

March 17, 2020

Swan Lake Estates HOA
C/O Ms. Robin Wiseman
446 Lakeshore Drive
Stockbridge, Ga 30281

RE: Report of 2020 Lake Sediment Probing
Swan Lake

Dear Mr. Hoffman:

Aquascape Environmental (AE) conducted a Random Probe Lake Sediment Assessment of the ± 1.94 -acre (Cove 1) inlet and ± 1.68 acre (Cove 2) inlet located within Swan Lake neighborhood in Stockbridge, Georgia (Figure 1). Field activities or his investigation were performed on March 9, 2020. Based on our investigation, this report documents the pre-development lake conditions.

Study Methods

The first part of the study defines the study area within the impoundment. Our scope of work included measuring existing water and sediment depths at randomly selected locations within the impoundment. The number of measurement stations established within the pond was dictated by site conditions and surface area. These measurements enabled us to develop a comprehensive “picture” of the existing sedimentation conditions prior to commencing with land disturbing activities. Particular attention was made to document those areas of the pond most likely to be influenced by sedimentation.

Measurements were taken at each station using a graduated survey rod. Water depth measurements were collected by resting the end of the rod on top of the bottom sediments. Pond depth measurements were collected by inserting the rod into the sediments until consolidated sediments were encountered. This typically delineates the original pond bottom. Sediment thickness was then calculated by subtracting the pond depth from the water depth. The water elevation of the pond served as the control point for these measurements. A benchmark elevation was established within the pond in order to correlate future study activities. For the purpose of this investigation, AE utilized the top of the masonry on the right side of the emergency spillway, (looking downstream) within the impoundment as our benchmark location. The water level was measured at 0.61 feet below the benchmark location within the pond.

Each data point station was recorded using a Trimble Geo7X Global Positioning System receiver. This system utilizes a 12-channel integrated GPS/Beacon/Satellite Differential receiver and antenna to record point position data with an accuracy of less than one meter horizontal. Integrating real-time differential GPS (DGPS) into the system is necessary for accurately relocating these stations in the event that future field activities are required. This system was also used to construct a map of the study area, identifying the data points collected. The locations of each random probe can be seen on the attached schematic diagram of the impoundment (Figure 2).

Study Results

The water and sediment depth data for this investigation is listed in Table 1. The following chart summarizes the conditions documented within the impoundment.

Study Year	2020
Cove 1 Surface Area (acres)	1.94
Measurement Stations	1-48
Number of Data Points	48
Average Water Depth (Feet)	1.02'
Range of Water Depths (Feet)	0.00' – 3.75'
Average Sediment Thickness (Feet)	4.82'

Study Year	2020
Cove 2 Surface Area (acres)	1.68
Measurement Stations	49-62
Number of Data Points	13
Average Water Depth (Feet)	3.17'
Range of Water Depths (Feet)	1.90' – 4.85'
Average Sediment Thickness (Feet)	3.13'

- Notes:*
1. Water depth is the measurement from the water surface to the top of the existing sediments.
 2. Sediment thickness is Pond Depth to “hard bottom” minus Water Depth.

General Observations/Notes

The purpose of this baseline study was to document existing sediment accumulation conditions within the impoundment. A general outline of the conditions encountered during this investigation has been provided in addition to water and sediment depth measurements.

- § The exact age of the pond is unknown; based on a review of map information provided by the 1962 United States Geological Survey (USGS) *Stockbridge*, Ga the pond is not shown to be an original landscape feature. A review of readily available historical aerial photographs dates the pond construction between 1955 and 1962; therefore, the pond is between 58-65 years of age.
- § The contributing watershed for the pond was determined to be approximately 820.50 acres or 1.28 square miles.

Conclusions

Generally speaking, dredging operations are typically undertaken to achieve a minimum 4-foot average water depth. Water depths within an impoundment shallower than this tend to be problematic in terms of aquatic weed management issues. Another guideline that dredging is necessary, especially for small impoundments and sediment retention areas, is when the volume of the pond has been reduced by more than one third due to accumulated material.

The data obtained during this investigation has identified an average water depth of 1.02 feet within Cove 1 (Stations 1-48) and 3.17 feet within Cove 2 (Stations 49-62). Further analysis of the data shows that the measured average sediment thicknesses of 4.82 and 3.13 respectively within each study area accounts for approximately 82% volume loss within Cove 1 and 49% volume loss within Cove 2. The data collected

during the study allows us to quantify the existing sediment volume within the impoundment. It is important to note that due to the random nature of our investigation, these quantifications should be considered rough approximations only. The following chart summarizes the conditions documented within the impoundment. These calculations were determined by multiplying the average sediment thickness within each study area by the corresponding total surface acreage.

Study Area	2020
Cove 1 Sediment Volume (Cubic Yards)	15,093
Cove 2 Sediment Volume (Cubic Yards)	8,595

The data obtained through the course of this investigation suggests that dredging operations for the impoundment should be planned for in the near future. This viewpoint is based upon the fact that the volume of each inlet cove study area is over 50% full of sediment and the average water depth is less than 4 feet. Our investigation has determined an annual accumulation rate of approximately 232 cubic yards for Cove 1, assuming no dredging efforts have been conducted since the ponds construction. As a general rule, the cost to remove sediment material from a pond is in the range of \$35 to \$55 per cubic yard. However, the cost can vary depending on factors such as disposal area and accessibility.

We are pleased to have been able to assist you with this project and have made every effort to conduct a thorough assessment and analysis based upon the proposed study scope. If you have any questions about any aspect of this report, please do not hesitate to contact our office.

Respectfully submitted,
Aquascape Environmental



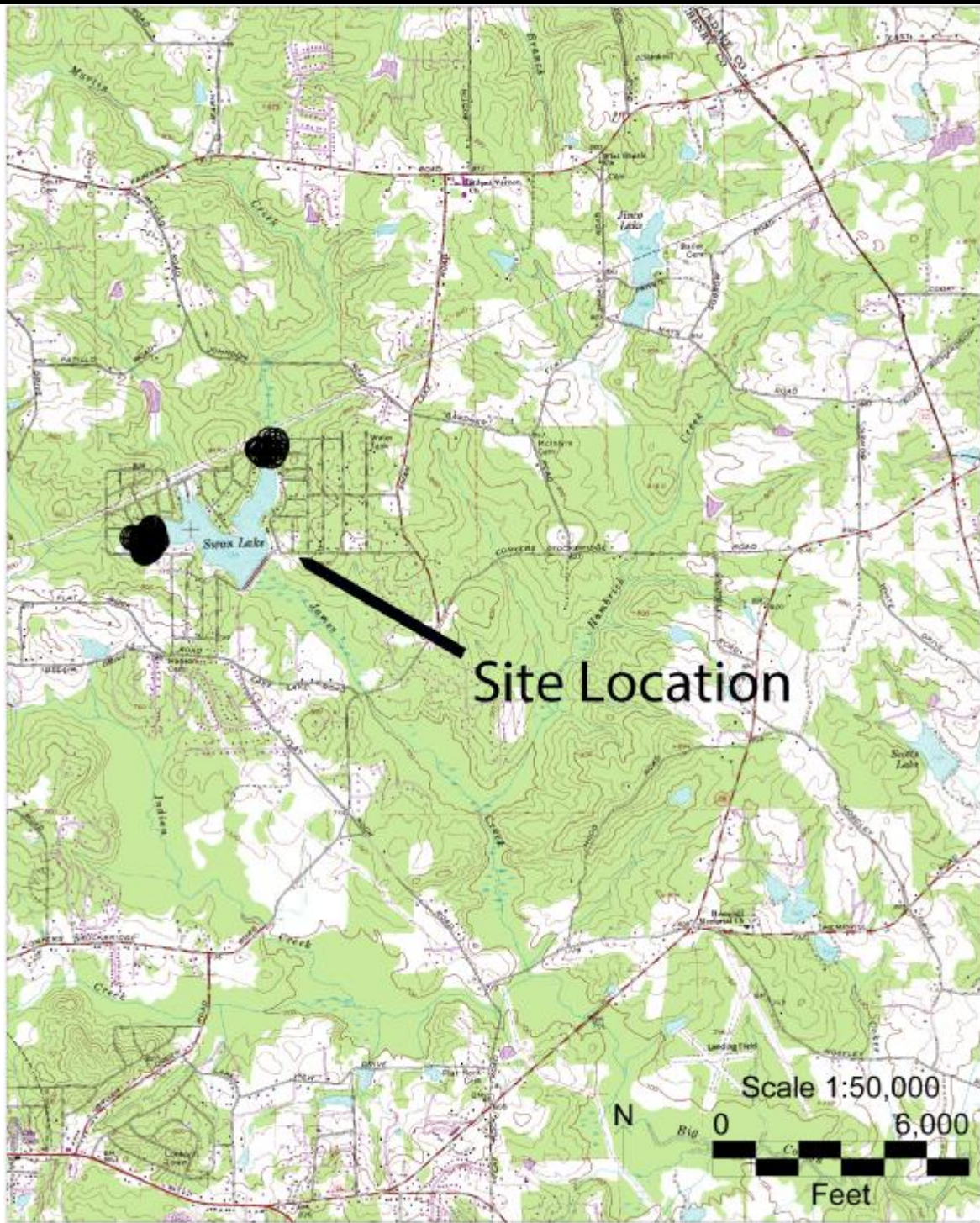
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Attachments:

- Figure 1 – Site Location Map
- Figure 2 – Random Probe Location Map
- Table 1 - Water and Sediment Depth Data



USGS Quad Map Stockbridge, Ga 1962

Figure 1

Project Location Map

Swan Lake
Lake Sediment Assessment

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Figure 2

Random Probe Location Map

Swan Lake Random Probe Assessment

March 17, 2020



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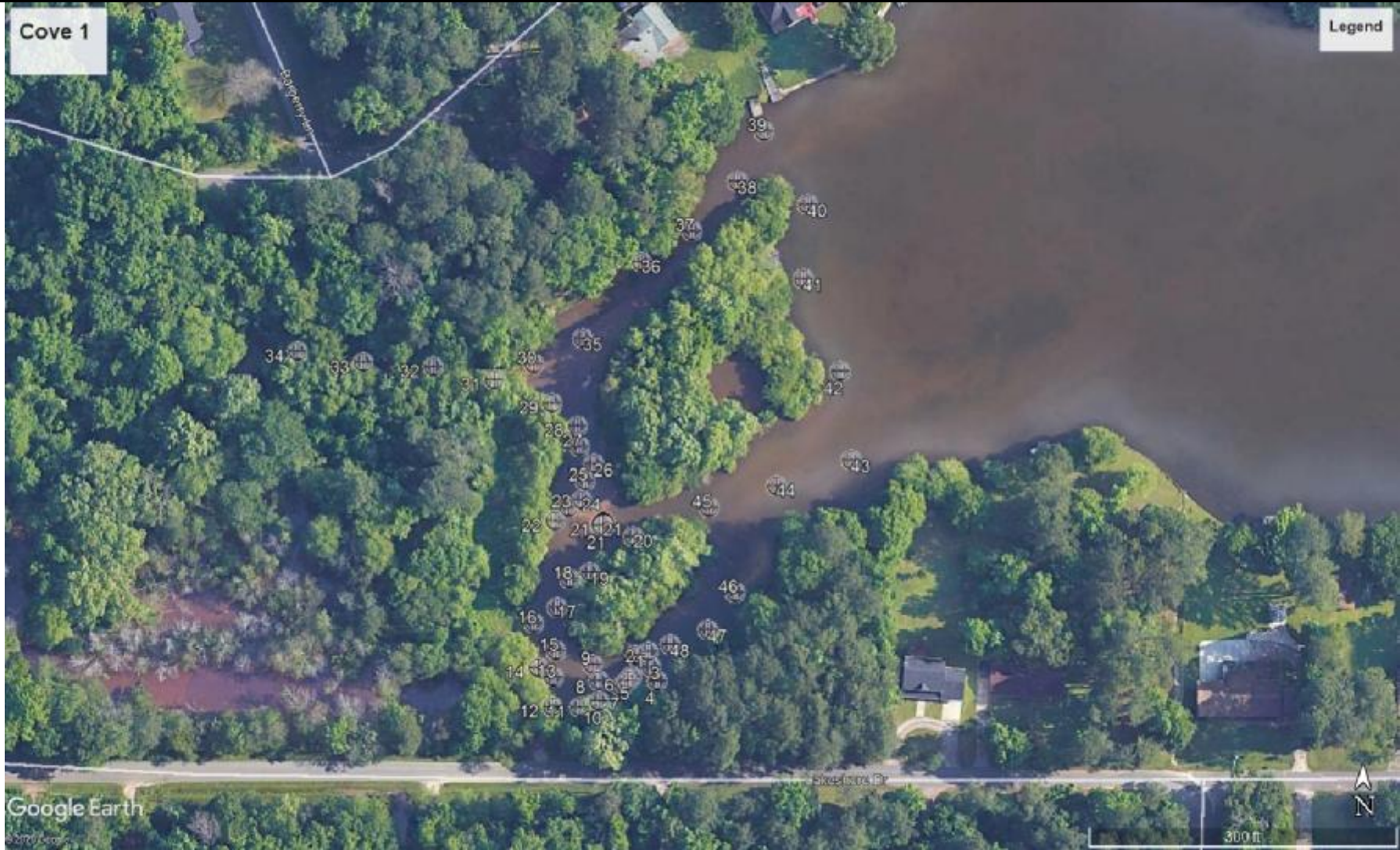


Figure 3 – Cove 1

Random Probe Location Map

Swan Lake Random Probe Assessment

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Figure 2 – Cove 2

Random Probe Location Map

Swan Lake Random Probe Assessment

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Table 1
Sediment and Water Depth Data
Swan Lake
March 17, 2020

Lake Sediment/Water Depth Data

<u>Station</u>	<u>Cove 1</u>		
	<u>Water Depth (ft)</u>	<u>Sediment Thickness (ft)</u>	<u>Lake Depth (ft)</u>
1	0.30	4.50	4.80
2	0.97	4.33	5.30
3	2.25	2.40	4.65
4	0.55	2.40	2.95
5	0.15	4.55	4.70
6	0.15	4.87	5.02
7	0.35	4.77	5.12
8	0.50	4.20	4.70
9	0.00	4.30	4.30
10	1.05	3.97	5.02
11	2.43	1.87	4.30
12	1.34	5.41	6.75
13	1.63	5.65	7.28
14	1.25	4.00	5.25
15	0.43	7.37	7.80
16	2.43	3.85	6.28
17	0.50	8.18	8.68
18	0.33	8.62	8.95
19	0.00	7.88	7.88
20	0.00	8.00	8.00
21	0.00	6.30	6.30
22	0.38	3.31	3.69
23	0.74	6.86	7.60
24	0.40	7.90	8.30
25	0.08	8.23	8.31
26	0.55	5.15	5.70
27	0.00	5.50	5.50
28	0.00	4.81	4.81
29	0.00	5.90	5.90
30	0.65	5.75	6.40
31	0.83	5.97	6.80
32	1.44	3.86	5.30
33	1.50	5.12	6.62
34	1.35	5.91	7.26
35	0.65	6.02	6.67
36	1.03	4.27	5.30
37	0.87	4.14	5.01
38	1.45	2.90	4.35
39	1.15	2.95	4.10
40	1.73	2.28	4.01
41	2.10	2.61	4.71
42	2.05	2.55	4.60
43	2.23	5.57	7.80
44	1.66	3.14	4.80
45	1.55	3.95	5.50
46	2.44	4.86	7.30
47	2.24	2.18	4.42
48	3.04	2.36	5.40
Average	1.02	4.82	5.84

Table 1
Sediment and Water Depth Data
Swan Lake
March 17, 2020

<u>Station</u>	<u>Water Depth (ft)</u>	<u>Cove 2</u>	
		<u>Sediment Thickness (ft)</u>	<u>Lake Depth (ft)</u>
49	3.75	2.50	6.25
50	3.95	3.55	7.50
51	2.73	4.17	6.90
52	1.95	5.65	7.60
53	3.20	1.00	4.20
54	3.00	1.60	4.60
55	2.77	3.53	6.30
56	2.85	1.55	4.40
57	3.13	1.62	4.75
58	3.63	2.62	6.25
59	3.53	4.07	7.60
60	3.16	4.09	7.25
61	4.85	3.27	8.12
62	1.90	4.60	6.50
Average	3.17	3.13	6.30