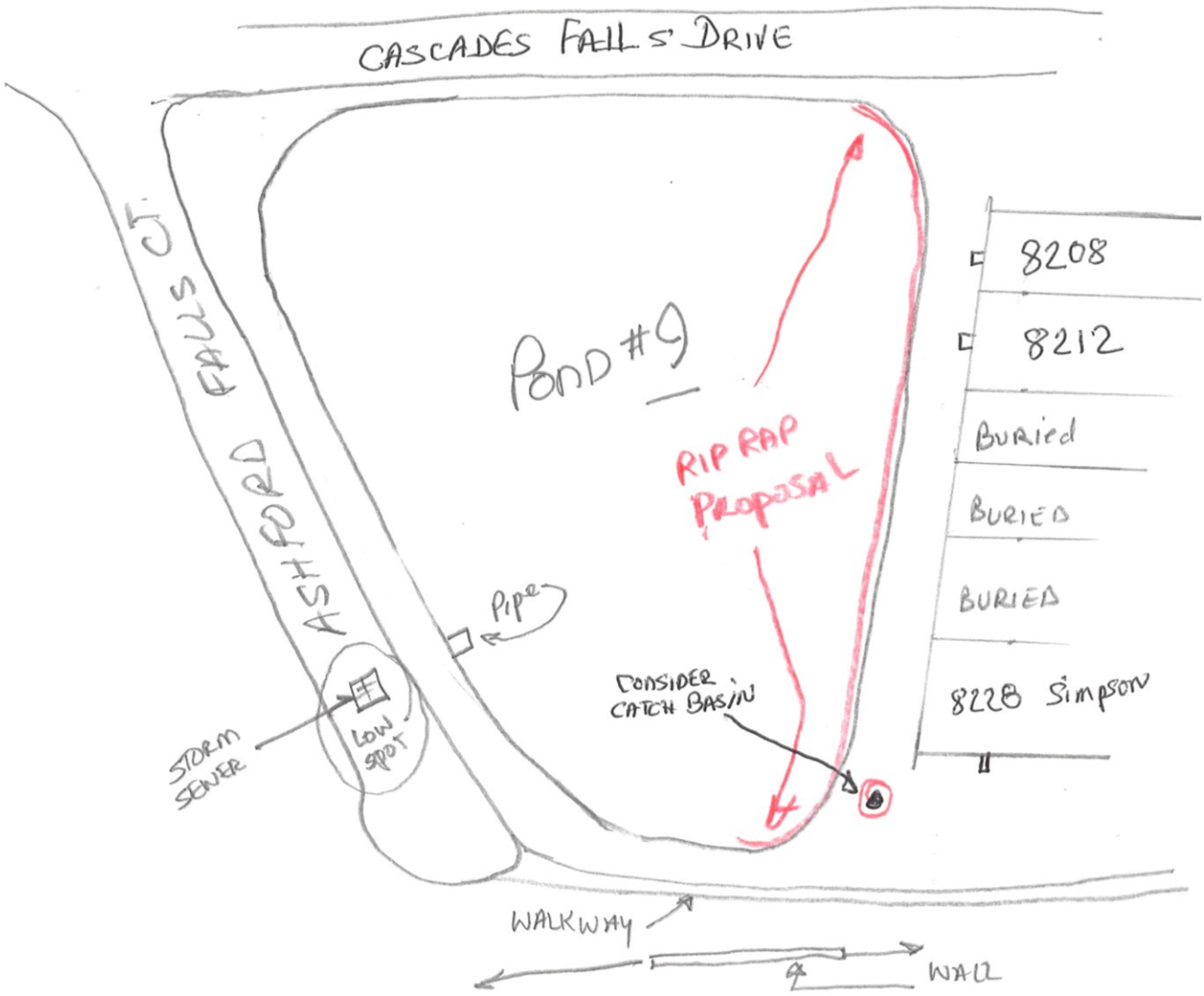
and the pond. Three owners have yet to bury their pipes. All six (6) units evidence considerable washout at the edge of the water. The pipes that are buried are at a 180-degree angle directly to the pond. It was noted the path of erosion followed the roll of the land, not in every case the straight line to the water. It was noted the 3 pipes at the pond end were dead-headed into the muck at the pond bottom. This "burying "could also be continued erosion after the pipes were initially buried. (See our suggestions as to how to properly bury pipes.)

The large pipe in the SE corner of the pond has some rocks near it that were used to hold a cap during previous work; those rocks could be repurposed to fill in the erosion damage along the south side of the pond. Above the large pipe, there is a swale; it appears to be caused by flow from across the walkway and mixes with the water from the side downspout from unit 8228 Simpson, the area just off the back corner of that unit. This may be a good place for a small catch basin as used in Pond 8 between the buildings in that application. (See handwritten field notes for location)

TO DO:

1. Encourage the owners of 8208, 8212, and 8228 Simpson Falls Court to have their pipes buried: 8208 and 8228 should consider joining their buried pipes with any catch basin that goes into the pond corners. All pipes should be buried or diverted before any remediation of the damage caused in the backyards is attempted.
2. Consider installing a catch basin in the SE corner of the pond slightly below the swale described above; consider a catch basin as used in Pond 8.
3. Reuse rocks in the SE corner, to fill in deep washouts.
4. Need to evaluate the impact of the irrigation system on the erosion here, especially along the south side. Need to explore as well the use of ground cover plants along this side.
5. Once the cause of the erosion on the south side is clear we need a plan to fix it.
6. Find a new home for the 6 ducks

SEVERITY RATING: Average



NOT TO SCALE

R. DORN
3/19/23

POND #9 **3/10/23**

Corner Ashford & Cascade: Across from 4251 – 4255 Cascade, soil erosion has caused 8 – 13in deep cavities under the edge, extending as far as we were able to reach. The cavity is large enough for a family of 6 ducks to swim underneath the ledge (at circle)

Across from 4159 – 4165 Cascade, there are multiple 4 – 6 in depressions 2 - 4ft from edge likely caused from soil erosion underneath the grass. Unable to evaluate the ledge at water's edge due to water level in pond. Across from 4165 there is a large erosion cut at water's edge.

POND #9 **3/10/23**

Corner Cascade & Simpson Falls: Multiple deep washout notches. The largest (1) is approx.13"d x 18"w & 3' to water. Unsupported 11in deep cavity under ledge at arrow. Unburied downspouts behind 8208 & 8212 Simpson. Water from the road could be contributing to the washout areas due to significant slope & trough.

POND #9 **3/10/23**

8216, 8220 & 8024 recently buried their downspouts. Don't know if the ground was filled flush after the spouts were buried or if the loosened soil caused by burying the spouts allowed continued erosion, but additional backfill is needed to fill holes and washout cuts still present where the spouts were buried. There is evidence of collapsed ledges (arrows), perhaps caused by erosion carving out cavities under the edges as shown in previous photos. The whole length of this side of the pond is riddled with 4 – 6" holes.

POND #9 **3/10/23**

SE Corner Simpson and sidewalk alongside of 8228 Simpson. Long and deep washout crevasse adjacent to the riprap that covers a previously buried concrete stormwater pipe coming from the road. 8228 also has an unburied drainpipe.

SE Corner Simpson and sidewalk alongside of 8228 Simpson. View below shows 3 buried drainpipes, the large washout next to the concrete pipe, and the location of a 16" deep cavity under the ledge.

POND #9 **3/10/23**

Mid-way along sidewalk side of Pond 9 we measured a 16" deep cavity under the ledge with a close-up inside. At the SW corner with Ashford Falls we took another cavity measurement with a close-up that measured .

At the SW corner with Ashford Falls we took cavity measurement of 32".

POND #9 **3/10/23**

SW corner with Ashford Falls we measured a 13" hole by the buried concrete storm drain along with several other smaller holes.

Pond # 10

This Survey was conducted on May 24, 2023, by LRF R&G Committee

The survey was conducted during our dry season, but the water level was at approximately its normal level. This pond supports the Irrigation system and its engineering will be explained in further detail later in this report. The pond is rectangular in shape with a bluntly rounded eastern side.

The north side of the pond abuts the Clubhouse, separated by a concrete walkway, and a dense hedge above a short slope covered by grass. The Clubhouse itself has gutters and downspouts. The pipe off the SW corner of the building is buried, and its terminus is barely visible in the pond below. The pipe off the SE corner of the building is not buried, and the runoff across the walk and beneath the hedge is causing erosion at the pond edge below. There is a third pipe off the rear of the building that was installed by the 2019 general contractor Mathews, that was designed to move water from the rear roof area, that originally went to the parking lot, toward the pond instead. This pipe is causing erosion at its terminus at the pond edge.

The south and southeast sides of the pond are abutted by the rear of 4 buildings that face Cascades Falls Dr. The 4 buildings each contain 4 separate villas. 15 of the 16 villas have gutters and downspouts, and one villa (unit) is without either. 5 units have presently buried their downspouts. There is a deep edge cut in the eastern end of the pond; the unburied pipes from units 4237,4239,4241 have either caused or are acerbating this cut.

There is also a serious cut further along the south side at the bank behind units 4211 and 4215. At this location, these two units are on either side of the third and fourth buildings. These two units have buried their pipes but have not repaired the damage, it is unknown when these pipes were buried. In addition, unit 4211 has not

buried the spout from the side of that unit that appears to feed toward the bank. The "alleyway" between these two buildings supports a 6" pipe coming from the direction of Pond 11, which we believe is the feed line from the

Well located next to Pond 11. The line is clearly visible, in the pond, feeding toward the irrigation station on the opposite bank. The alleyway also contains a 26" concrete pipe, obvious at its termination, leading from the street storm sewer along Cascades Dr., some or all of these unassociated pipes could be adding to this erosion, The most westerly unit # 4205 has an unburied downspout on the side of the building that appears to be adding to a cut behind that unit.

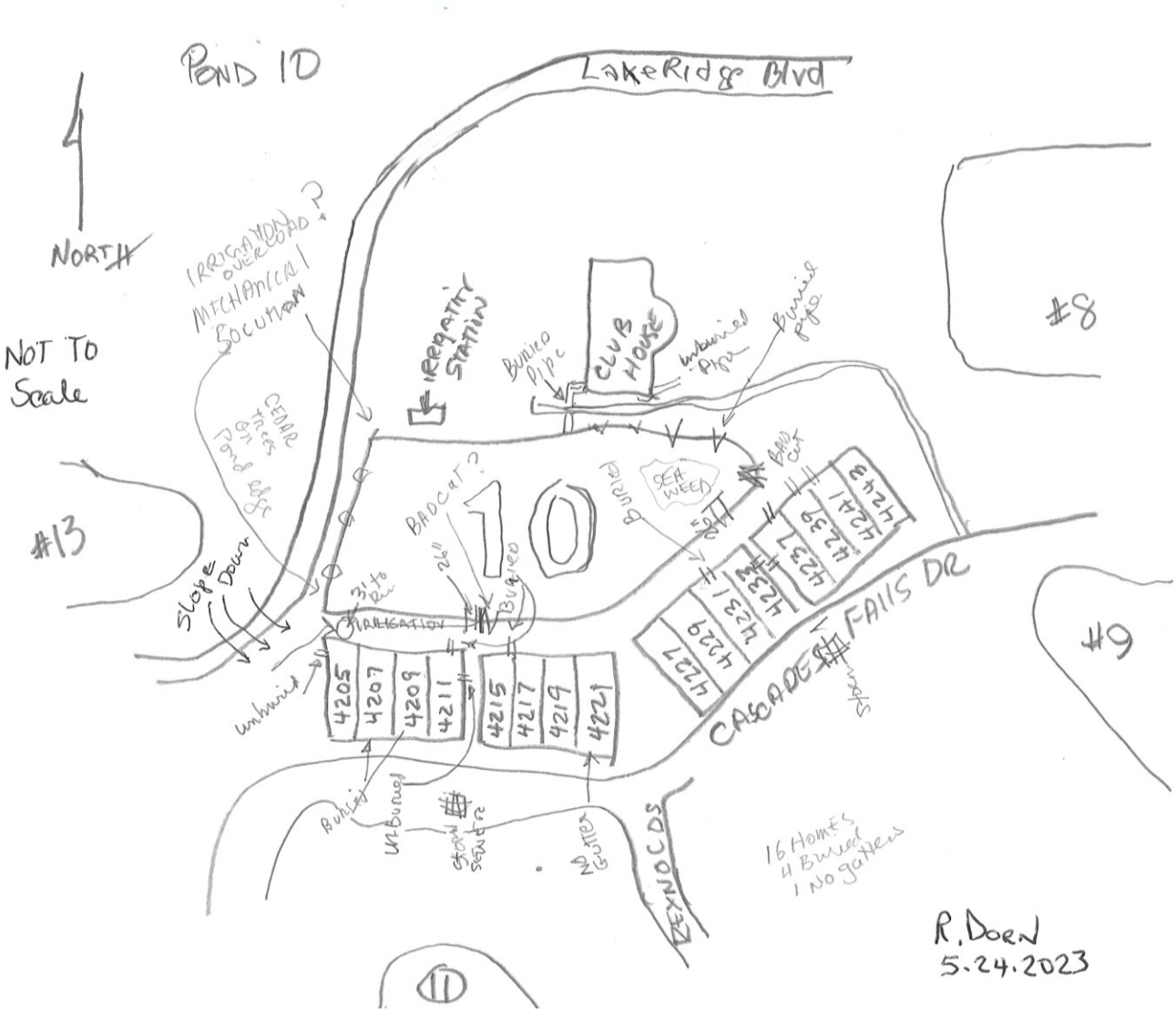
The west side of the pond is adjacent to LRF Blvd. The bank has receded back to a line of Cedar trees whose roots alone seem to be holding back the bank. This area could be suffering from excessive irrigation watering as well as bank undercut. This Bank is in need of a Mechanical solution to reinforce its stability and check further erosion. As to a mechanical solution, riprap would seem a rather severe solution.

Note: This pond has been specifically engineered to always have a ready source of water available to operate the Irrigation system. The intake to this pond is rainwater as well as the 6" pipe coming from the well located along the west side of Pond 11. The normal outflow is via the irrigation system; alternatively, by overflow via a Weir built into the line on its way to Pond 8 and then back into the community overflow system. The only other water intake appears to be from street catch basins. It was noted that the pond, unlike any other examined, was rich in invasive plant material. The unusual water movement is probably allowing the excessive bad nutrients and plant life a longer time frame to grow with possible negative effects such as, the present clogging of the Irrigation system's intake.

TO DO:

1. Downspouts from the rear of units 4237, 4239, 4241, and side spouts from units 4211, and 4205 are currently adding to the erosion, and owners should be encouraged to bury or redirect their pipes.
2. The pipe from the SE corner of the clubhouse should be buried under the concrete walkway and into the pond.
3. The west side of this pond needs a proposal for a mechanical solution to stop erosion, stabilize the bank, and possibly save the existing trees.

SEVERITY RATING: Average, with the exception of the west bank.



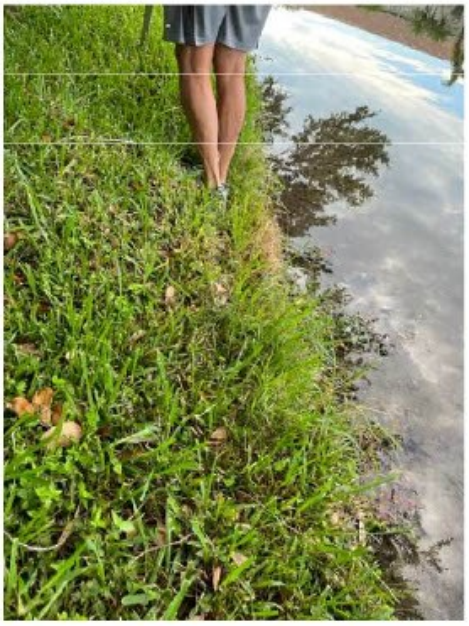
POND #10 **5/26/23**

Too much water in the pond to walk the littoral shelf and determine the condition of the side of the bank. Top: Large patches of underwater plants - possibly Vallisneria - primarily on the north side of the pond. Vallisneria is highly invasive and should be removed or controlled. Bottom: Submerged grasses extending almost halfway across the pond on northeast side

~bcj | pg 1

POND #10 **5/26/23**

North side: The bank is soft & mushy with many small holes and has collapsed in some places mainly below the shrub plantings. Possibly the result of over watering.



~bcj | pg 2

POND #10 **5/26/23**

Top: Clubhouse drainpipe is buried and runs under the sidewalk and plant bed. Deep cut hidden by grass from plant bed to the barely visible pipe exit in pond. Bottom: Soft, collapsing bank.

~bcj | pg 3

POND #10 **5/26/23**

Top: 4237/4339 have unburied drainpipes. 8in deep by 8ft wide cut/swale filled with holes marked by flags. Bottom L: 26" cement culvert from road drain Bottom R: 4229 mystery water-filled garbage attached to the bottom of the drainpipe.

~bcj | pg 4

POND #10 **5/26/23**

Top: 4231 has a buried drainpipe & no cut in bank. Middle & bottom: Newly buried drainpipe. Lower left: Note the poor bank reconstruction with loose sod/soil eroding into the pond already and beginning to cover the pipe.

~bcj | pg 5

POND #10 **5/26/23**

Top: 10"deep swale between 4215/4211. Bottom left: Blue buried pipe from 4211; 26" concrete culvert from street drain; white pipe from the well in pond #11. All three have signs of continued erosion with sagging ground and soil beginning to cover the pipes. Bottom right: mini "no-mow" zone?

~bcj | pg 6

POND #10 **5/26/23**

Top: The pond exit of the buried drainpipe at 4209 is completely blocked by continued erosion causing the rain water to back up and overflow the connection. This has resulted in a large hole around the pipe that extends under the foundation.
Bottom: Buried drainpipe at 4205 exits in the lawn 6ft from the pond edge. Exit is filled with grass and soil.

~bcj | pg 7

POND #10 **5/26/23**

4205 Drainpipe is not buried. Soil erosion not caused by wave action but by top side erosion due to rain or excess irrigation has left bare ground and exposed tree roots. Lower right: : Frothy pond scum

~bcj | pg 8

Pond # 11

Survey conducted March 10 and 13, 2023, by LRF R&G Committee

The pond was surveyed during our dry season, and the water was at a low level, allowing a good view of the pond side of the respective banks, as well as the close-in view of the bottom.

The pond is of an odd shape (see attached diagram), basically, a rectangle with the NE corner contoured around the well surround. The lower east side of the pond follows the concrete walkway along the southern Wall of the Community, and the southern end of the pond continues along the path and wall. The lower east side and south side of this pond show serious ongoing erosion from berm run-off, as well as wall settlement inside the pond itself. Erosion from the berm appears to begin to wash out and/or undermine the concrete walkway in spots. In November 2020, rebar was driven into the bottom of this pond at a location off the south side of this pond to measure erosion going forward. The rebar was inserted 24 inches from the lip of the pond edge. On current inspection, the distance measured 38 inches from the same two spots. (There were two rebars in the location on our visit?)

The west and north sides of this pond are enclosed by the rear of five (5) fourplexes, following Cascades Falls Blvd, three along the west side, one along the north side, and one finally along Reynolds Falls Court, along part of the east side.

On the west side of the pond, there are three buildings (fourplexes). Starting from the southwest corner of the pond, the first building has two units with downspouts leading to the pond. The other two units have no gutters installed. The first unit, 4136 Cascades, downspout is located on the south side of the building and along with water draining off the side yard, is mixing with the runoff across the walkway and causing a cut at the corner of the pond. Along with burying the downspout, a catch basin to control the corner appears warranted here. In fact, not

only burying the pipe but connecting it to the adjoining catch basin here would eliminate another pipe entering the pond. The adjoining unit, 4138, needs to bury its pipe.

The next building has two recently buried pipes and the two end units, 4146 and 4152, with unburied pipes. There is no indication the owner of one recently buried pipe has attempted to address the previous damage from the downspout. The two outside units need to bury downspouts or redirect their flow, and along with a third, need to repair the resulting damage. There is a swale between this building at 4152 and the adjoining building at 4156. This seems a proper location for a catch basin between the buildings. Combining or joining several of the pipes in this location before entering the pond should be considered.

The third and last building along the west side is a fourplex. Neither end unit 4156 nor 4162 has buried their downspouts. Unit 4158 has no gutters and 4160 has recently buried the spout but has not repaired a massive cut at the edge of the water. 4162 is the last unit on the west side of the pond; the corner of the west and north side of the pond has been a problem with washout for some time. The community has on two occasions attempted to fix it but without success. The corner is fed surface water from two downspouts from unit 4162 to the west, and two unburied pipes from unit 4204 and 4206 from the north, as well as flow from the Cascades Road bed across a large corner lot. In addition to burying the pipes a decent size catch basin above the corner may help. Here, it may be possible to join some of the buried pipes in groups, including catch basin pipes, to minimize pipes entering the pond.

The north side of the pond is flanked by a fourplex, none of which has downspouts buried. There is serious erosion going on both evident by cuts at the water edge, as well as undermining evident around several trees on the properties. All these units: 4204, 4206, 4208, and 4210 Cascades need to bury pipes.

As Cascades Falls proceeds past unit 4210, the road meets Reynolds Falls Court and so the pond edge turns east following the rear of a fourplex along Reynolds. The first unit, 8206 Reynolds, has gutters and an unburied downspout off the west side of the building. Similar to the issue on the NW corner, the two flanking unburied pipes in the NE corner, from 4210 Cascades and 8206 Reynolds, combined with storm runoff from the adjacent roadway, are causing a serious erosion cut at that corner of the pond. The other three units on the Reynolds building are far enough away from the pond that no obvious surface erosion is evident. From this point south around the well enclosure, no obvious drainage erosion is evident until one meets the southern walkway. 8206 Reynolds needs to bury or redirect the downspouts.

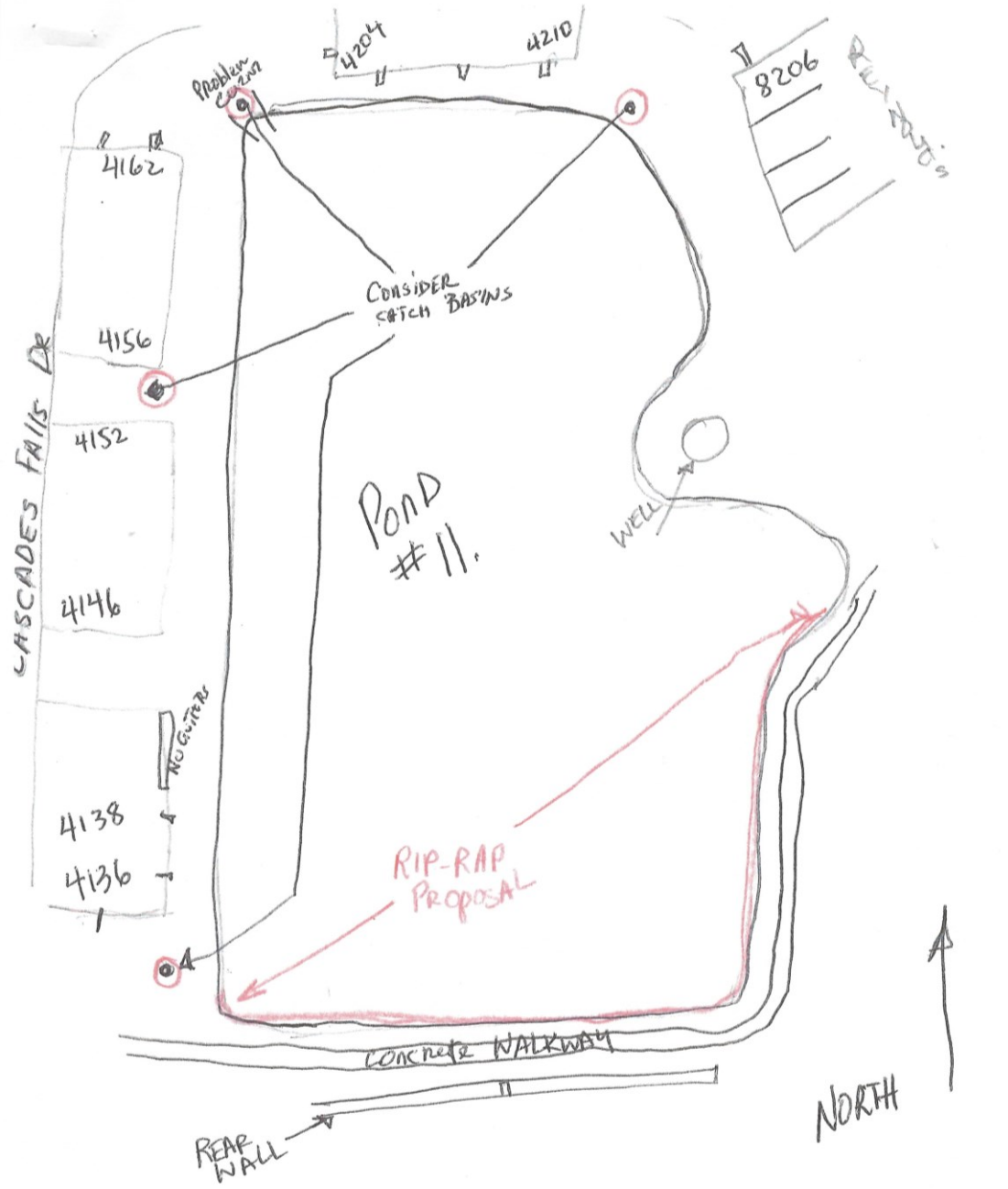
TO DO:

1. Encourage all owners noted to bury or redirect the downspouts away from the pond. Consider catch basins similar to those installed in Pond 8. Buried downspout pipes should be joined by other close pipes to cut down on the number of pipes entering the pond.

2. Obtain a proposal for a mechanical solution to stabilize the south and lower east sides of this pond.

*NOTE The south and lower east side of this pond (Community property) has a gentile slope that might support a plant solution. i.e., erosion is coming from above. At this point, the reason is a mystery. Perhaps it is, as suspected, over-irrigation? We can not fix it until we solve the why? We should consider a change in irrigation and possibly a ground cover to either absorb or force the runoff along?

SEVERITY RATING: Above average



NOT TO SCALE

R DORN
3/19/23

POND #11 **3/10/23**

NE corner Cascade & Reynolds Falls. 10" cavity under bank behind 8206. No buried drain spouts on 8210, 8214, & 8216. Many indentations in the backyards, but no significant erosion marks seen on the surface from the drainpipes, nor cuts at pond's edge.

Unusual indentation along the bank edge behind 8210, 8214, & 8216. Could be from the mower, (but why only one indentation, a mower should leave two?). Beyond that adjacent to the pump the ground is very mushy, and the bank may be beginning to collapse (4" fall off along edge). Unable to determine if there are undermining cavities at the water line.

POND #11 **3/10/23**

Just past the pump at the first bend by the sidewalk there is more evidence of bank collapse. The drop-off follows the same line as the indentation seen in the previous photo and there are a 10" & 12" cavities measured under the bank in several places.

Along the first bend by the sidewalk there are 5"x15" holes, trenches, and erosion under the sidewalk. Multiple little holes along much of the bank look like animal burrows. These would make the soil very unstable and, with heavy irrigation and rain, likely contribute to topside erosion.

POND #11 **3/10/23**

The animal burrows continue down the East wall after the bend all the way to the South wall. The entire eastern stretch is riddled with holes & burrows, and the waterline is collecting grasses, weeds, and algae. These are representative photos. There are too many holes to photograph all. The sidewalk is undermined/washed-out in several places as much as 6"d x 10"w due to runoff from the slope alone the East fence making erosion cuts to the water. This can only be from rain and over-irrigation as the pond does not reach this high.

POND #11 **3/10/23**

17" hole at lower Southeast corner. Rain or irrigation from the slop is undermining sidewalk down(right photo) to the bank. Bank below sidewalk has collapsed (upper circle and middle) .

15" deep vertical hole (left) & 9" deep horizontal cavity (middle & right) along south bank below sidewalk washout

~bcj | pg. 4

POND #11 **3/10/23**

South side along sidewalk: 2 Rebar markers, originally placed at 24". One is 6" and one is 35" from bank.



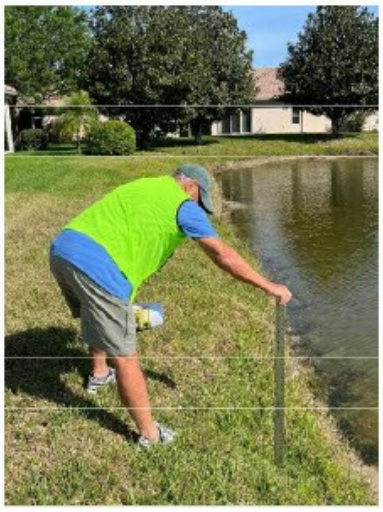
Southwest corner behind 4136/4138 Cascade. Bank collapsing and numerous 6 – 9" holes. Unburied side & rear drainpipes.




POND #11 **3/10/23**

4148 Cascade. Buried drainpipes. Owner has marked off wide area that is soft, depressed & lumpy. Continued erosion after burying and backfilling has completely covered & blocked the drain pipe exit in the pond.

Bank drop-off/collapse behind 4152 & 4156. Evidence of erosion under the bank at the water line across the pond by the well.



POND #11 **3/10/23**

18" deep washout behind 4160 Cascade. Drainpipe not buried.

Northwest corner, Cascade & Cascade, a large swale between the buildings has been repaired several times. Apparently unsuccessfully as significant erosion persists. While drainpipes may contribute to the swale, it's clear that over-irrigation/rain must play a part. Perhaps a catch basin or terracing might reduce the impact of flow from drainpipes and road.

POND #11 **3/10/23**

North side behind 4206 Cascade. Drainpipe not buried. A large Magnolia tree has significant washout under and around the roots. 25"deep hole vertically and a 35" cavity horizontally beneath the roots! An arborist should check the stability and safety of this tree. The bank is collapsing along North side.

Pond #12

Survey conducted March 27, 2023, by the LRF R&G Committee:

The pond was surveyed during our dry season. The water was at a low level, allowing a good view of the pond side of the respective banks, as well as a close in view of the bottom.

The pond is in the shape of a rectangle. The north end follows the LRF Blvd. The east, south, and west sides follow an inside loop of Cascades Falls Drive. The north side of the pond is without any abutting structures and evidences moderate and uniform erosion along the bank running down from LRF Blvd. The inner wall of the pond evidences settlement and cavities under the pond lip. In areas the adjoining roadway is at a steeper angle to the pond rim such as at the NE corner in an area adjoining the property of 4171 Cascades Falls. This corner of the pond was previously repaired with a cut backfilled with unsupported rock, fill. and sod (2018?). In addition, the slope of the rocks in the pond may have been too steep an angle. This area is again in need of some top fill. In 2022 the owners advised that they had buried one of two down spout pipes running off the roof at the rear corner, the spout off the side of the building remains unburied.

Continuing down the east side of the pond; there are including the 4171 unit, the rear of three buildings abutting the pond. The four-plex containing 4171 has no other unit with gutters, nor does the next four-plex. The third building is a six-plex, between the second and third buildings there is a large/deep cut developed along the swale. This swale could accommodate a catch basin as used between the buildings in Pond 8. Two units in the third building #4145 and #4143 have downspouts that are not buried. There are cases we found where improperly buried downspouts can and have caused as much damage to the bank as unburied pipes.

Turning to the south side we have three four-plexs along the south perimeter of this pond. In the first building units 4133,4131 and 4129 have unburied pipes. The last unit in building #4127 has buried the downspout, as has unit 4123 in the next building. A stormwater drain from the street also runs along this alleyway. There is current as well as evidence of past erosion problems here. The area has presently a serious cut and could benefit from a catch basin between the buildings at the rear corner of the buildings. The second building has an unburied pipe at 4119. The remaining two units of that building have no installed gutters. The third building has two unburied pipes one at 4105 and 4107. It would appear that catch basins between these south-side buildings could make a difference here. Depending on the future basin position, the homeowners should consider running pipes to catch basins rather than directly to the pond.

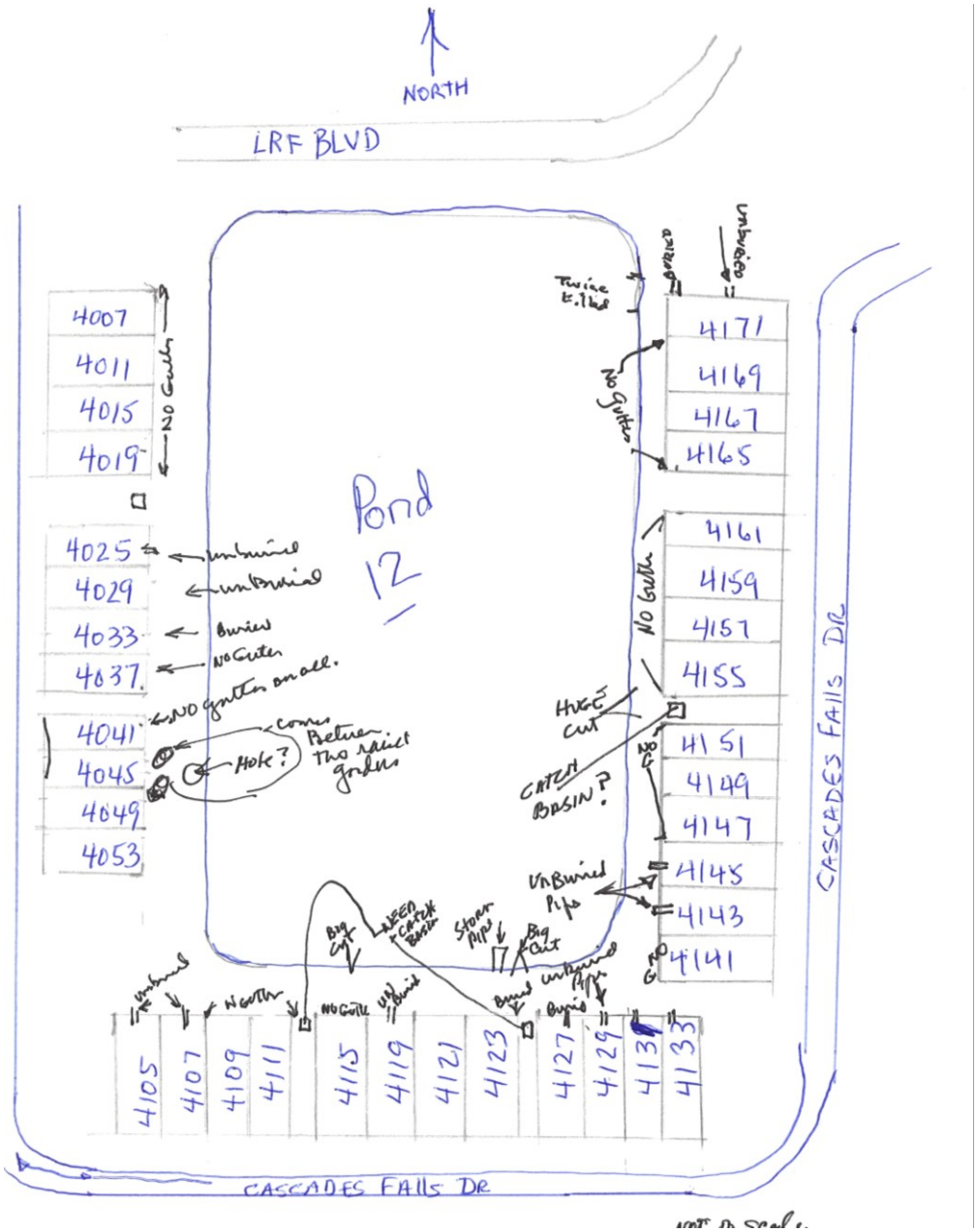
The west side of the pond is abutted by the rear of three four-plexes. Only three of the twelve units have gutters. One has buried a pipe, the ones at 4025 and 4029 are unburied. OF NOTE: between 4045 and 4049, both units have raised plantings close together just past their respective slider doors with a small grass area between them. Water from the gutterless roofs is forced into this spillway on its journey to the pond; and a cut has formed at the pond edge(damage), as well as a hole in the yards. This is an example where no downspouts, but the plantings are causing as much damage as unburied pipes.

The runoff damage at this pond appears much less than at Pond 11 where the only observable difference is that the rear yards abutting Pond 12 are deeper and have a greater area to absorb and disperse the roof runoff. The west side of this pond evidences a line of tree stumps well into the water in a line about a foot off the bank. We were unable to see trees in this location from a satellite photo from 2006.

TO DO:

1. Advise owners of 4145,4143,4133, 4131,4129, 4119, 4107, 4105, 4125, and 4029 to bury their downspouts, and where practical, redirect them away from the pond.
2. Consider catch basins as described herein between several buildings.
3. Consider having adjacent units bury downspouts and where appropriate have those pipes empty into catch basins versus directly to the ponds.

SEVERITY RATING: less than average.



Pond 12 3/27/23

4171 Cascade: Owner has marked area of bank that has eroded leaving cuts and missing chunks. Old riprap put in several years ago is almost completely overgrown with dirt, grass, and weeds. The bank slope is very steep exceeding the 2:1 ratio for untethered riprap therefore some rocks have slipped or rolled down into the pond. There are also 8" holes in the lawn.

Pond 12 3/27/23

Downspout is buried but continued erosion after burying, has covered, and completely blocked the pond exit.

No gutters on units 4169 – 4147 Cascade. Unburied downspouts on 4145 & 4143. No significant signs of erosion except between units (below). The ground is also fairly level and a distance from the pond which may allow the water to be percolate into the ground before it reaches the bank with or without downspouts.

20"deep x 4 – 5 ft wide coming from between units 4155/4151. No gutters or downspouts, however the double amount of rain coming from two rooftops to a common area coupled with irrigation may be what caused the swale.

Pond 12 3/27/23

4127/4123 Both have 2 drainpipes buried. There is an 8" swale to the right of the concrete drain pipe coming between the units. The ground next to the swale (upper right) and above the exit pipes(bottom left) is chopped up and collapsing. Improperly packing of buried drainpipes often result in loosened soil in the trough and continued erosion. 4123's pipe is capped with a grate supported by a concrete block.

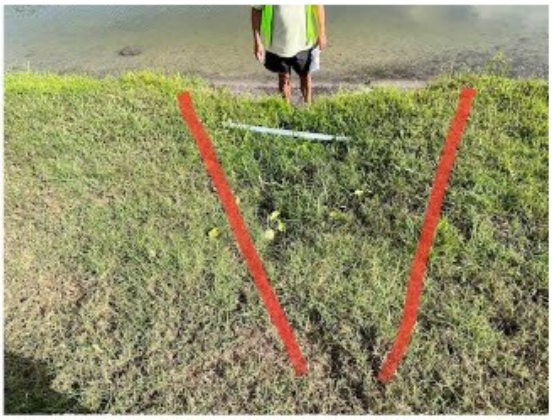
~bcj |pg. 3

Pond 12 3/27/23

4121 (above) drainpipes are buried but the exit is partially blocked by silt from bank. 4119 (below) has an unburied drainpipe and a 10" deep by 5' wide swale. If not done well, buried pipes can cause almost as much damage as unburied.

Pond 12 3/27/23

4115/4111 (above) No gutters but again double the water from the two roofs plus irrigation is likely what caused the swale between units and cut in pond bank. 4053 (below) No gutters/no cuts. Again, flat yard may allow water to percolate before it gets to the bank. However, there are numerous holes in the yard between unit and bank.



~bcj |pg. 5

Pond 12 3/27/23

Trough between 4049 & 4045 and 4025 & 4019. Large chunk missing in the bank at 4019. Row of trees (lower right) under the water on the west side of the pond.

Pond # 13

Survey conducted on April 3, 2023, by LRF R&G Committee

The pond was surveyed during our dry season and the water level was low, allowing a close-up look at the near bottom and lower side walls of the pond. Photos were taken and are attached. The photos are a good representation of what we found on inspection.

The pond is shaped like a rectangle but with the east side rounded like the tip of a finger. The north side is bound by Bowen Falls Place, the east and south by LRF Blvd and the west abuts the rear of three single-family residences along Stirling Falls Circle. The pond shows inner wall settlement and erosion from above the lip, particularly around the trees. The pond also evidences a rather uniform 11-inch average undercut of the four banks on measurement. There are tree stumps along the bottom of the pond on the north side approximately five feet from the current pond rim, There was a sprinkler head in the SE corner of the pond 18 inches from the inner pond rim. A length of rebar had been driven into the bottom of the east side of the pond in November 2020 at 24 inches from the rim, it measured 28 inches from the bank today.

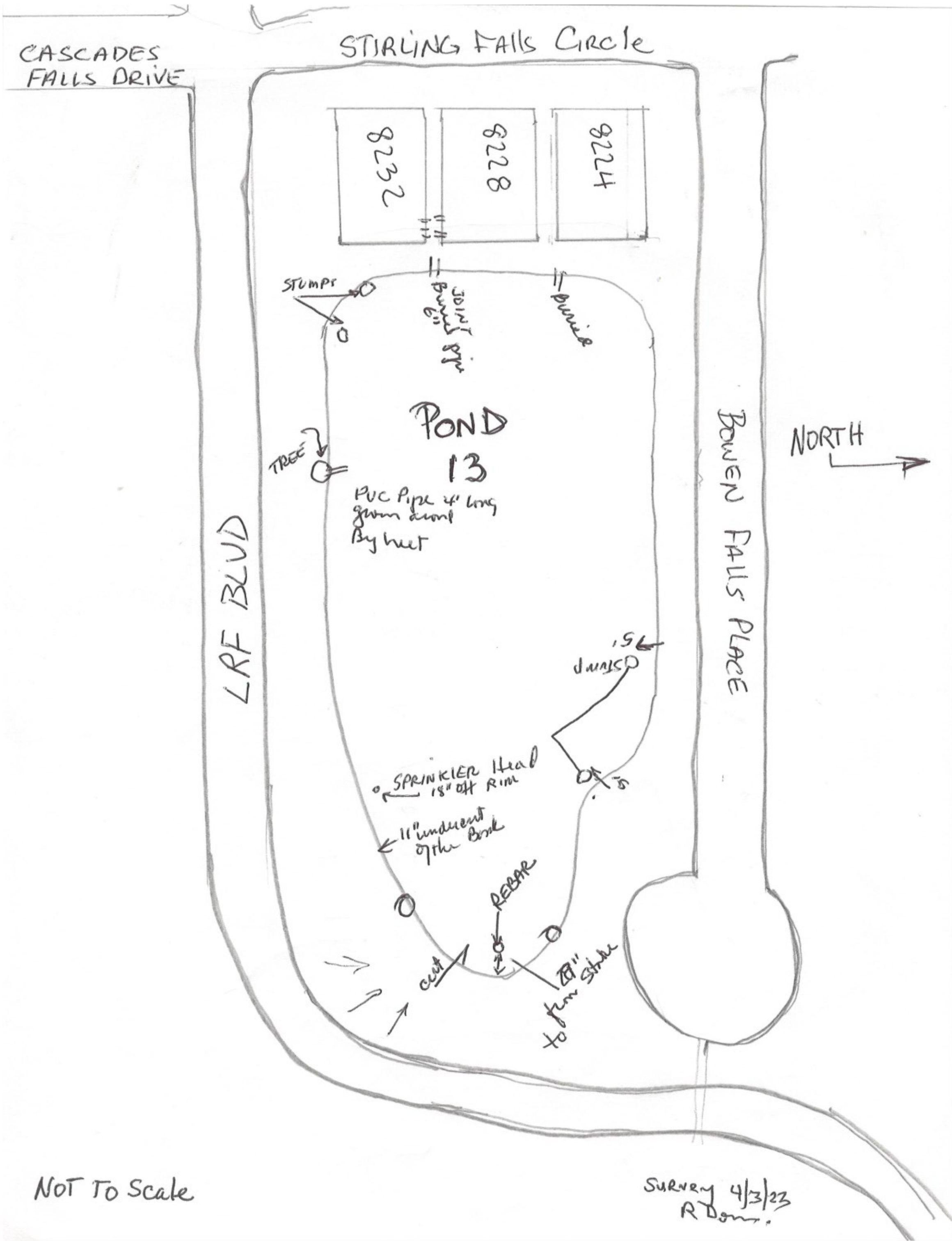
There are three single-family homes on the west side of the pond. The three homes were the original models for the developer. #8232 and #8228 Stirling each have two downspouts each connected to a single 6-inch corrugated pipe, that is buried, leading into the pond. #8224 has a similar pipe leading into the pond as well. The owner of #8232 stated that he has resided there for 15 years and the pipes were existing as is before he took possession. There is a good chance the developer installed and buried what we found today. The pond wall on this west side has collapsed the same as the other sides, but there is a 22" cavity under the bank between 8228/#8232 (photo) probably why the bank collapsed. However, there are no cuts or

gullies from roof or yard runoff. We found a 17" cavity in the SW corner. The SE corner of the pond, just south of the previously mentioned rebar is affected by runoff from the Blvd roadway (irrigation?) and evidences a small cut at the adjacent pond edge.

This pond was part of a "Florida Friendly" flora experiment, along with the garden at the east end of the pond. Local aquatic plants were inserted in and around the pond Circa 2009-10. The neighboring owners, particularly along Bowen Falls Place filed a petition with the BOD demanding the removal of the plants. At a subsequent contentious Board meeting in 2014 or 15, they pushed the Board into agreeing to remove the plants demanding it be done as soon as possible. The plants were removed. Whatever effect the plants had at the time: the Bank collapse and undercut were not remarkably different than the average pond inspected during this review.

TO DO: Look into the irrigation issues.

SEVERITY RATING: Average


STIRLING FAlls Circle
CASCADES FALLS DRIVE
8232
8228
8224
STUMPS
POND 13
TREE
PVC Pipe 4' long
LRF BLVD
BOWEN FALLS PLACE
NORTH
SPRINKLER Head 18" off RIM
REBAR
cut
NOT To Scale
Survey 4/3/23

POND #13 **4/03/23**

Top left: East side where rebar was placed 24" from bank edge several years ago. Currently at 20" apparently due to bank collapse. Top right: Erosion areas SE corner both from the top (irrigation) as well as from pond action. Bottom: close-up photos of above areas. The swale in the lower left corner due exclusively to top erosion by rain or irrigation as the pond level does not reach this high.

POND #13 **4/03/23**

Approximately a 13" cavity under bank extends along most of the south side of the pond. Top right photo: 11" cavity under the bank and a corroded sprinkler head sitting 11" into the pond. Bottom photos: Washed out soil around Cyprus roots from run off from sprinklers. White PVC pipe embedded in cypress tree.

POND #13 **4/03/23**

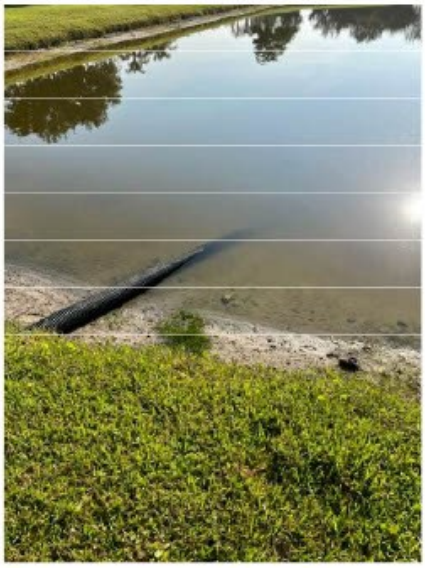
Top: 17" cavity at the SW corner; patch of rust colored water. Bottom: Tree stumps that would be submerged if water was at its normal level. 22" cavity under the bank on the west side between 8232 & 8228 Sterling Falls.

POND #13 **4/03/23**

One of a few aquatic plants (Arrowhead/Duck Potato) left over from a planting several years ago that was subsequently removed. 8232/8228 Sterling combined to bury a single drainpipe. Note the exposed terminal end exposed above the water (?) Also note the scum and bubbles along the bank. The bubbles are usually caused by stagnant water, hot weather, and an excess of dissolved or decaying organic matter (fish waste, grass, leaves, etc).

8228/8224 Buried drainpipe also appears to be shared.

Tree stump 5ft from bank across from 4019 Bowen.



Pond # 14

Survey conducted on May 11, 2023, by LRF R&G Committee

This pond was surveyed during our dry season (also a drought) and fortunately allowed us a close-up look at the lower areas of the pond walls.

The pond is a long narrow tube-shaped body with a north/south orientation and a large rounded bulb shape at the southern end. The west side of the pond abuts the Tuttle Avenue berm and wall. The east side abuts the rear of 24 single-family homes with deep rear yards, leading to the pond. The construction documents show a 36-inch pipe connecting the north end of the pond to Pond #4. There is a 60-inch pipe transversing the pond between units 8163 and 8159 that connects the main drain in the mitigation area and the other side of Tuttle Ave. The SW corner of the pond is connected to Pond #16 via an aqueduct under the LRF Blvd roadway.

The east side of the pond bordering the residential units shows some signs of erosion particularly swales between the homes toward the northern end. More troubling was, the exception of, the first two homes #8227 and 8231 Stirling Falls Circle. These two homeowners' have previously buried the roof drain pipes from the north side of 8231 and the south side of 8227. On an earlier visit to the site, the owner of 8227 stated that she has lost about 10 feet of her backyard to erosion. On today's visit, we met the owner of 8231. He stated that the drains were buried about 8 years ago and he estimated he has lost about 8 feet of his yard. The pond west of his property runs along the common property, which has receded up to several conifer trees, that have roots exposed holding the tree and bank from falling into the pond. It was noted how steep a slope the above roadway (LRF Blvd.) forms down toward the location of these two homes. He stated that the 8 ft lost was once wide enough to have been cut by the wide landscaper's lawnmower. Both of these residents were original owners so they watched this from day 1. The south side of the

pond had receded to the point where bordering trees are holding the bank back with their exposed roots.

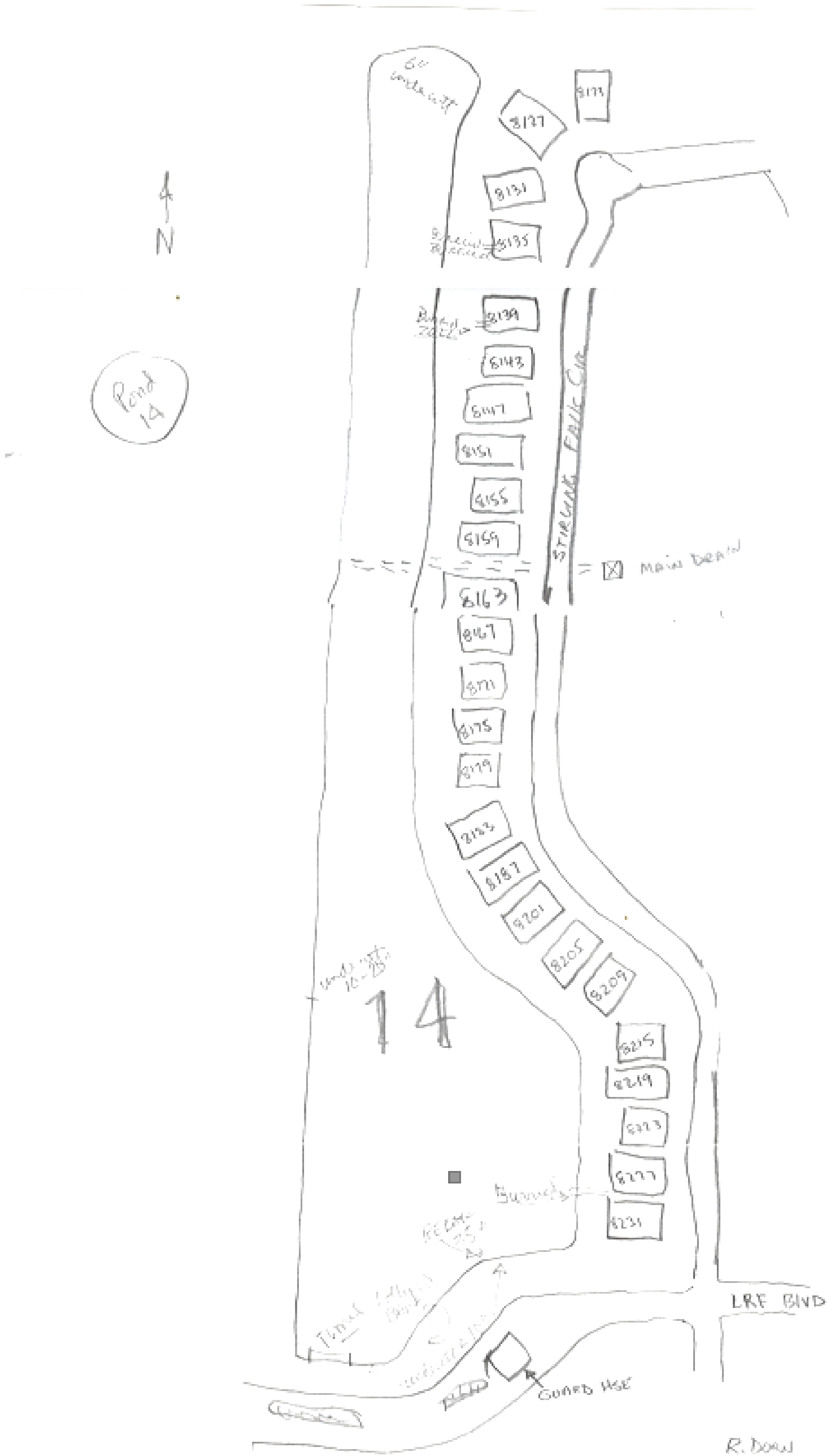
The north end of the pond evidences an undercut of 6 inches, but a solid bank, as does the east side of the pond., with the exception of the swales mentioned above. The western side evidences undercuts ranging from 10-20 inches deep. The west side banks are under a much steeper berm (bank). The east side of the pond banks is served by longer flatter yards that seem to dissipate the runoff.

As we turn the SW corner returning back east, we encounter the conduit leading under LRF Blvd that connects the pond to Pond # 16. The conduit surrounds evidences some washout as well as voids; more visual than critical. Further east of the conduit, there are two areas of serious bank collapse. Further beyond the collapses is a rebar before the tree root issue. The date the rebar was driven into the pond was subsequent to 2018: it shows 35 inches from the bank, or at least 11 inches of bank loss since installation.

The southern end of the pond, as well as the immediate joining east side, is in need of stabilization; sooner rather than later. The two homes on the SE corner are probably the most troubling plots in the community that we have come across in the 8 ponds surveyed to date. This is even though they have attempted efforts to contain the erosion over the past 8 years.

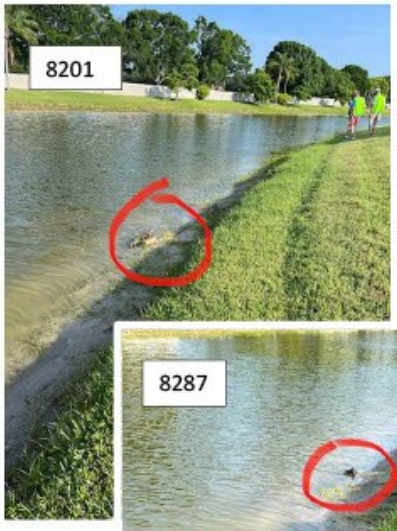
NOTE: The south side of this pond evidences excessive runoff from the LRF Blvd berm above. Perhaps cutting back on the irrigation of this area as well as the tree irrigation lines may slow down the erosion from above. The undercut along the west side may also be impacted by too much sprinkler action along a very steep berm (bank).

SEVERITY RATING: Serious along the southern side.


N
Pond 14
8173
8137
8131
8135
8139
8143
8147
8151
8155
8159
STIRLING FALLS CIR
MAIN DRAIN
8163
8167
8171
8175
8179
8183
8187
8201
8205
8209
14
8215
8219
8223
8227
8231
LRF BLVD.
GUARD HSE
R. DOW

Pond 14 5/11/23

Buried pipe shared between 8231 & 8227 Stirling Falls Circle. Swale between 8223/8219. 8201/8187 also has a collapsed bank. Drainpipes not buried. Stumps in the water behind 8201 & 8287.



Pond 14 5/11/23

8179/8171 Stirling. The lawn area also looks as if it's been dug up and there are numerous ankle-deep holes (L). 8 to 15ft swale between the homes (R). Cut in the bank between 8175/8171 and swale between the houses (bottom).

Pond 14 5/11/23

Swale between 8163/8159 Stirling. The sand from when the pool was dug was deposited in the pond (bottom R).

Pond 14 5/11/23

10" hole/cut in bank and swale between 8155/8151 Stirling (top). Drainpipes not buried. Similar issue between 8151/8147.

Pond 14 5/11/23

Drainpipe buried at 8143 Stirling. Force of water from direction of buried pipe is causing a trough in the pond bottom. A cut in the bank is visible at the next property. 9" cavity next to buried drainpipe at 8139 (bottom).

Pond 14 5/11/23

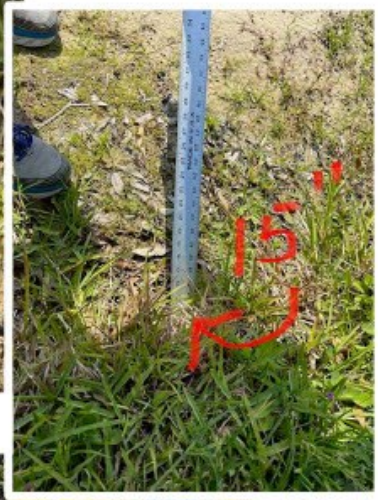
11" cavity under bank next to buried drainpipe at 8139 Stirling. Two drainpipes buried at 8135. One is almost covered by silt and completely blocked by further erosion after burying. 8" cavity under bank at 8135

Pond 14 5/11/23

Upper photos: 8131 Stirling. Drainpipe not buried. 10" undercut at bank. 8" bank collapse at 8127.
Lower photos: 6" undercut at north east corner (L). Approximately a foot of thick grass/weeds on the littoral shelf along northern edge of pond (R). No bank undercutting noted but the water was too high to confirm.

Pond 14 5/11/23

Upper left: Midway down west side there is silt build up into the pond. Cause unknown. Beginning on the west side across from 8215 Stirling where the water level was low enough to permit examination of the bank from the littoral shelf, there was an almost continuous 8" to 22" deep cavity under the bank extending all the way to the south side. (Some holes may have been cause by animals)



Pond 14 5/11/23

On the south side, bank collapse is caused from top side erosion by rain or irrigation since water level of the pond does not reach high enough to have caused erosion and exposure of the Cyprus knees and bank collapse.
Lower left picture shows the position of the rebar which was placed at 12" and is now approximately 30" from the bank. The southwest side (top left) could be graded for plants, but the southeast side (top right) requires something more aggressive.

~bcj | pg. 9

Pond 14 5/11/23

South side cont. More topside erosion from rain or over-irrigation. Sprinklers at the base of the mature trees. Should be disconnected if they haven't been already. Mature trees do not need a dedicated sprinkler head and it could contribute to erosion around the roots.

Pond # 15

This survey was conducted on April 3, 2023, by the LRF R&G Committee.

The pond was surveyed during our dry season, and the water was at a low level, allowing a good view of the pond side of the banks, as well as a close in view of the pond bottom.

The pond is in the shape of a rectangle. The north and south sides are short, the east and west the longer sides. The north side of the pond is behind the waterfall entry monument and faces the guard house. In November 2022, this side of the pond was riprapped by ACI for $13,950. The work was done to secure the north bank from another overflow of the bank from above. We suggest further work here. *See also Note at end of this document. *

The east side of the pond is abutted by the rear of four 4-plexs. The sixteen units have 9 units with gutters and leaders and downspouts leading to the pond, however, only one unit has buried its downspout. The remaining eight have not buried their downspouts. Seven units have no gutters and hence no downspouts. The rear yards are relatively deep (deeper than average for Sandstone); and none of the units, whether spouts are buried or not, are seen to be causing specific identifiable erosion (cuts) at the pond edge.

The south side of the pond runs along the south walkway adjacent to the community's south wall. There is noticeable erosion from runoff across the walkway at both the SE and SW corners of the pond, with two cuts. The eastern cut is better described as a gulley. It was noted that there are, what appear to be 36-inch concrete pipes, entering into the pond. Two pipes at each side of the SW corner and a third pipe along the west side across from unit 4032 across the pond. See the Diagram/map attached to this report. The erosion here appears to be caused by runoff above. If we determine that irrigation is a/the problem and we are able to

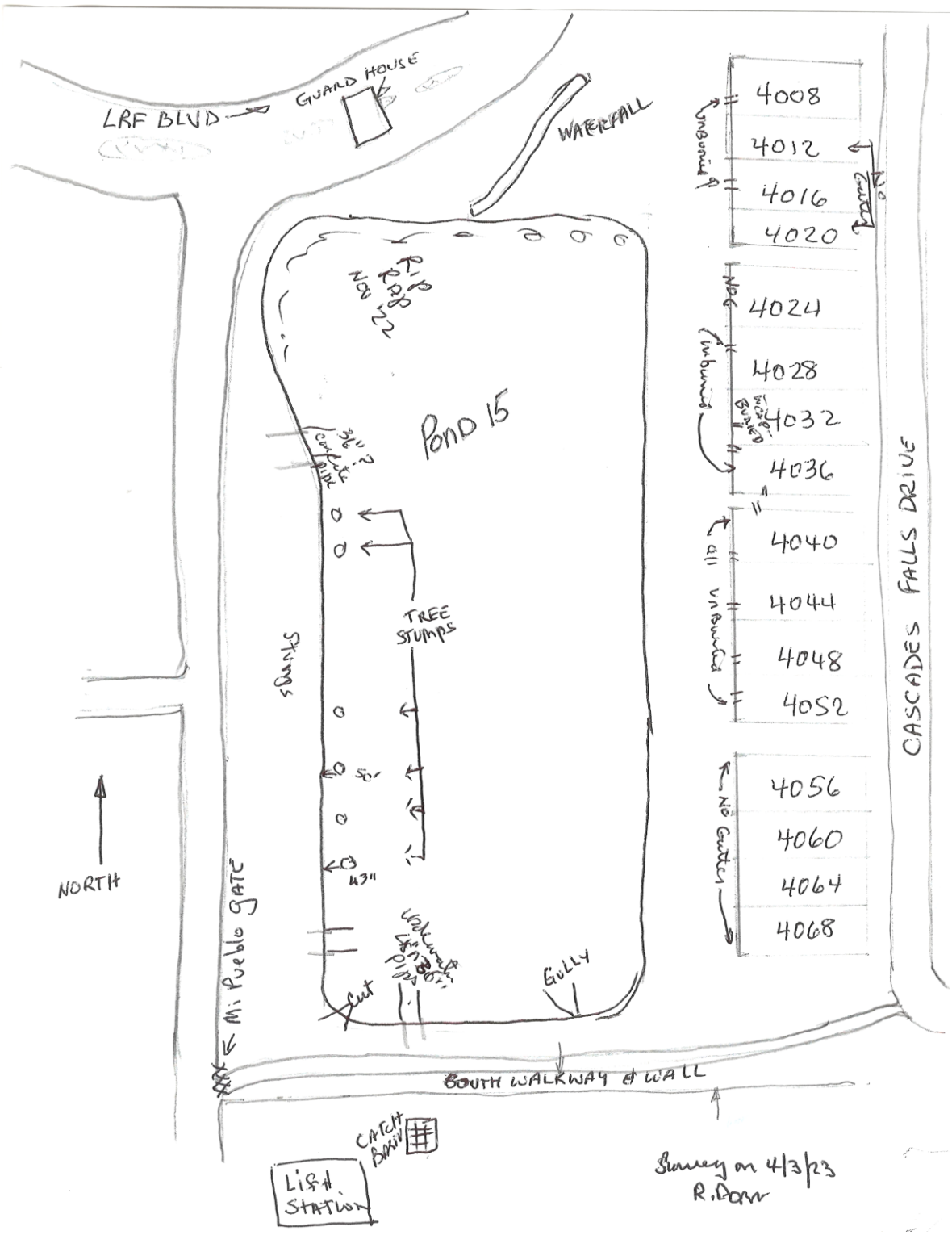
control that; Plants that could provide ground cover may be a solution here. * See note at the end.

The west side of the pond backs up to and follows the outer community wall. At the current low water level, it was noted that a line of tree trunks line the pond bottom about 40 to 50 inches from the inside of the pond rim. Again, see the hand-drawn map attached.

TO DO:

1. Once it is determined if irrigation is the/a cause of the erosion on the south bank, we need to Solicit proposals to Mechanically repair or stabilize the south side of this pond. This should, if possible, look toward plants for ground cover along the berm and walkway. The slope is gentle and the erosion does not presently threaten any homes, we have the luxury of time to experiment here.
2. NOTE: Regarding the previously completed riprap on the north bank. We believe the riprap has not held up as we expected. There may not have been any fiber baffle against the bank to stop sand from moving past the rocks installed. We believe the rocks have settled and or possibly shifted and voids are appearing. We realize that this was not a bid to our specifications, but would suggest we ask ACi to return and work with us on this issue.

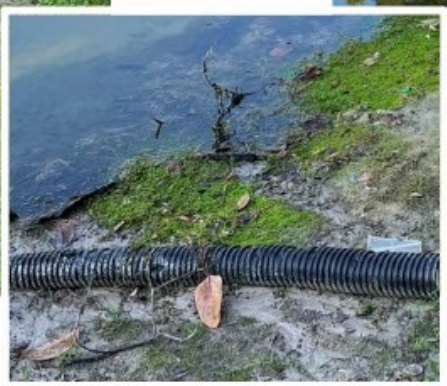
SEVERITY RATING: Average


LRF BLVD
GUARD HOUSE
WATERFALL
POND 15
TREE STUMPS
STUMPS
NORTH
Mi Pueblo GATE
SOUTH WALKWAY & WALL
GULLY
CATCH BASIN
LIGHT STATION
CASCADES FALLS DRIVE
4008
4012
4016
4020
4024
4028
4032
4036
4040
4044
4048
4052
4056
4060
4064
4068
Survey on 4/3/23
R. Dorn

POND #15 **4/03/23**

Multiple holes/depressions behind 4008/4012 Cascade 3 units away from the pond. No downspout on 4008/ no gutter on 4012.

One of two buried pipes from LRF entrance waterfall. Riprap installed on North side of pond. Note the greenish brown water, dead branches, leaves, and pond scum/algae.



~bcj | pg. 1

POND #15 **4/03/23**

East side of Pond 15. Buried downspout 4032 with grate at pond end. Unburied downspout 4036. No notable erosion.

4ft wide by 16" deep gully at Southeast corner near sidewalk. Exact origin and reason unknown. Possibly coming from steep border wall slope and over sidewalk? Other side of border wall is sloped down the other direction so not coming from Publix side. Clearly any erosion affecting the sidewalk or pond edge is coming from above by rain or over- irrigation, not pond wave action. Cause must be determined before appropriate correction can be determined.

~bcj | pg. 2

POND #15 **4/03/23**

Corner of Brosche Lake Ln and the rear access road behind Publix – Left photo/Right arrow. Right arrow points to catch basin that drains into Pond 15 through large cement culvert - Left photo/Left arrow and Right photo

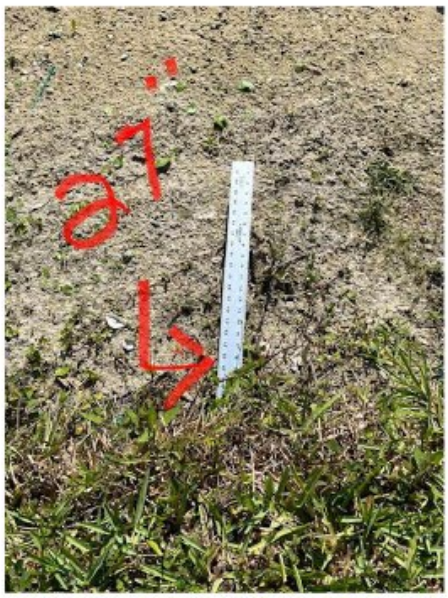
Southwest corner and up west side. Submerged row of tree stumps approximately 3 ft from bank.

Lower West side. 10" cavity

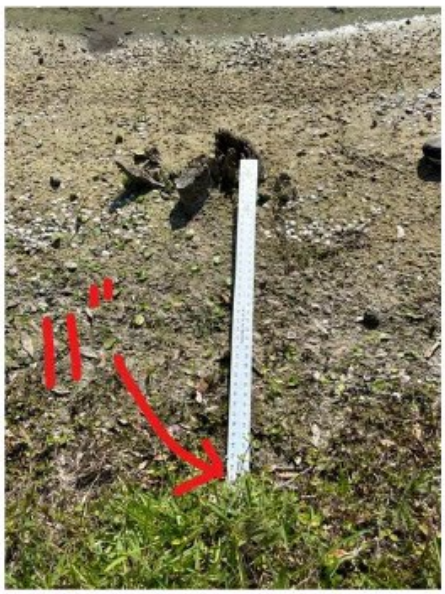
~bcj | pg. 3

POND #15 **4/03/23**

West side midway. 27" cavity



West side midway. 11" cavity

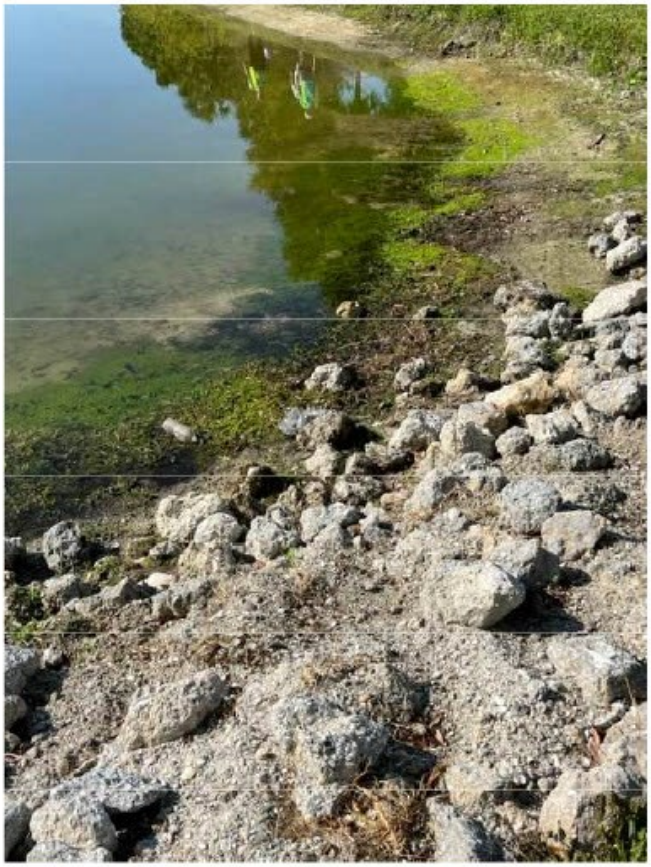


West side. Lower of two cement culverts on west side of Pond (connecting Pond 15 & 16?)

West side. Upper of two cement culverts on west side of Pond (connecting Pond 15 & 16?)

POND #15 **4/03/23**

North side. Recently installed riprap appears to have not held up well. The rocks are loosely spaced and crumbling with lots of dirt/sand visible between rocks. Riprap should not have visible sand.
Also note green scum/water and trash.



North side. Second buried pipe coming from entrance waterfall through riprap.

~bcj | pg. 5

Appendix A

January 2023 Retaining Ponds Update

LRF contains 16 Retaining Ponds on site, along with several more ponds from Publix's shopping plaza, which are all interconnected. The ponds ultimately drain accumulated rain water, via a 60-inch pipe, under Tuttle Ave to the Pearce Canal and on to discharge into Sarasota Bay.

For some time before 2017, it was becoming obvious that erosion in the ponds, needed to be addressed by the community via the Roads and Grounds Committee, and recommendations needed to be formulated to address the issue.

In 2017 the Board of Directors impaneled a Ponds Working Group, independent from the R&G committee, to research and develop recommendations to mitigate the erosion of the then-current concerns; as well as to develop a long-term plan addressing the erosion problem going forward.

In 2020 the PW group presented to the Board of Directors a very detailed and comprehensive report, they were thanked by the Board and discharged. One of the recommendations was that the Board redirect the issue back to R&G. At a subsequent Board meeting the Board asked the R&G committee to reassume responsibility and the committee responded positively. (See report)

Pond 8

In 2021 the Board of Directors accepted a proposal from the committee to install a trial project "The Pond 8 project". The board also directed the Budget committee to fund the project for fiscal 2022. The Board subsequently approved the 2022 Budget allowing $15,000 for this project during fiscal year 2022.

In February 2022 the vendor ACI installed riprap in sections along the south side of Pond 8. During this time adjacent residents were encouraged to bury any existing downspouts, draining toward this pond, under the sod. Catch drains were

installed between the four buildings and the outflow was run underground to the adjacent pond (8) and thru the riprap.

The committee conducted a survey inspection in September (6 months post-install). It was too early to make any real determination of success, as during that 6-month period it was fairly dry, except for the visit of Hurricane Ian. It was noted that Ian raised the pond water height to above the level of the riprap stones. Ian also reminded the committee how important pond drainage is to the community's well-being.

On January 3, 2023, a visual inspection disclosed that compared to just one year ago the site does not evidence any further pond erosion in the areas treated with the riprap and buried pipes. There is still one erosion area at the SE corner of the pond. This continued erosion may be/is due to the fact that the owner of 4283 Cascades has yet to mitigate his downspout. Also, noted***There is a swale area behind #4269 and #4271 Cascades. It appears that the catch basin and Rip Area are working fine the ground softness and loss of sand/dirt immediately short of the riprap may still be normal settling after the initial work in February. This spot was the worst spot of erosion in that pond noted before the installation of the riprap; and probably just needs to be backfilled once more. The other catch basins and swales seem to be working fine.

*** Recommendation: Have this noted area addressed with some fill and sod.

** Note: There are Four Buildings along the south side of Pond 8. There are 4 units in each building. Of the 16 units 12 have added roof gutters. 11 have so far buried the drain pipes from the gutters, 1 has not done so to date. 4 units are without gutters.

<u>Pond 15</u>

In 2018 or 2019 there were two separate washouts in the Monument waterfall trough. In both cases, the water washed out a considerable section of the hill from the right front corner of the monument down to the pond. Several tons of fill washed

into the pond, also the washouts destabilized a decorative block wall along the northern side of Pond 15. An engineering firm was engaged and recommended a solution to include backfilling and stabilization of the monument and its ground-level water pool. The engineer advised that the existing Block wall was not a retaining wall but a decorative wall, simply blocks piled up in an alternating pattern. The R&G committee at that time did research in attempting to determine what to stabilize the pond with either riprap or something else. We looked at a wooden bulkhead solution which seems to be popular with upscale golf courses. We obtained prices and the committee at that time recommended the bulkhead approach, which as I recall was in the same ballpark as the price of riprap. The Budget committee decided to add funding to the Monument reserve account as there was still no reserve account or plan as to the long-term solution for erosion control at that time. This bulkhead would have been an experiment both as to form and function, and since the riprap and bulkhead were about the same price it gave us an opportunity to begin collecting for an identified goal.

Thereafter the wall started to collapse again (in 2020?) and a decision was made that it was time to price the solution out. A new group of committee members were unhappy with the previous decision to recommend the bulkhead solution and went around and round until the Board took the issue and decided on riprap for the northern side of Pond 15 in late November 2022

At this writing, we the committee are still in an early phase of watching and deciding if we have the best solution, we need to continually monitor and analyze results from all our actions.

Aquatic Plants

Let me digress for a moment and try to summarize this topic over which the committee spent considerable time and effort.

Subsequent to the PWG's submittal of its final report; a very vocal group of community members lobbied for the installation of aquatic plants to be strategically

inserted in the ponds with the belief that this would reduce "wave" induced erosion caused by the wind. The 2021 BOD was not convinced and did not approve or fund this idea. The Board did agree to the following:

A test site along the north side of Pond 3 (Along the fire road} was seeded with several aquatic species. To the best of my knowledge, no further measurements or results have been officially recorded?

In addition in November 2020, rebar were driven into the ponds as markers in several ponds for test measurements to see what effect the wave action was affecting erosion. The rebar was driven into the test locations at 24 inches from the then-current shoreline. I believe the rebar was inserted by ACI contractor, Adam Pueblo(sp). I am unaware of any follow-up at the sights since the initial installation. Rebar was driven at both the north and south end of Pond 3. At the north end, the rebar is within the planted test area noted above. Rebar is also at the NE corner of Pond 8, SE corner of Bowen Pond, the south side of Pond 11, in Pond 14 adjacent to the guard house.

TO DO:

We at this time need to survey, analyze, and prioritize all the ponds for the identification of erosion problems and most importantly set forward-looking reserves to be able to pay for solutions coming at us in the future.

We also need to develop an incentive program to encourage residents to take the action necessary to bury their gutter drain pipes leading into the ponds. The turnaround of Pond 8 should be reason enough to encourage owners in doing what is necessary on their property to stem the loss of our pond banks.

To be continued….

Appendix B

R&G POND EROSION MITIGATION PLAN

1. See current pond report (historical perspective)
2. We need a current comprehensive survey of all 16 ponds
    a) showing areas of erosion, plants; current as well as fixes(repairs)
    b) agree on a grading scale so as to be able to designate the seriousness of each location.
3. We need to walk all ponds and produce a map showing the current status of each site: erosion, plant measurements, and rebar measurements. I believe rebar was set in ponds 24" from the nearest pond edge.

** We need to document visually with pictures and profiles (sketched) we could use someone who could set up a PowerPoint presentation.

Once the survey is completed we should revisit the sites on a regular schedule, such as every 6 months. Need full-time residents and a regular schedule published with volunteers assigned.

Things needed to be done sooner than later:

1. Have someone (Victor?) rearrange rocks in Pond 9 SE corner place them in the swale cut and then start to backfill. Have adjoining residents bury the pipe first.
2. Have someone further backfill the center swale in Pond 8 south side.
3. Draft an article for a newsletter outlining the process and benefits of burying your downspout pipes. Burying pipes is critical for sandstone residents NOW.
4. Send a violation letter or polite invitation to the owner of 4283 Cascades asking him to bury his pipe now.