

**SITE ASSESSMENT AND
BASELINE CONDITIONS REPORT**
Forest Edge Estates Homeowner Association
Basin Assessment

Coralville, Iowa | August 22, 2019

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Basin Complex Assessment

Ankeny, Iowa | August 22, 2019

Prepared for:

Forest Edge Estates Homeowner Association
3005 High Bluff Court
Coralville, Iowa 52241

Snyder & Associates, Inc. Project No. 119.0428

Prepared by:



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8/22/2019

Date



Parker Just E.I., CFM
Water Resource Engineer

8/22/2019

Date

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1. INTRODUCTION

Snyder & Associates, Inc. conducted a site review and field observation for two retention pond basins within Outlot “F” located within the Forest Edge Estates Homeowner Association (FEEHA). Herein is a summary of field observations made and a baseline of existing conditions for the FEEHA to review and reference prior to making any potential future improvements to the FEEHA property.

The information and recommendations presented in this report are professional opinions based on visual observation, review of available plans and information pertaining to the subject property. The opinions and recommendations presented herein apply to the subject property conditions at the time of Snyder & Associates, Inc. investigation.

2. SITE REVIEW AND SITE IMPROVEMENT GOALS

Initial information collected including aerial photography, Lidar aerial topography and Forest Edge ‘As Built’ drawings provided by the Client for Part 2 and Part 6 of the development. See Exhibit A.

An initial meeting was conducted on site prior to conducting field observations. We met with Jon Durst and David Dick as representatives of the FEEHA. Three key factors and associated goals were discussed:

- **Water Quality and Pond Stability**
Past maintenance on pond to address water quality and stability include, sonar, copper sulfate applications; as well as, sedimentation and vegetation growth removal from south basin outlet structure in accordance with the 2014 recommendation letter made by Schnoor Bonifazi.
Property owners have concerns with algae growth and unpleasant smell in basins.

GOAL: Provide list of potential short and long term management needs and recommendations.

- **Site Access and Vegetation Management Techniques**
Invasive species noted (e.g. Rosa multiflora/Multiflora Rose, Alliaria petiolate/Garlic Mustard, Lonicera fragrantissima/Bush Honeysuckle, Glechoma hederacea/Creeping Charlie).
Management techniques ranged from minimal or no management of landscape to manicured/mown lawns. The inconsistent management techniques add to the difficulty of distinguish between FEEHA property and private properties.

GOAL: Provide recommendations for FEEHA property management. Provide potential ways to increase greenspace value and access.

- **Condition of Dam Structures**
There are pond basins associated with this review and two dam structures. There are also several storm sewer inlets from the FEEHA flowing into the Outlot “F” basins (e.g. street and community storm sewer system, roof drains).

GOAL: Provide general observations of existing dam structures, inlet/outlet structures and recommendations for next steps.

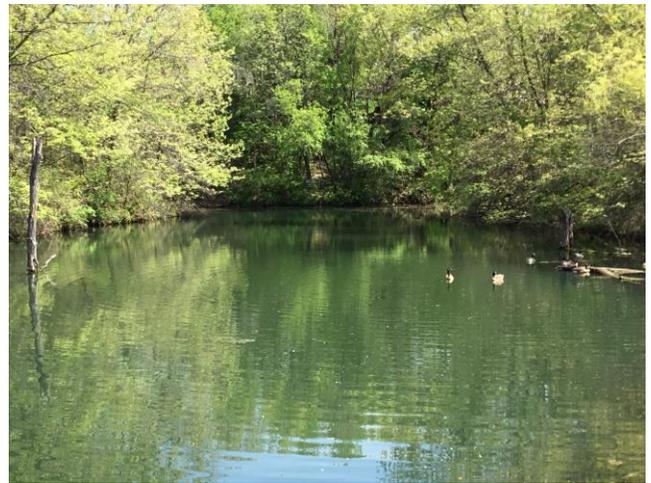
3. POND WATER QUALITY AND FIELD OBSERVATIONS

Field investigations were performed on May 16, 2019 by Snyder & Associates, Inc. to establish a baseline of existing conditions including circulation patterns, problem areas and landscaping surrounding the retention ponds. The overall stormwater management system in Outlot “F” is made up of two separate basins. For the purpose of this report we will define them based on location “North” and “South”.

A. North Pond Observations

Water Quality and Pond Stability

Information provided does not provide information on grading depths of pond. The normal water level is anticipated around Elev. 749.60 based on storm sewer outlet to pond elevation near High Bluff Drive, as shown in the As Built Plans for Forest Edge Estates – Part Six, Sheet 5 of 8, dated September 9, 2006. This may of potentially been originally designed as a singular basin. Additional information and drawings would be needed to confirm when the north dam and pond was constructed. A ponds water quality is often affected by the amount of suspended sediment, nutrient levels in the pond, water flow/circulation, oxygen levels and pond depth. The pond is fairly shallow with signs of cloudy water, algae blooms and a green blue tint. This is likely due to high nutrient load from stormwater runoff and sedimentation from erosion. The higher nutrients, most commonly phosphorous and nitrogen, cause the increase in growth of algae and cyanobacteria. This high nutrient load causes a process referred to as cultural eutrophication and depletes dissolved oxygen in the water for desirable organisms and fish. These eutrophic conditions can cause an undesirable odor. Further testing of the water would be required to determine estimated nutrient load, algae or bacteria present. Cyanobacteria levels which can give the water a blue green color can be highly toxic. High levels of cynobacteria can be harmful to human health if one makes contact with or consumes the water. The State Hygienic Laboratory¹ at the University of Iowa has a Limnology² office in Coralville. They can provide a water quality evaluation and assessment. A bathymetric survey would help further define the current depth of the pond water.



Photos 3-1 & 3-2: North pond water color

1. State Hygienic Laboratory <http://www.shl.uiwa.edu/env/limnology/index.xml>
2. *Limnology: the study of the physical, chemical, and biological characteristics and processes of aquatic systems and their watersheds*

Site Access and Vegetation Management Techniques

The shoreline around the north pond is primarily unmanaged woodland. Some residence are utilizing the shoreline and FEEHA property for their personal use (i.e. pier, paddle boat, tree fort, putting green, memorial bench and natural trails). There are no on site visual identifiers for residents to know where private property and the FEEHA property meet. Access points to the FEEHA are also not clearly defined or marked. This limits access to the pond for other residents within the FEEHA.



Photo 3-3: North Pond looking north from spillway



Photo 3-4: North Pond tree fort on FEEHA property



Photo 3-5: North Pond natural trail on FEEHA



Photo 3-6: North Pond bench on FEEHA property

B. South Pond Observations

Water Quality and Pond Stability

Based on Construction Plans for Forest Edge Estates – Part Two, Sheet 1 of 6, dated June 30, 1997 the pond was originally about 20 feet in depth (Elev. 708). The normal water level is anticipated around Elev. 728.00 based on drop inlet structure with trash rack and baffle elevation on south east edge of pond; as shown in the As Built Plans for Forest Edge Estates – Part Two, Sheet 4 of 6, dated February 11, 1998. The pond is currently fairly shallow with signs of sedimentation, floating sediment and algae blooms. These signs are often associated with cultural eutrophication which depletes dissolved oxygen in the water for desirable organisms and fish. These eutrophic conditions can cause an undesirable odor. An orange coloration at the north pond inlet into the south pond was also noted. Further testing of the water would be required to determine estimated nutrient load, algae or bacteria present. This is likely due to high nutrient load from stormwater runoff and sedimentation erosion. Similar to the North Pond laboratory testing of the water would be required to determine estimated nutrient load, algae or bacteria present. A bathymetric survey would help further define the current depth of the pond water.



Photo 3-7: South Pond sedimentation at north End of pond



Photo 3-8: South Pond looking south from north pond inlet



Photo 3-9: South Pond sedimentation



Photo 3-10: Orange Substance at North Pond Inlet to South Pond

Site Access and Vegetation Management Techniques

The shoreline around the south pond is a mixture of mown maintained lawn, unmown turf, managed and unmanaged woodland. Some residence are utilizing the shoreline and FEEHA property for their personal use (i.e. open lawn, natural trails, boat storage). There are no on site visual identifiers for residents to know where private property and the FEEHA property meet. Access points to the FEEHA are also not clearly defined or marked. This limits access to the pond for other residents within the FEEHA.



Photo 3-11: South Pond looking southeast from western shoreline



Photo 3-12: Roof subdrain from private residence



Photo 3-13: South pond surface drainage erosion and debris



Photo 3-14: South Pond looking north from dam



Photo 3-14: Wooded Area with natural trail west shore



Photo 3-15: Signs of erosion along areas mown up to edge of pond

C. Recommendations for Water Quality and Site Access

Overall both ponds show signs of sedimentation and undesirable algae growth. These conditions can have potential human health impacts, reduce dissolved oxygen for aquatic animals and cause undesirable odors. The following are recommendations for next steps in addressing these concerns as well as neighborhood access to the pond.

Pond Water Quality

- Perform water quality testing on both basins. This should include nutrient levels as well as undesirable bacteria levels. A local source for providing this service is The State Hygienic Laboratory¹ at the University of Iowa has a Limnology² office in Coralville. They can provide a water quality evaluation and assessment. <http://www.shl.uiowa.edu/env/limnology/educationoutreach.xml>

Michael Birmingham,
University of Iowa Limnology
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- A bathymetric survey would help further define the current depth of the pond water. This would help the FEEHA understand how much sedimentation has occurred in the ponds; as well as current pond depth. The pond depth can affect what solutions are feasible in addressing pond oxygen levels and algae growth, such as aeration fountains.
- Educate homeowners within the neighborhood concerning their own practices that can negatively affect pond health. (e.g. mowing up to pond edge, over fertilization of lawns and gardens, slope erosion, chemicals and undesirable pollutants that can wash from driveways into storm sewer system).
- Provide homeowners with a list of best practices and resources for helping protect pond health.
 - a. IA DNR resource on Rain Barrels:
<https://www.iowadnr.gov/Portals/idnr/uploads/pins/rain%20barrel%20flyer%20081614.pdf>
 - b. Easter Lake Watershed (example resource for watershed residence):
<https://easterlake.org/get-involved/install-a-conservation-practice/>
 - c. Iowa Stormwater Education Partnership:
This website provides a lot of resources, for individuals and businesses, pertaining to watershed and stormwater management.
<https://iowastormwater.org/>
<https://iowastormwater.org/basics/watersheds/>
<https://iowastormwater.org/resources/individuals/>

Site Access

- Prepare a site master plan for the FEEHA property. The master plan would identify vegetation management strategies (e.g. natural areas vs mown areas), shoreline protection opportunities and public access improvements (e.g. pier, trail loop, signage, and bench locations).
- Water quality testing and bathymetric survey results would help guide the master plans recommendations for pond enhancements and water quality improvement solutions.
- Engage the homeowners in the process. This creates an opportunity to education the homeowners about best practices for protecting the ponds health and longevity. This also helps build community ownership of the ponds.

4. DAM INSPECTION

The following is a summary of field observations for both retention ponds. Field assessment of the embankments and principal spillways were completed to assess the structural quality and performance of these features. Field indicators of internal drainage and seepage were examined. Recommendations for improvements are included following the summary of field observations.

A. North Pond Dam

Embankment

The pool level in the pond appears normal. Water in the pond is flush with the top of the principal spillway and water was heard flowing through the structure. Minimal shoreline erosion was present around the pond. The ground surrounding the embankment was dry. The land use downstream of the pond has not changed since construction and thus the hazard classification of the dam is appropriate.

Upstream Slope

The upstream slope of the pond is steeper than the south pond but appears to be adequate. The slope is adequately mowed. A small amount of brush and small trees were observed on the upstream slope along the toe of the embankment in spots. Small pockets of shoreline wave erosion are present along the toe of the upstream slope due to lack of vegetation in some spots. No cracks were observed on the embankment slope. No noticeable sinkholes, depressions, or bulges were observed on the upstream slope. Animal burrows were not observed.

Top of Dam

The top of dam appears to be in good condition with no obvious flaws. No cracks, unusual settlement, or sinkholes were observed along the top of dam. The top width is uniform and adequate. The top of dam appears to be periodically mowed in spots. Some taller grasses have grown on the east end of the top of dam.

Downstream Slope

The downstream slope does not appear to be too steep. Ample vegetation has been established with a variety of trees and brush, which will provide protection against erosion of the downstream slope. No visible cracks were observed on the slope. Some small overland flow rills are present due to local drainage. Some minor depressions in the slope are present. No large sinkholes were observed. Animal burrows do not appear to be a concern.

Internal Drainage and Seepage

The dam does not appear to have internal embankment drains upon initial inspection, as outlets were not visible. As-built drawings did not record the presence of internal drainage systems. Active seepage was not observed.

Principal Spillway

The principal spillway of the pond is a 24" reinforced concrete riser pipe with a baffle plate and a trash rack. Some algae growth and fallen woody debris is present around the principal spillway, but otherwise debris accumulation is not currently a concern. The spillway was observed to be flowing normally. The riser pipe, trash rack, and baffle plate are showing age aesthetically but appear to be in good structural condition. The pipe appears to be structurally sound, as no sinkholes or other faults were observed at the outlet. Sediment has built up around the structure and is flowing downstream into the South Pond during high water levels.

The outlet of the pond below the embankment is free from debris and appears to be flowing freely. Trees are present above the outlet, which could be a risk factor for debris accumulation around the outlet but are not currently causing issues. The outlet has a small drop onto the downstream channel, which is causing a small scour pool to develop. Gabion netting with small rocks has been placed to mitigate further scour. The scour pool appears stable. Although this currently appears to be stabilized if undermining were to continue the structure can fail. Continue to monitor this for further scouring is recommended.



Photo 4-1: North Pond spillway inlet structure



Photo 4-2: North Pond spillway outlet structure

Auxiliary Spillway

The dam does not appear to be designed with an auxiliary spillway. However, a medium sized ditch on the southwest edge of the dam may function as an auxiliary spillway since it is lower than the top of dam elevation. This area is earthen and contains significant brush on the downstream side. The ditch does not appear to be able to route concentrated overflow from the north pond into the south pond, so it does not appear that this was a design feature of the dam.

B. South Pond Dam

Embankment

The pool level in the pond appears normal. Water in the pond is flush with the top of the principal spillway and water was heard flowing through the structure. Minimal shoreline erosion was present around the pond. The ground surrounding the embankment was observed to be slightly moist. The land use downstream of the pond has not changed since construction and thus the hazard classification of the dam is appropriate.

Upstream Slope

The upstream slope of the pond appears to be adequate. The slope is adequately mowed. Brush and small trees were observed on the upstream slope along the toe of the embankment, which provide an extra layer of protection against erosion of the slope. No cracks were observed on the embankment slope. Minor wave erosion was present at the upstream slope. No noticeable sinkholes, depressions, or bulges were observed on the upstream slope. Animal burrows were not observed.

Top of Dam

The top of dam appears to be in good condition with no obvious flaws. No cracks, unusual settlement, or sinkholes were observed along the top of dam. The top width is uniform and adequate. The top of the dam is adequately mowed and maintained.

Downstream Slope

The downstream slope had a few spots of concern. Principally, three to four large sinkholes were observed near the outlet of the principal spillway. In one location, the concrete of the outlet pipe was visible. It is unclear upon initial inspection what the root cause of these issues are. It does not appear likely that the outlet pipe is cracked or leaking in a location which would cause concerns under normal flow conditions, as water was not visible running in the sinkholes. If cracks or leakage from the pipe or pipe joints were to be observed, it may be during a high flow event when the pipe is flowing full. These sinkholes could be caused by internal seepage through the dam adjacent to the pipe. These sinkholes do not appear to be a surface erosion issue as the slope is sufficiently vegetated adjacent to the sinkholes and no overland rills are present.



Photo 4-4: Sinkhole around South Pond Outlet Pipe

Small overland flow rills are present on the downstream slope from upstream overland flow. These do not appear to be compromising the structural integrity of the dam. The downstream slope is covered in vegetation, which will help prevent lateral spread of the rills. The rills may get deeper over time.

The downstream slope does not appear to be too steep. Ample vegetation has been established with a variety of trees and brush, which will provide protection against erosion of the downstream slope. No visible cracks were observed on the slope. Animal burrows do not appear to be a concern.

Internal Drainage and Seepage

The dam does not appear to have internal embankment drains upon initial inspection, as outlets were not visible. As-built drawings did not record the presence of internal drainage systems. Active seepage was not observed, however, the sinkholes described in the preceding section may indicate that seepage has occurred.

Principal Spillway

The principal spillway of the pond is a 24" reinforced concrete riser pipe with a baffle plate and a trash rack. Some debris and plant and algae overgrowth were observed around the inlet of the principal spillway. However, these do not appear to be interfering with the normal flow of water out of the pond, as the spillway was observed to be flowing normally. The riser pipe, trash rack and baffle plate are showing age aesthetically but appear to be in good structural condition.

The outlet of the pond below the embankment is covered in debris from fallen trees, branches, and general plant overgrowth. This may restrict the downstream channel's ability to discharge during high flow events. The debris does not restrict normal flow out of the pipe, as water is able to flow freely out of the pond. The debris makes access to the outlet difficult.

The downstream channel at the outlet of the pipe is protected from scour by rocks. Flow out of the pipe discharges into the downstream channel over these rocks at a shallow grade. No scour pool was observed.

Auxiliary Spillway

The dam was not constructed with an auxiliary spillway. In the event that the dam overtops, water should flow across the length of the top of dam without a concentrated flow path.

C. Recommendations for Dams

Overall, both dams appear to be in good structural condition and function properly under normal flow conditions. Ongoing maintenance will be necessary to ensure that the dams continue to function properly. Below are some general maintenance recommendations that can be periodically performed:

- Ensure that the trash racks and surrounding areas of the principal spillways are cleared of debris and vegetation.
- Maintain a clear outlet free from fallen trees and other debris.
- Brush and trees should not be permitted along the top of the embankment as their root systems can create paths for water seepage, especially after roots decay. This seepage could contribute to eroding of the embankment.
- Monitor outlets for additional scouring and maintenance needs.

The Iowa DNR publishes a manual titled *Maintenance Manual for Dam Owners*, which provides further maintenance guidelines to dam owners.

It is recommended that further inspection be performed to identify the cause of the sinkholes adjacent to the outlet pipe of the south pond. CCTV sewer inspection could be utilized to assess whether cracks or other deformities are present within the pipe. If cracks or seepage from the pipe itself are the cause of the sinkholes, it may be pertinent to repair the cracks or replace the outlet pipe. If the pipe is not observed to be deformed, a geotechnical investigation is recommended to identify the cause of the sinkholes. A possible solution may be to fill the sinkholes with soil and seed the slope or place revetment adjacent to the outlet to protect against erosion. However, if internal seepage issues are present within the dam, it is possible that these sinkholes may return.

The sinkholes should be periodically checked to see if they are increasing in size or otherwise worsening. If the conditions are worsening, prudent repair is recommended to prevent further issues. Likewise, the overland flow rills should be periodically inspected to see if the problem worsens.

D. Budgetary Costs for Maintenance Items

Budgetary costs are included in this section for annual trash rack clearing, CCTV sewer inspection of the south pond outlet pipe, and for sinkhole maintenance. A more detailed breakdown of these costs, particularly for sinkhole maintenance, are included in Appendix C. Annual maintenance to clear the trash rack of debris is estimated to cost \$1,500 per visit. This includes the cost of equipment mobilization to get to the trash rack as well as labor. CCTV sewer inspection is estimated to cost \$2,000, also assuming equipment mobilization

and labor fees. Sinkhole maintenance is estimated to include topsoil backfill in the sinkholes, seeding of the filled areas, and optional placement of erosion stone and engineering fabric around the outlet of the pipe to mitigate future erosion. It is anticipated that mobilization of large equipment and labor will make up a substantial amount of the probable cost of sinkhole maintenance. The total fee to hire a contractor to perform this work is estimated to cost \$12,800.

APPENDIX A
SITE AERIAL EXHIBIT



APPENDIX B
DAM INSPECTION FORM



<u>Embankment</u>		
<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Field Conditions		
Pool Level	Appears normal, water flush with spillway, structure is flowing	Appears normal, water flush with spillway, structure is flowing
Describe Water Level	Appears normal, minimal erosion around pond at pool level	Appears normal, minimal erosion around pond at pool level
Ground Moisture Condition	Moist along top of dam	Dry on top of dam
Any chances in downstream land use that may impact hazard classification of dam	No	No
Upstream Slope		
Slope appears too steep?	No	Possibly, north pond upstream slope steeper than south pond, slope about 1:1
Slope has poor vegetative cover?	No	No
Slope contains trees and/or brush?	No, berm is adequately mowed, Brush and small trees on upstream slope along pond at toe	Miniscule, some trees and brush
Cracks on the embankment slope?	No	No

Wave erosion at the water line?	Minor, some jump in height of upstream slope	Some wave erosion because embankment is steeper
Embankment has sinkholes, depressions, slides, or bulges?	None noticeable	Some wave erosion at toe of bank
Animal burrows?	None noticeable	None noticeable

<u>Top of Dam</u>		
<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Cracks, unusual settlement, or sinkholes along the top of dam?	No	A few sinkholes
Is the top width uniform and adequate?	Yes, about 15-17 feet and uniform elevation across top of berm	Yes, about 15' width with uniform elevation across top of berm
Slope contains trees and/or brush?	Not on slope. Just mowed turf grass	Yes, some longer prairie grasses on east end of slope, grass is higher
General Notes	Top of berm is in good condition with no obvious flaws	Good condition, some vegetative growth and a few small settlement spots

Downstream Slope		
<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Slope appears too steep?	Appears uniform with upstream slope	Appears uniform
Slope has poor vegetative cover?	No, significant established trees and brush. Thick	No, significant established trees and brush. Thick
Slope contains trees and/or brush?	Ample trees and brush. Downstream end of slope fairly wet and muddy on hot, humid day. Had not rained in Coralville for a few days prior	Ample trees and brush.
Cracks on the embankment slope?	None Visible	None Visible
Wave erosion at the water line?	None Visible	None Visible
Embankment has sinkholes, depressions, slides, or bulges?	Some spots of rill erosion, seems to be due to local drainage from upstream. 3-4 Large sinkholes around pipe outlet, with pipe visible in one spot. Water not running in sinkholes, so initial thought is that pipe is not largely cracked otherwise water would be running in the sinkholes. These sinkholes are concerning	Some rill erosion due to drainage, but not as much as south pond. Some local depressions, no large sinkholes
Animal burrows?	N/A	N/A

Other Notes	Orange discharge from small drainage way on SE corner of dam, several drainage rills	Noticably less moisture, fewer rills, not as saturated, no observed sinkholes. Marsh on SW side may be tailwater from south pond. Some spots of wet drainage but not as much as south pond
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Internal Drainage and Seepage		
<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Does the dam have internal embankment drains?	None seen, no pipes observed on embankment, none recorded on as-builts	None seen, no pipes observed on embankment, none recorded on as-builts
Description of embankment drains	N/A	N/A
Outlets were oserved and in good condition?	N/A	N/A
Estimated flow from drains (describe each drain separately)	N/A	N/A
Was seepage observed through the embankment outside of designated drains?	Rills on downstream side and sinkholes around pipe outlet	No

Principal Spillway

<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Description of Spillway	24" rcp with riser pipe, baffle plate, and trash rack	24" rcp with riser pipe, baffle plate, and trash rack
Is the inlet free from debris?	Some overgrowth around inlet, some stagnant water and algae growth minimal trash, appears to flow well (audible, consistent sound into pipe)	For the most part. Some vegetative growth and stagnant water with algae growth
Are there trees and brush around the inlet	Yes	Yes, less than south pond
Does the dam have a conduit spillway?	Yes, 24" RCP measured at outlet	Yes, 24" RCP measured at outlet
Is the trash rack and anti-siphon device in good condition?	Appears to be in good structural shape, trash rack and baffle plate showing age (rust) but look to be in otherwise good shape	Appears to be in good structural shape, trash rack and baffle plate showing age (rust) but look to be in otherwise good shape
Is riser/inlet in good condition?	Appears to be in good structural shape, showing age	Appears to be in good structural shape, showing age

<p>Does the conduit appear structurally sound including water tight joints?</p>	<p>At outlet, the pipe appears intact. There is some seepage from sinkholes, so watertight joints may not be sound or included in design. Only flow out of the pipe was observed at outlet, and did not see water in sinkholes. If the pipe is leaking, there are no obvious signs observed in the field</p>	<p>Yes, no sinkholes or other faults observed at the outlet</p>
<p>Does the dam have an open chute spillway?</p>	<p>No</p>	<p>No</p>
<p>Is the stilling basin in stable condition?</p>	<p>Yes, outlet is protected by rocks, no scour pool observed. Flow bypasses main outlet creek due to rocks, which push flow to left of outlet down a rocky slope with shallow grade</p>	<p>Has rocks at outlet, some energy dissipating netting was observed on the outlet. Outlet invert is higher than ground, so there is some drop of water at the outlet. Small scour pool on downstream side of outlet, but appears to be in good shape</p>
<p>Are there trees and brush around the outlet?</p>	<p>Yes, plenty. Difficult to see and reach outlet structure because of brush and fallen trees.</p>	<p>Yes, but do not block outlet. Trees are above outlet.</p>
<p>Other notes</p>	<p>Significant erosion near outlet, could be seepage from pipe. 3 or 4 large sinkholes adjacent to pipe. Water flows to left at outlet and around rock impediments. Pipe otherwise appears to be in good shape</p>	<p>Some orange discharge at outlet. Iron levels in water may be an issue</p>

Auxiliary Spillway

<u>Question</u>	<u>South Pond</u>	<u>North Pond</u>
Does the dam have an auxiliary spillway?	No, just one uniform embankment with no notch. No obvious flow path	Medium size gully on SW side may function as an auxiliary spillway. Path is lower than rest of embankment
Description of spillway:	N/A	Earthen berm/channel
Is the spillway free of obstructions?	N/A	No, significant brush on downstream side
Is there an adequate vegetative cover free of trees and brush?	N/A	No, significant brush on downstream side
Is the spillway free from erosion?	N/A	Some rill erosion on downstream end of channel

APPENDIX C
BUDGETARY COST ESTIMATES OF MAINTENANCE WORK

OPINION OF PROBABLE MAINTENANCE COSTS



FEEHA Site Assessment & Dam Inspection
 Coralville, IA
 119.0428.01

ITEM #	DESCRIPTION	Note	QUANTITY	UNIT	UNIT PRICE	EXTENDED PRICE
Annual Maintenance						
1.1	Trash Rack Clearing	Mobilization, labor	1	LS	\$ 1,500.00	\$ 1,500.00
CCTV Inpsection						
2.1	Televising South Pond Outlet	Mobilization, labor	1	LS	\$ 2,000.00	\$ 2,000.00
Sinkhole Maintenance						
3.1	Topsoil	Fill soil for sinkholes	20	CY	\$ 50.00	\$ 1,000.00
3.2	Conventional Seeding, Fertilizing	200 square feet area	1	LS	\$ 1,500.00	\$ 1,500.00
3.3	Erosion Stone	Rock protection around outlet with engineering fabric	22	TON	\$ 150.00	\$ 3,300.00
3.4	Mobilization	lump sum for equipment, labor	1	LS	\$ 7,000.00	\$ 7,000.00
TOTAL ESTIMATED COST (SINKHOLE MAINTENANCE):						\$ 12,800.00