KALAMAZOO COUNTY DRAIN COMMISSIONER'S

LAKE LEVEL STUDY FOR SUNSET LAKE

SCHOOLCRAFT AND BRADY TOWNSHIPS AND THE VILLAGE OF VICKSBURG KALAMAZOO COUNTY, MICHIGAN

FINAL

February, 2013

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WIGHTMAN & ASSOCIATES, INC.

ENGINEERING ◆ SURVEYING ◆ ARCHITECTURE

KALAMAZOO COUNTY DRAIN COMMISSIONER'S
SUNSET LAKE, LAKE LEVEL STUDY
SCHOOLCRAFT AND BRADY TOWNSHIPS AND THE VILLAGE OF VICKSBURG
KALAMAZOO COUNTY, MICHIGAN

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I. PURPOSE

The purpose of this study is to collect and present data concerning the history and impact of various lake levels on Sunset Lake located in Schoolcraft and Brady Townships and the Village of Vicksburg, Kalamazoo County, Michigan and to recommend the establishment of a legal lake level based upon the data presented. Setting a recommended lake level will:

- maintain historic community identity
- protect property values
- protect the lake environment
- maintain recreational benefit
- reduce shoreline ice damage
- minimize erosion damage from periods of high water
- maintain fisheries, wildlife, and aesthetic values
- designate authority to the Drain Commissioner
- provide a means to share management costs
- provide a means to pay costs associated with the major control structure

The study has been prepared in accordance with the Michigan Department of Environmental Quality procedures for Stabilizing Inland Lake Levels under Part 307, Inland Lake Levels, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. All elevations in this study are referenced to NAVD88. A conversion factor of 0.463' must be added to NAVD88 elevations at this location to calculate equivalent NGVD29 elevations. The lake level prepared for the court by this study is referenced to NAVD88.

II. HYDROLOGY OF WATERSHED

Sunset Lake is located in and north of the Village of Vicksburg, in Kalamazoo County, Michigan. Most of the lake is in Schoolcraft Township; however, a small portion of Sunset Lake is in Brady Township. The dam that controls the level of the lake is located within the Village of Vicksburg. A location map is included as Figure 1 in the Appendix to this report.

Sunset Lake is located in the north central portion of the St. Joseph River Watershed and is approximately 10,000 feet long with a width that varies from 150 feet to 1,100 feet. Sunset Lake has a total surface area of approximately 97 acres. These measurements were taken from the USGS Quadrangle Map included as Figure 2 in the Appendix.

The watershed for Sunset Lake consists of 37.3 square miles and includes a large portion of the City of Portage including Sugarloaf, Hogset, Gourdneck, Austin, West, and Long Lakes. This watershed by definition is the land area that would normally drain to Sunset Lake. It should be recognized that the watershed includes some areas, usually depressions that will not drain to a lake or river, that will percolate into the surrounding soil. The contributing drainage area is the area that will always drain into Sunset Lake, and is calculated to be 28.3 square miles. The watershed and contributing drainage area were calculated by the Michigan Department of Environmental Quality (MDEQ) for this report.

The surface topography in this watershed is a typical outwash glacial topography and it varies from flat to gently rolling hills. The soils in this area are outwash deposits that range from sand to gravel, and post glacial alluvium. Kalamazoo loam is the dominant soil type surrounding the lake. At a depth of about 36", the texture is loamy coarse sand which gradually changes to gravelly sand at a depth of 60".

The flood frequency discharges for Portage Creek at the Sunset Lake Dam were calculated by the MDEQ. The chance peak flows were estimated to be: 140 cubic feet per second (cfs) for the 10 year, 300 cfs for the 50 year, 360 cfs for the 100 year, 460 cfs for the 200 year, and 600 cfs for the 500 year chance storm. See Figure 3 in the Appendix for a copy of the MDEQ e-mail.

III. HYDRAULICS OF OUTLET CHANNEL

Sunset Lake was formed by the construction of a dam on Portage Creek between Gourdneck Lake and Barton Lake; originally constructed by John Vickers in 1831 to operate a grist mill. The people of Vicksburg now refer to the incoming stream from the north as Gourdneck Creek and the outgoing stream as Portage Creek. The current major outlet control structure located on Portage Creek south of West Washington Street in the Village of Vicksburg was constructed by the Lee Paper Company in 1905 to operate and furnish clean water to their paper mill. The dam failed in 1991 and was rebuilt in 1992.

Gourdneck Creek is the only inlet into Sunset Lake, which flows south from Gourdneck and Austin Lakes into the northern end of Sunset Lake. There are two (2) outlets from Sunset Lake. One outlet is located in the south end of the channel on the southeast corner of the lake. This is a minor outlet and consists of an 18" culvert that extends beneath West Prairie Street near downtown Vicksburg. This minor outlet control structure feeds a stream that flows through the Village of Vicksburg's Clark Park. There is a control structure located on this outlet in the channel which consists of a 2'-0" square by 18" high concrete structure with the upstream side open with steel channels for holding wooden gates to control the water elevation entering the 18" culvert. The invert of the structure is at an elevation of 845.35' and the top of the structure is at 846.85'. The water upstream of the structure can be set to enter the structure at any elevation between these two (2) points. On the day that these elevations were obtained, October 6, 2011, there were no wooden gates in the structure and the water was flowing into the 18" culvert from a water surface elevation of 846.25' or a height of 0.90' above the 18" culvert invert. This provided a flow through the park on that date of 2.80 cfs or 1,260 gpm.

The major outlet from Sunset Lake is the control structure on Portage Creek located south of West Washington Street in the Village of Vicksburg. This is a concrete structure that consists of three (3) spillways, each between 2.5' and 3.0' (2.58', 2.93' and 2.75') wide with a total operable width of 8.26' and a depth of 7.3', ranging from a maximum elevation of 846.37' to a minimum elevation of 839.07'. The elevation of each spillway is set by placing boards in grooves set in the concrete walls of the spillways. On October 6, 2011, the elevation of the boards in each spillway from west to east was 845.89', 845.26', and 845.65' respectively. The water surface elevation on that date at the control structure was 846.23'. The flow over the dam based upon these elevations would be approximately 14.2 cfs or 6,390 gpm. West Washington Street west of S. Mill Street actually acts as a third outlet control for Sunset Lake, as the height of the road (847.28') is slightly lower than the top of the major outlet control structure (847.42').

With the spillway boards set at their current elevations, the maximum flow through the control structure before topping the dam is approximately 72.0 cfs or 50% of the estimated 10 year storm flow. This requires that fluctuations in flow above 72.0 cfs must be taken up by storage in the lake or by removal of the boards or a combination of both. The current lake level is 1.08' below West Washington Street (847.28') which does not provide a great deal of storage before the dam is topped. The dam was topped in September of 2008 when greater than a 200 year storm occurred. When setting the legal lake level, the capacity of the outlet structure must be considered.

IV. Recommendations For The Most Desirable Lake Level Based On:

A. Sunset Lake Water Surface Elevations

There is a staff gage attached to the southern face of the major outlet control structure on Portage Creek located south of West Washington Street. On October 6, 2011, the water level on the staff gage read 7.00' and the elevation of the water surface at the staff gage was measured to be 846.23'. Four years of records for this staff gage were obtained, from March, 2002 through March, 2006 but historical survey data linking historical gage height to the USGS height was not well established. Records of readings on the gage ranged from a high of 7.70' to a low of 6.90'. If the relationship measured on October 6, 2011 is equivalent to the historical relationship, this would correspond to elevations of 846.93' to 846.13'. The notes on the staff gage log indicate that a gage reading of 7.70' (846.93') was a flood condition and that anytime the water was above 7.50' (846.73') boards were removed from the control structure to reduce the risk of flooding. The average water surface elevation for this period appears to be between 7.20' (846.43') and 7.30' (846.53').

B. Septic Tank / Drain Field Levels in Low Lying Areas

All of the homes on the northwest side of Sunset Lake, north of McKain Street are on septic systems. The balance of the lake is served by sanitary sewers. Approximately 30 riparian parcels on the lake have septic systems at elevations just above 848.00'. Current sanitary code requires 4 feet of unsaturated soil between the bottom of the septic system and the groundwater surface level. Mound systems are allowed if depth to groundwater is greater than 2 feet. Viruses are treated in the first 16" of the system and bacteria by 3 to 4" if the vertical separation below the septic system is unsaturated. If the legal lake level were 846.00', mound systems can legally be constructed at elevations 848.00'. Shallow (those with only 6" of cover) drain field and trench systems would be allowable at 851.7'. According to the Kalamazoo County Health and Community Services Environmental Health Department, at least 8 of the parcels have had to replace failing systems at least once.

A sanitary sewer currently extends to McKain Street. An extension of sanitary sewer is estimated to cost about $12,000 per parcel if residents petition to extend the system. The current cost of borrowing makes this an attractive option. Another option available for residents with high groundwater who prefer on-site sewage systems is a pump and haul system.

There are two open Leaking Underground Storage Tank sites near the Lake: one at 200 W Prairie St (Heimstra Sunoco) and 223 W Prairie (Speedway #6615). Both sites have groundwater contamination. A change in groundwater level associated with setting a lake level will not change the direction of groundwater flow and should have a minimal effect on their clean up progress.

C. Questionnaire Results

A questionnaire was sent to all Sunset Lake waterfront property owners at the end of September, 2011. A copy of the questionnaires received with the results is included in the Appendix as Figure 4. A total of 30 questionnaires were received, all from property owners. No tenants responded. Seven (7) of the responses were for Village of Vicksburg property and 23 were from private citizens. Twenty-five respondents indicated they were in favor of an established lake level for Sunset Lake.

Figure 5 in the Appendix graphically shows the response to question #5: at what elevation would you like the lake level set, higher, lower, or the same. Eleven responses (including seven [7] from the Village of

Vicksburg) want a higher level, six (6) a lower level, and nine (9) the same level. Six of the seven respondents on the east shore said that they wanted the legal lake level lower. There is approximately 1,665' of shoreline occupied by residents on the eastern shore. The shoreline associated with the six respondent's parcels is about 1,300', or 78% of the total east shore frontage. Some of the reasons expressed by the east shore residents for lowering the level include: two house flooding's, one yard flooding, shoreline erosion, and ice damage. Erosion damage was noted at nine properties around the lake. Two house flooding's and septic problems were also noted on three properties on the west shore north of McKain St.

Figures 6, 7, and 8 in the Appendix graphically depict the responses to questions 6, 7, 9, 10, and 11. Only one (1) person responded that the lake level affected their septic system while eight (8) people indicated flooding was a problem. Twenty-nine out of 30 responses indicated aquatic weed growth was a problem to be considered in setting the lake level while only three (3) indicated that ice damage was a problem. Twelve responses indicated that erosion was a problem during high water periods. The questionnaires received indicate a wide range of responses that must be considered when setting a legal lake level for Sunset Lake.

D. Recreational Uses of the Lake

Sunset Lake is a recreational lake that is used for fishing, boating, and wildlife viewing. Raising or lowering the lake significantly could have a negative effect on its ecosystem. Raising the lake level would reduce the growth of aquatic weeds, improving the boating and fishing. Too significant of a raise in lake level would flood nesting habitat and fish spawning areas. Significantly lowering the lake level would increase aquatic weed growth and negatively impact boating and fishing.

E. Levels At Which Shore Erosion and/or Ice Damage Occurs

As shown on Figure 4 in the Appendix, three (3) responses to the questionnaire indicated problems with shoreline ice damage and 12 people indicated erosion problems during high water periods. Figure 8 in the Appendix graphically depicts the responses concerning ice and erosion damage.

F. Fisheries and Wildlife Habitat

Dr. Pat Crowley, the Kalamazoo County Drain Commissioner (KCDC), contacted the Michigan Department of Natural Resources (MDNR) on October 10, 2011 concerning the existence of any endangered species in or around Sunset Lake. The MDNR has determined that there are no endangered plants or wildlife in the Sunset Lake area and that there are no endangered species of fish in Sunset Lake. A copy of Dr. Crowley's letter is included in Figure 9 of the Appendix.

According to a list provided by MDNR Southern Lake Michigan Management Unit Fisheries Biologist, Brian Gunderman, all fish found in Barton Lake, with the exception of Ciscoes, exist in the waters above the dam. The wetlands at the north end of Sunset Lake likely provide spawning habitat for northern pike, yellow perch, and spotted gar (a species of special concern in Michigan). Juvenile fish of many fish species utilize wetlands for cover and foraging habitat. Several reptile and amphibian species also inhabit this wetland complex. For example, five turtle species were captured during the 2005 fisheries survey on Gourdneck Lake: snapping turtle, common musk turtle, common map turtle, painted turtle, and spiny softshell turtle. It is probable that most or all of these species also inhabit Sunset Lake. As discussed in the Conservation Guidelines report, altering water level fluctuations can affect vegetation abundance and the species composition of the aquatic plant community (e.g., by converting emergent wetlands to submergent wetlands). Of course, any alterations of the plant community can have cascading effects on the animals that depend on those plant communities for food, cover, or spawning habitat.

Ciscoes (a state threatened species) have been collected in Barton Lake. There are no records indicating that this species has been collected upstream of Barton Lake. The state threatened spotted turtle has been collected around Gourdneck Lake and may occupy the wetlands on Sunset Lake.

G. The Effect of Levels on Aquatic Weed Growth

Twenty-nine out of the 30 responses received indicated that aquatic weed growth was a problem at the current lake level. Sunset Lake is a relatively shallow lake and aquatic weed growth is a problem due to its shallow depth. Due to the various considerations of establishing the lake level (environmental concerns, erosion and ice damage, etc) and the already shallow depth of Sunset Lake, it will not be feasible to change the level of the lake by more than 0.50' higher or lower from the observed water surface elevation (846.2). This minor change in level would not significantly impact the current aquatic weed problem. Research shows that nitrates will leach from septic systems in sandy soils but that nutrients are associated with algal growth, not macrophyte growth.

H. Recommended Lake Level

There are a number of factors that must be considered when establishing a legal lake level. These factors include historic levels, impact on septic systems, public opinion, recreational uses, shore erosion and ice damage, fisheries and wildlife habitat, and aquatic weed growth, all of which have been previously discussed in this report. Based upon historic lake levels, the elevation of Sunset Lake has averaged 0.3' to 0.4' above the elevation of 846.20' measured on October 6, 2011. Public opinion is split as to whether the lake level should be raised, lowered, or left the same. Recreational uses, fisheries and wildlife habitat, and aquatic weed growth will not be affected by a minor change in water elevation (+/- 6"), up or down. Ice and erosion damage would be reduced if the lake level were lowered.

The current lake level of 846.20' provides a freeboard elevation of 1.08' below West Washington Street. The freeboard dimension determines the storage capacity available before a flood flow tops the dam, or in this case, West Washington Street. The amount of storage determines the amount of time available to react to major storm events, allowing board removal from the spillway as needed.

Considering all of the factors listed above, it is recommended that the normal legal level of Sunset Lake be set at 846.00' (NAVD88). This elevation will increase the freeboard by almost 0.2', reduce ice damage and shore erosion, maintain recreational benefits, maintain flows in the Vicksburg Park, protect property values, and maintain fisheries, wildlife, and aesthetic values. Conversion to an equivalent NGVD29 elevation is discussed in Section 1, page 2.

V. RECOMMENDATIONS FOR PRACTICAL METHODS OF MAINTAINING AND MANIPULATING THE PROPOSED LEGAL LAKE LEVEL

The existing major control structure located south of West Washington Street is adequate to control the level of Sunset Lake. By adjusting the elevation of the three spillways by removing/adjusting the wooden stop logs, the proposed Lake level of 846.00' (6.80 on the staff gauge) can be maintained. An inspection and report of this dam and control structure was prepared in December of 2003 by Ayres, Lewis, Norris, & May, Inc. of Ann Arbor, Michigan. This report found the condition of the dam and facilities to be good and that the structure had adequate spillway capacity with the following assumptions:

1. The areas which would experience overtopping are adequately maintained.
2. The bar grates at the West Washington Street culvert can be removed or kept free of debris during storm events.
3. Stop logs can be removed during a flood event.

The 2003 report classifies this structure as a small size high hazard dam according to Section 31518 of Act 451 of 1994. High hazard dams require an inspection by a licensed professional engineer every three years and therefore an inspection of this dam is overdue and should be scheduled in the near future. The recommendations of the 2003 report indicate that little work is required to maintain the dam in good condition. Those recommendations are as follows:

1. The owner should continue to keep equipment on hand or have immediate access to equipment required to break or cut the stop logs in an emergency situation.
2. Periodic (weekly, as well as during and after rainfall events) checking and cleaning (if necessary) of the grating at the Washington Street culvert should be continued.
3. Continue to periodically monitor the impact of trees adjacent to the right abutment wall. Remove brush from the left downstream embankment immediately adjacent to the left abutment.
4. A daily log of water elevation, stop log setting and miscellaneous operations should be kept.
5. The 1999 EAP Notification Flow Chart has been updated and is located in the Appendix. The owner should also update those contacts identified in Section 5 of Administrative Rule 11 of Part 315 of the NREPA.

This style of dam requires very little maintenance, however, it does require constant monitoring of the level and the removal or addition of stop logs as required to maintain the lake level. This is particularly important during flooding conditions. As a minimum, normal maintenance should include the following, all of which should be included in a log book for future reference:

1. Weekly visual inspection of the dam, particularly after high flows are experienced. The southern bank of the major control structure must be kept free of all trees and brush.
2. Daily log of the water elevation and stop log setting.
3. Date and number of stop logs removed or added.
4. High water complaints by surrounding residents.
5. Description of maintenance work and dates performed.
6. Monitor water level during storm events and remove stop logs as needed to prevent flooding. During a flood or emergency drawdown condition, the removal of stop logs would most likely require breaking out or cutting of the stop logs. This is the most efficient means of removing the stop logs in an emergency condition.

VI. ESTIMATED COST OF PROJECT INCLUDING ANNUAL MAINTENANCE AND TRIENNIAL INSPECTIONS

Since the existing structure is operational, and not in need of significant repairs, the cost of improvements is minimal. Per the previous inspection report, and the dam's classification as a small high hazard dam, a dam inspection is required every 3 years. The last inspection was performed in 2003, therefore an immediate dam inspection by a professional engineer will be required, and an additional inspection in 3 years will also need to be budgeted before the transfer is complete. Each inspection is estimated to cost $2,500.

It is apparent that some fallen trees and branch clearing is required to alleviate potential erosion concerns adjacent to the control structure. We would also recommend that most, if not all, of the control structure boards be replaced, due to the unknown age of the boards. The estimated cost for this work is $4,500. Additional items to be added to the project cost include the Lake Level study, district mapping, and other miscellaneous costs which totals $19,000.

The total estimated cost to be assessed for the project is $26,000. The Kalamazoo County Drain Commissioner's Office has prepared a 'Computation of Cost of Construction' for the project. The sheet details the specific costs associated with the assessment, and is included in Figure 11 in the appendix.

VII. Recommended Assessment District Boundaries

The Kalamazoo County Drain Commissioner's Office has prepared an Assessment District Boundary Map for the project. The map, included in Figure 10 in the appendix, includes 56 riparian parcels under 0.8 acres, 11 riparian parcels over 0.8 acres and under 20 acres, and 6 parcels over 20 acres. There are also 59 back lot parcels, and 8 properties are considered exempt from paying at large assessment.

VIII. Recommended Apportionment Of Assessment Within The District

The recommended apportionment of assessment is proposed to occur on three levels: small lot size riparian, regular lot size riparian, large lot riparian, and back lots. Based on the district assessment map, it is anticipated that the assessments will be spread as follows: 10% to the County ($2,600), 20% to the Village of Vicksburg ($5,200), 3% to Brady Township ($780), 7% to Schoolcraft Township ($1,820) and the remaining 60% to the property owners ($15,600). The list of property owners within the assessment district is included on map in the assessment district map in Figure 10.

IX. ESTIMATED COST TO INDIVIDUAL PROPERTY OWNERS AND POLITICAL SUBDIVISIONS

The estimated cost for the small lot riparian (0.8 acres or less), regular lot riparian (0.8 acres to 20 acres), the large lot riparian (20 acres or larger) and the back lots are $150, $225, $300 and $50 respectively.

Counts and assessments are approximate due to some adjustments which combine small parcels with others at the same address and other adjustments made at the day of review.

X. AN ENVIRONMENTAL ASSESSMENT OF THE PROPOSED ACTION

The proposed lake level of 846.00 will not have a significant effect on the existing wildlife and fisheries habitat. The proposed lake level is 0.2' lower than the observed water elevation in October, 2011; and is at the low end of the operating range of the historical elevation records. The environmental considerations utilized in determining the recommended lake level are included in Section IV of this report. No additional environmental assessment will be performed.

XI. Conclusions And Recommendations

It is recommended that the normal legal lake level of Sunset Lake be established at 846.00 and that the lake continues to be controlled using the existing control structure just south of West Washington Street. The existing structure is in good condition, and will only require the replacement of boards, a dam inspection and minor tree and limb clearing to prevent future erosion.

As mentioned in Section VI, the estimated improvements and budget items total $26,000. Annual fees should also be budgeted in the Kalamazoo County Drain Commissioner's budget to allow for regular monitoring as discussed in Section V. A reasonable fee of $500 should be budgeted annually for routine operations, and approximately $2,500 ($833 per year) for triennial dam inspections in the future.

FIGURE 1

SUNSET LAKE LOCATION MAP

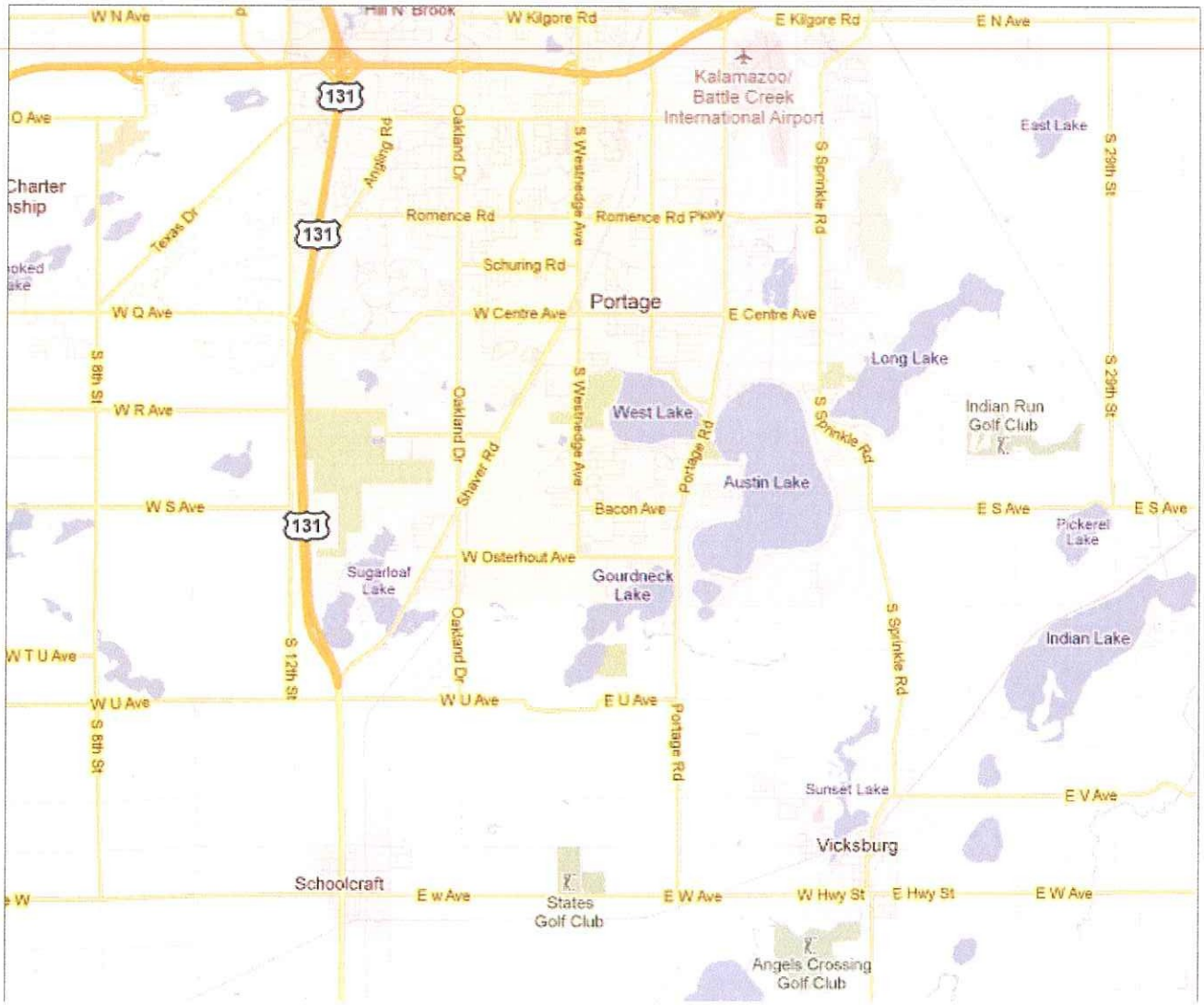
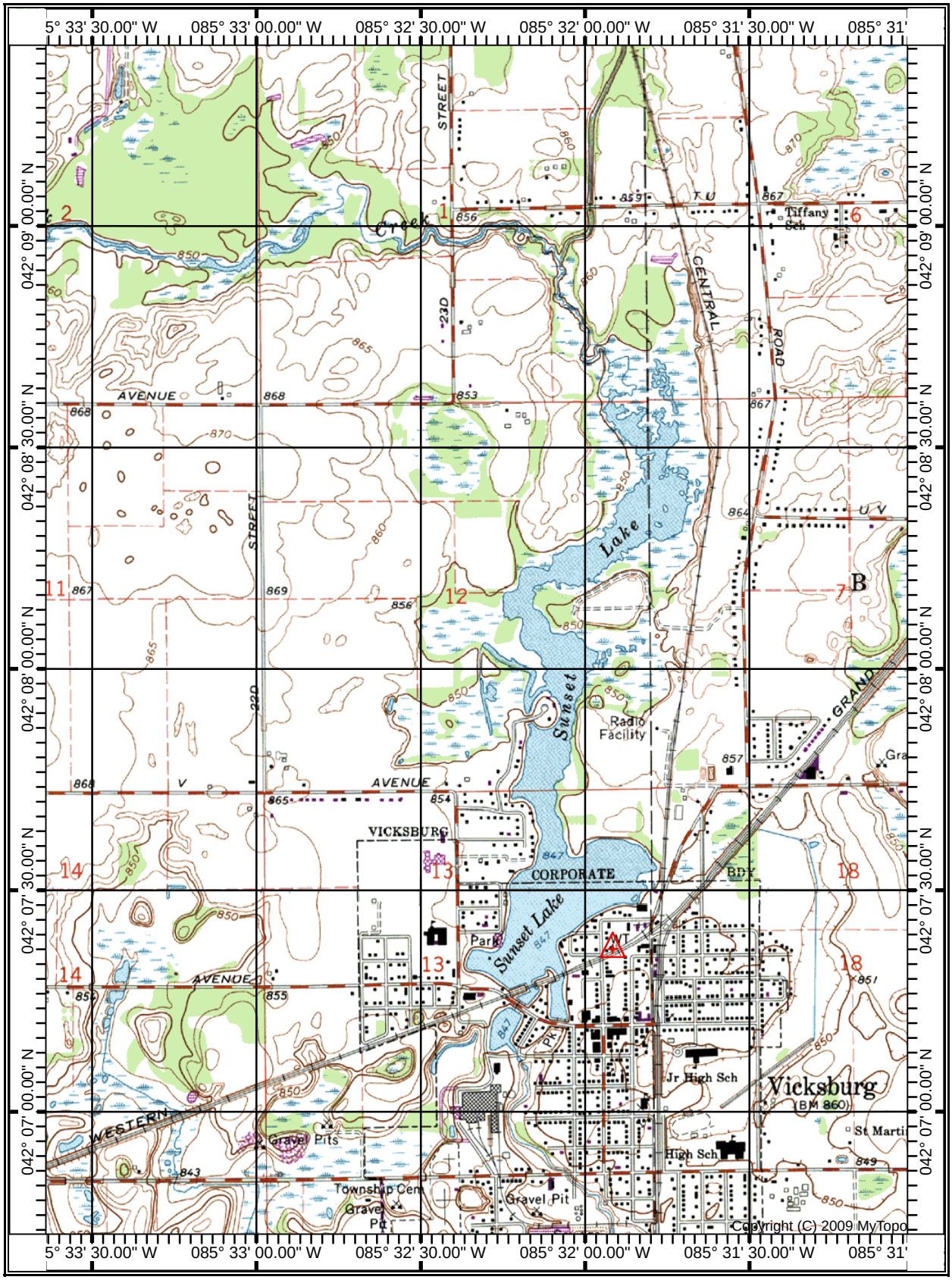


FIGURE 1 – SUNSET LAKE LOCATION MAP

FIGURE 2

USGS QUADRANGLE MAP OF SUNSET LAKE



SCALE 1:24000

0 1000 2000 3000 4000 5000 6000 7000

FEET

FIGURE 2 - USGS MAP OF SUNSET LAKE

FIGURE 3

MDEQ FLOOD FREQUENCY DISCHARGES

From: Oscar R. Loveless
To: Thomas A Deneau; Stephen C. Carlisle
Subject: FW: flood or low flow discharge request (ContentID - 168812)
Date: Wednesday, October 19, 2011 1:42:43 PM

Sunset Lake - Lee Paper Company Dam 144 Hydraulics Oscar

-----Original Message-----
From: deq-wrd-qreq [mailto:deq-wrd-qreq@michigan.gov]
Sent: Wednesday, October 19, 2011 1:15 PM
To: Oscar R. Loveless
Subject: RE: flood or low flow discharge request (ContentID - 168812)

This reply is being sent via email only.

We have estimated the flood frequency discharges requested in your email of September 20, 2011 (Process No. 20110330), as follows:

Portage Creek at Lee Paper Company Dam (Sunset Lake), Dam ID 144, Section 13, T4S, R11W, Village of Vicksburg, Kalamazoo County, has a total drainage area of 37.3 square miles and a contributing drainage area of 28.3 square miles. The design discharge for this dam is the 0.5% chance (200-year) flood. The 10%, 2%, 1%, 0.5%, and 0.2% chance peak flows are estimated to be 140 cubic feet per second (cfs), 300 cfs, 360 cfs, 460 cfs, and 600 cfs, respectively. (Watershed Basin No. 34 St. Joseph).

Please include a copy of this letter with your inspection report or any subsequent application for permit. These estimates should be confirmed by our office if an application is not submitted within one year. If you have any questions concerning the discharge estimates, please contact Ms. Susan Greiner, Hydrologic Studies and Dam Safety Unit, at 517-241-1210, or by email at: GreinerS@michigan.gov. If you have any questions concerning the hydraulics or the requirements for the dam safety inspection report, please contact Mr. Luke Trumble of our Dam Safety Program at 517-335-3170, or by email at: TrumbleL@michigan.gov.

-----Original Message-----
From: Oscar R. Loveless [mailto:oloveless@wightman-assoc.com]
Sent: Tuesday, September 20, 2011 4:41 PM
To: deq-wrd-qreq
Subject: flood or low flow discharge request (ContentID - 168812)

Requestor: Oscar R. Loveless
Company: Wightman & Associates, Inc
Address: 2303 Pipestone Road
City: Benton Harbor, MI
Zip: 49022
Phone: 269-927-0200 x 322
Date: 9/20/2011
F10percent: Yes
F2percent: Yes
F1percent: Yes
F0.5percent: Yes
F0.2percent: Yes
ContactAgency: None Selected
ContactPerson:
Watercourse: Portage Creek outlet of Sunset Lake
LocalName:
CountyLocation: Kalamazoo
CityorTownship: Vicksburg

Section: 13
Town: 04S
Range: 11W
Location: Dam #144 (Former Lee Paper Company Dam) Outlet of Sunset Lake into Portage Creek in the Village of Vicksburg in Schoolcraft Township
FFR1: Other

Content-Length: 164017

FIGURE 4

QUESTIONNAIRE

FIGURE 4

SUNSET LAKE – LAKE LEVEL STUDY
KALAMAZOO COUNTY DRAIN COMMISSIONER'S
QUESTIONNAIRE
(With Summary of Answers)

Your response to this questionnaire will help in the investigation of establishing a lake level on Sunset Lake.

1. Please provide your name and address details below:

   Name:_____ Telephone:_____

   Home Address:_____

   _____

   Sunset Lake Address: (If different)_____

   _____

2. How long have you been at the Sunset Lake Address? 5 to 100 Years
3. Your status with regard to this property? (Check one)

   21 Owner residing or conducting business at property

   0 Tenant

   2 Owner not residing or conducting business at property

   7 Other (please specify) (Parks & Village Property)

4. Are you in favor of an established lake level on Sunset Lake?

   25 Yes (1-don't know; 2-need more information)

   1 No

5. At what elevation would you like the lake level to be established relative to the dam elevation?

   11 Higher, ____' (+0.5' was most common request for increase)

   6 Lower, ____' (-0.25' was most common request for lower)

   9 Same (2 – need more information)

6. Does the existing lake level affect your septic tank/field?

   1 Yes

   29 No

7. At your Sunset Lake address have you ever experienced? (Please check all that apply.)

   4 Flooding in your yard area.

   6 Flooding above habitable floor (house).

   20 I have never experienced flooding.

8. If you have experienced flooding, during what time of year did it occur?

   2 Winter

   4 Spring

   2 Summer

   4 Fall

   *Provide number of occurrences _____ and dates of flooding, if known_____

9. Do you consider aquatic weed growth a problem in the lake at current lake levels?

   29 Yes

   1 No

10. Do you have shoreline ice damage to your property? (Does not include structures; such as docks.)

   3 Yes

   27 No

11. Do you have erosion damage to your property during periods of high water in the fall and spring?

   12 Yes (2-Maybe)

   16 No

Please feel free to add written comments and opinions to this Questionnaire and return to:

Wightman & Associates, Inc.
2303 Pipestone Road
Benton Harbor, MI 49022
Attn: Mr. Steve C. Carlisle

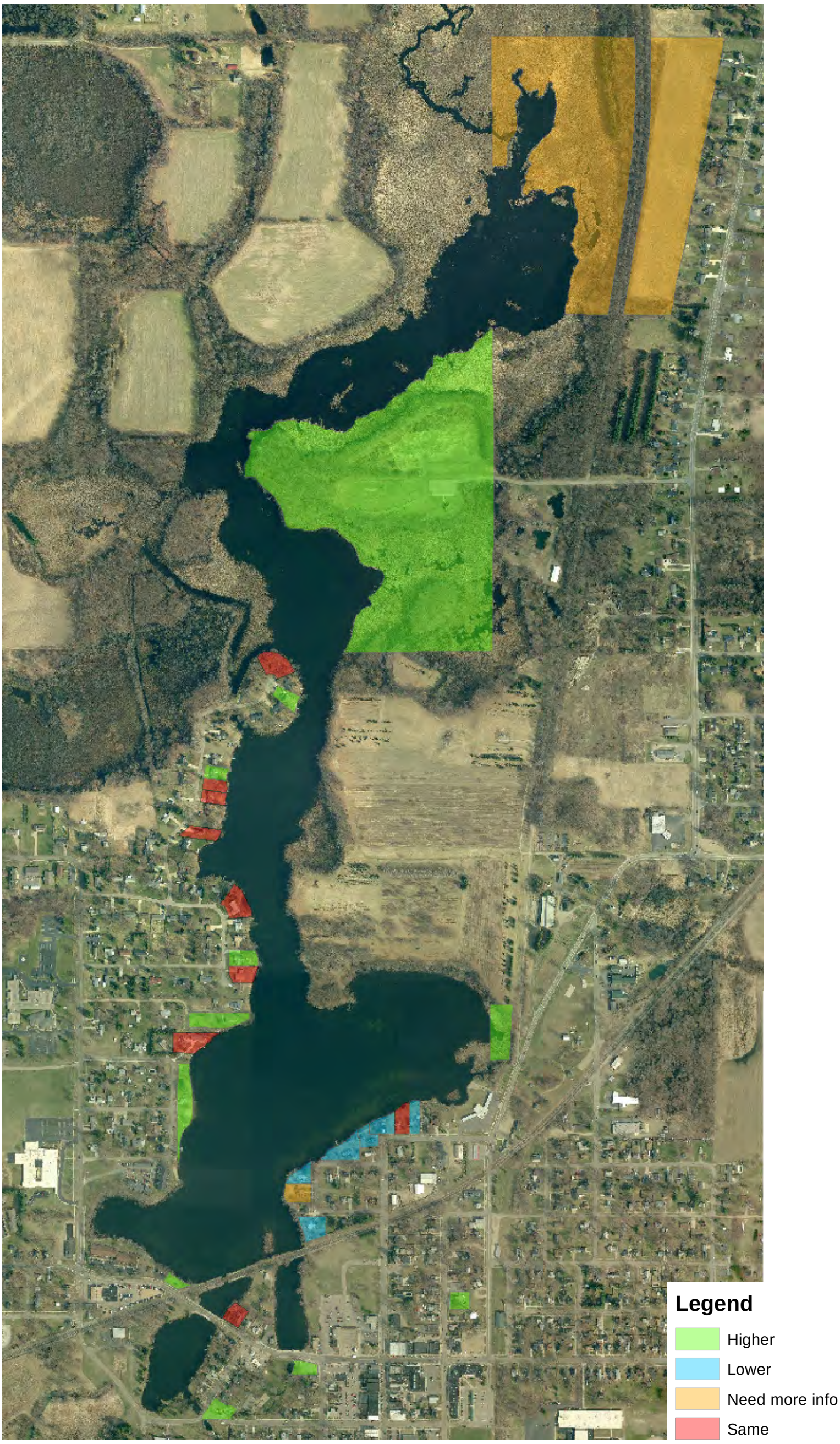
Questions received after Friday, October 14, 2011 will not be considered.

FILLING OUT THIS QUESTIONNAIRE DOES NOT OBLIGATE YOU IN ANY WAY.

FIGURE 5

QUESTION #5 - LAKE LEVEL HIGHER, LOWER, OR SAME

Question #5:
Would the property owner like the lake level raised, lowered or left the same?



500 0 500 1,000 1,500 2,000 Feet

N

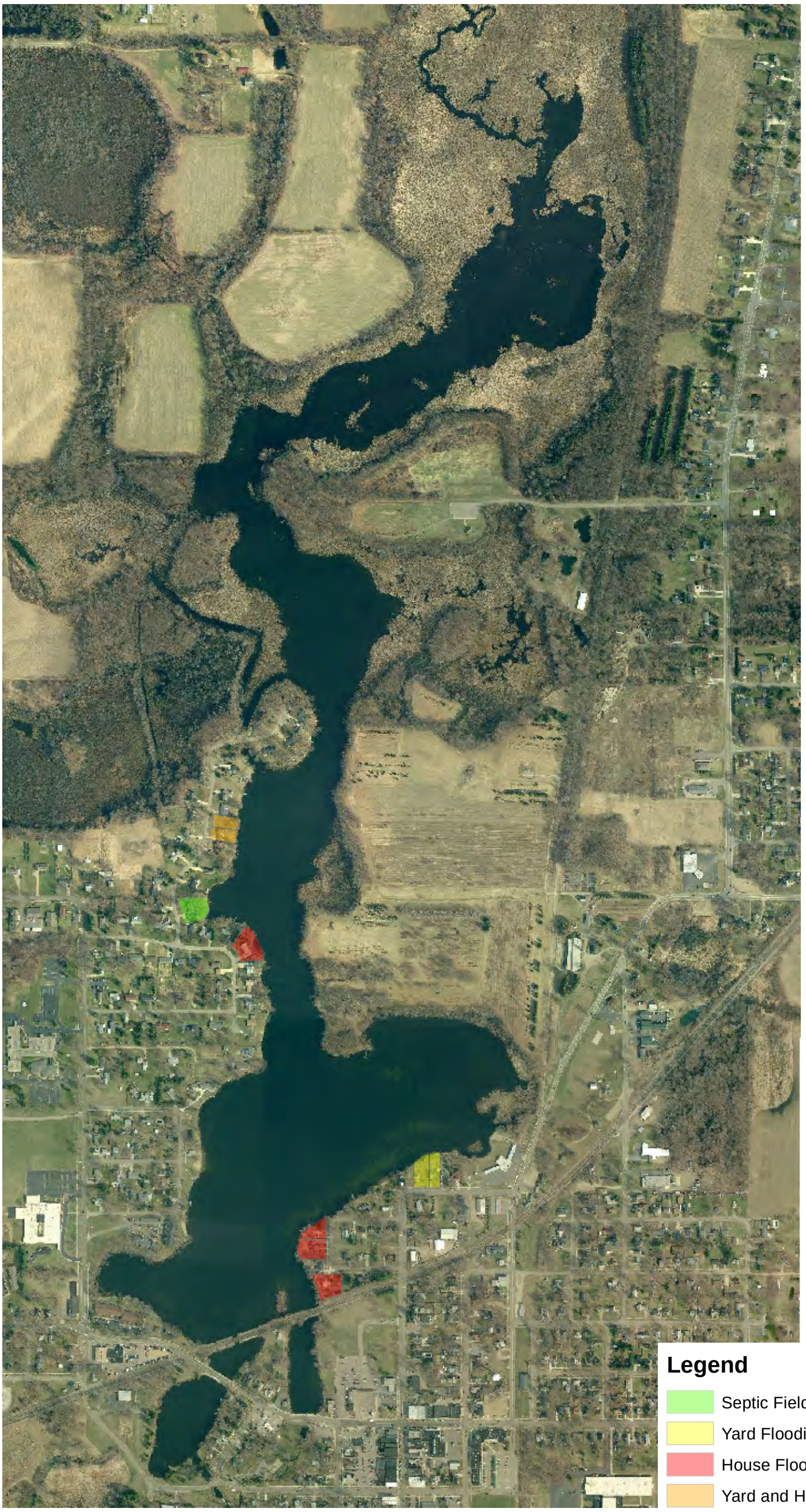
Figure #5

WIGHTMAN & ASSOCIATES, INC.
ENGINEERING ◆ SURVEYING ◆ ARCHITECTURE

FIGURE 6

QUESTION #6 - SEPTIC, QUESTION #7 - FLOODING

Question #6: Does the existing lake level affect property owners' septic tanks/fields?
Question #7: Has the property owner experienced flooding in their yard or house?



500 0 500 1,000 1,500 2,000 Feet

N

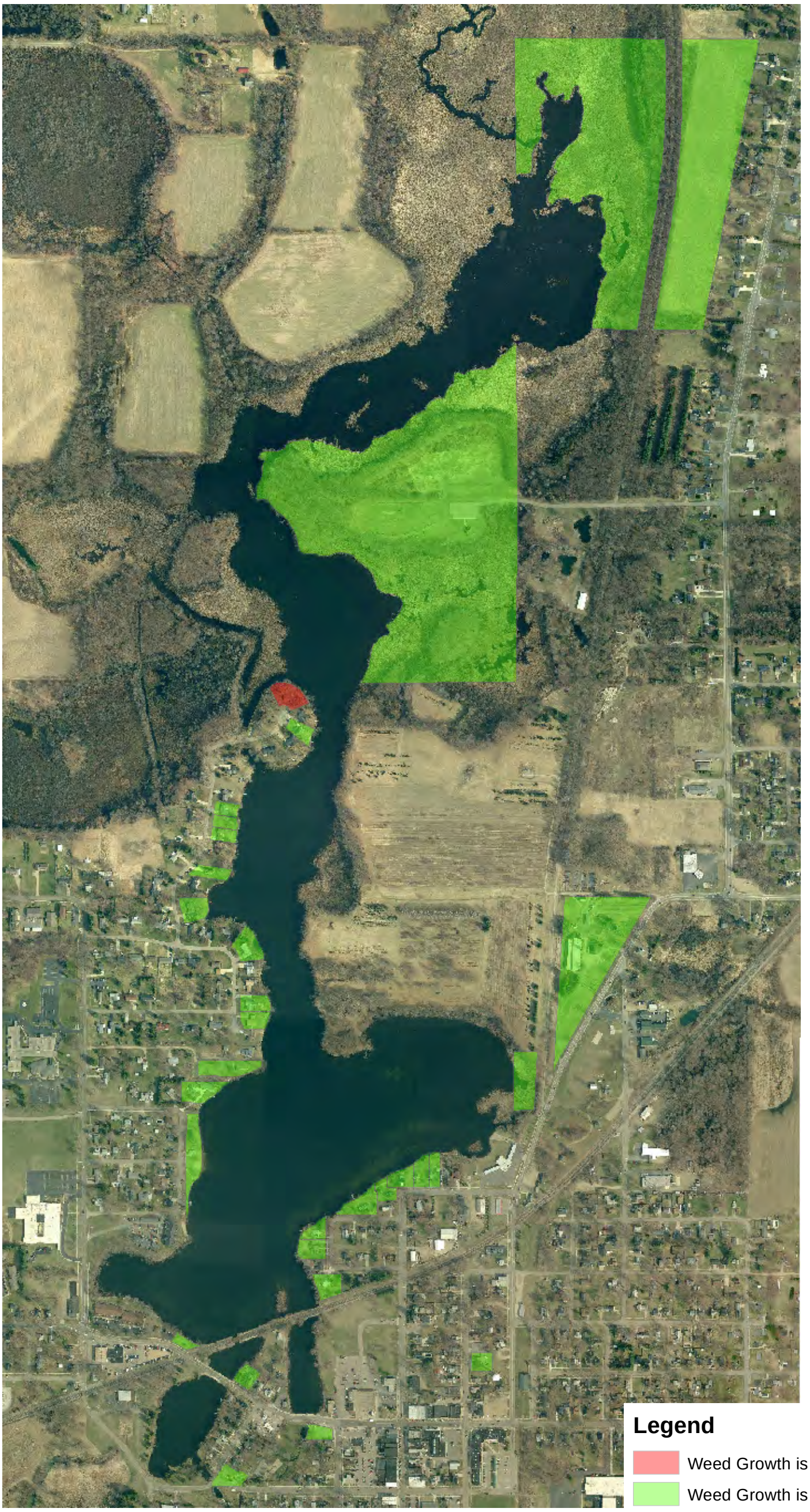
Figure #6

WIGHTMAN & ASSOCIATES, INC.
ENGINEERING ◆ SURVEYING ◆ ARCHITECTURE

FIGURE 7

QUESTION #9 – WEED GROWTH

Question #9:
Does the property owner consider aquatic weed growth a problem in the lake at current lake levels?



500 0 500 1,000 1,500 2,000 Feet

N

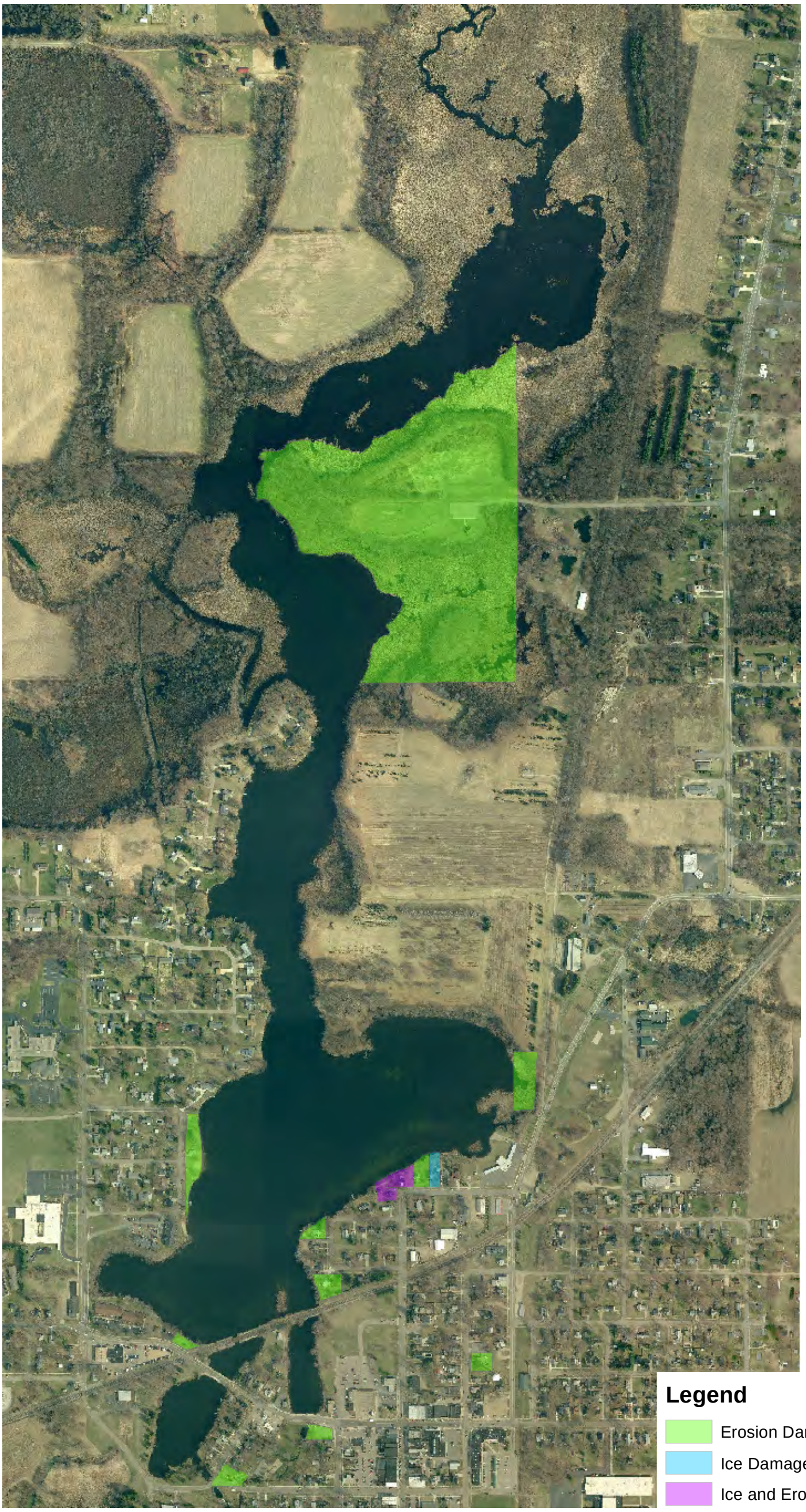
Figure #7

WIGHTMAN & ASSOCIATES, INC.
ENGINEERING ◆ SURVEYING ◆ ARCHITECTURE

FIGURE 8

QUESTION #10 – ICE DAMAGE, QUESTION #11 - EROSION

Question #10: Has the property owner experienced shoreline ice damage?
(Does not include structures, such as docks.)
Question #11: Has the property owner experienced erosion damage during high water periods?



500 0 500 1,000 1,500 2,000 Feet

N

Figure #8

WIGHTMAN & ASSOCIATES, INC.
ENGINEERING ◆ SURVEYING ◆ ARCHITECTURE

FIGURE 9

ENDANGERED SPECIES ASSESSMENT

Endangered Species Assessment for Sunset Lake, Vicksburg, MI

Pat Crowley, 10/10/11

On 10/10/11, I called MDNR Plainwell to ask for their assistance in determining if there were any endangered species associated with the above area, as required as part of our Lake Level determination task list.

Sarah, from Fisheries Division Office (269-685-6851),said that there were three people that specialized in endangered species for the Vicksburg area:

Chris Hoving (Plants) at 517- 373-3337,
Steve Chadwick (Wildlife) at 269-685-6851 X142, and
Craig Smith (Fish) at 269-685-6851 X115.

Sarah then connected me to Steve Chadwick, of MDNR Plainwell, who queried the Michigan Natural Features Inventory Database, last updated on 6/1/11. Steve looked for information for Schoolcraft Twp (T4S, R11W) Sections 12 and 13, and Brady Twp (T4S, R10W) Sections 7 and 18, and other nearby sections. He said there were ***no hits (sic) of endangered species of plants or wildlife in that area.*** There were annotations of species from 1943, but he said those annotations were irrelevant to our current endangered species inquiry. So I didn't need to call Chris Hoving (Plants).

I then called Craig Smith, of the Fisheries Division, in Plainwell. He looked in their Sunset Lake file. The only annotation in that file was associated with the spotted gar as being a "great conservation need" meaning that it was not endangered in any way, but a desirable fish to encourage as Sunset Lake was at most northerly extent of the spotted gar habitat. He said the spotted gar information was not relevant to the endangered species inquiry. So there were ***no species of fish on the endangered species list for Sunset Lake***.

Both Mr. Chadwick and Mr. Smith said that there were no other sources that need to be investigated.

FIGURE 10

ASSESSMENT DISTRICT MAP

Sunset Lake Level District, 2012

Kalamazoo County, Michigan

Pub. 7/12/2012

Patricia A. S. Crowley

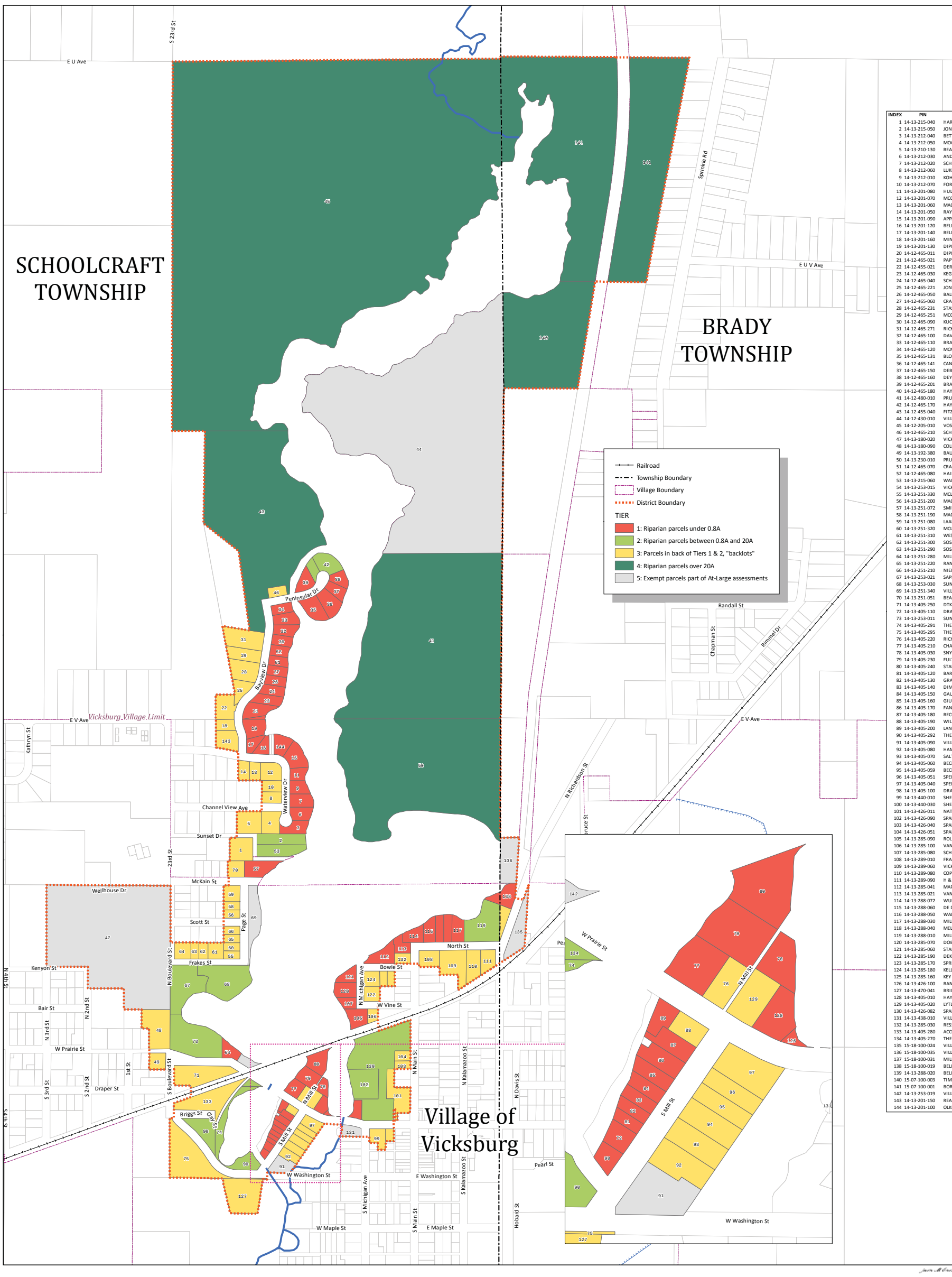
Kalamazoo County
Drain Commissioner

0 0.1 0.2 0.3 0.4 0.5 Miles

0 600 1,200 1,800 2,400 3,000 Feet

1:4,000

1 inch = 333 feet



INDEX	PIN	OWNER
1	14-13-215-040	HARPER OTIS F TRUST
2	14-13-215-050	JONES THOMAS & NANCY
3	14-13-212-040	BETTS JOHN & KAREN
4	14-13-212-050	MOORE HADLEY & MORRIS DUSTIN
5	14-13-210-130	BEAMS BRADLY D & LISA E
6	14-13-212-030	ANDERSON JOSEPH & MARSTON SUSAN
7	14-13-212-020	SCHRIEMER DAVID J & PAULA A
8	14-13-212-060	LUKE KIM
9	14-13-212-010	KOHL TRAVIS
10	14-13-212-070	FORSYTHE DENNIS L & KATHLEEN H
11	14-13-201-080	HULSE CASEY E & DARLA K
12	14-13-201-070	MCCLINTIC JOHN R & JUDITH ANN
13	14-13-201-060	MACGREGOR BENJAMIN & JESSICA
14	14-13-201-050	RAY RICKEY L & KAREN M
15	14-13-201-090	APPELL LLOYD E & GRACE C
16	14-13-201-120	BELDEN GARY D & LINDA D
17	14-13-201-140	BELDEN GARY & LINDA
18	14-13-201-160	MINNIS BRADLEY R
19	14-13-201-130	DIPISA ANTHONY J & ROBIN D
20	14-12-465-011	DIPISA ANTHONY J & ROBIN D
21	14-12-465-021	PAPWORTH ARTHUR R & NANCY A
22	14-12-455-021	DERHAMMER GREGORY G & SANDRA L
23	14-12-465-030	KEGELER CLIFFORD G & PAULA S
24	14-12-465-040	SCHUPAN MARC A & JEANNE M
25	14-12-465-221	JONES WILLIAM L & JOLYN C
26	14-12-465-050	BALL FAMILY TRUST
27	14-12-465-060	CRAWFORD MARK J & LINDA M
28	14-12-465-231	STASIK JAMES E & JAQUELYN M
29	14-12-465-251	MCCULLIN JEAN
30	14-12-465-090	KUCHTA JOHN & SHIMER JENNIFER
31	14-12-465-271	RICHARDS DALE A
32	14-12-465-100	DAVIS THOMAS & EASTMAN ANN
33	14-12-465-110	BRAYMER DONALD G & BETTY J
34	14-12-465-120	MCMULLEN ANN S
35	14-12-465-131	BLOINK DONALD C
36	14-12-465-141	CANNELL STEPHEN A & MARIE E
37	14-12-465-150	DEBRUIN DONALD C & MARY C
38	14-12-465-160	DEYOUNG KAREN TRUST
39	14-12-465-201	BRAYMER CAROL
40	14-12-465-180	HAYWARD ROBERT & MARY
41	14-12-480-010	PRUDENTIAL NURSERY CO
42	14-12-465-170	HAYWARD ROBERT
43	14-12-455-040	FITZGERALD SHELLEY TRUST
44	14-12-430-010	VILLAGE OF VICKSBURG
45	14-12-205-010	VOSS BRAD
46	14-12-465-210	SCHMIDT HENRY F
47	14-13-180-020	VICKSBURG COMMUNITY SCHOOL
48	14-13-180-090	COLE L J & KNOWLES V C
49	14-13-192-380	BAUS RICHARD & SANDRA
50	14-13-230-010	PRUDENTIAL NURSERY CO
51	14-12-465-070	CRAWFORD MARK J & LINDA M
52	14-12-465-080	HAINEN JAMES V & J M RRUST
53	14-13-215-060	WALTERS HARRIS E & EFFIE TRUST
54	14-13-253-015	VICKSBURG PHARMACARE CENTER LLC
55	14-13-251-330	MCLOUD DEBRA & TIMOTHY DELANEY
56	14-13-251-200	MACKENZIE NANCY J
57	14-13-251-072	SMITH RONALD & LUPE
58	14-13-251-190	MACKENZIE NANCY J
59	14-13-251-080	LAAKSONEN CHRISTINE L
60	14-13-251-320	MCLOUD DEBRA & TIMOTHY DELANEY
61	14-13-251-310	WESOLOSKI WALTER J & JANE M
62	14-13-251-300	SOSSOMAN SCOTT F
63	14-13-251-290	SOSSOMAN SCOTT F
64	14-13-251-280	MILLER ROBERT & LUCILE
65	14-13-251-220	RANCE SHAWN LEWIS
66	14-13-251-210	NIEDZWIECKI DANIEL & CAROL MEYER-
67	14-13-253-021	SAPPANOS DONALD
68	14-13-253-030	SUNSET LAKE APARTMENTS LLC
69	14-13-251-340	VILLAGE OF VICKSBURG
70	14-13-251-051	BEACH JEFFREY & JENNIFER
71	14-13-405-250	DTK REAL ESTATE LLC
72	14-13-405-110	DRAKE RONALD A & JOANN L
73	14-13-253-011	SUNSET COVE APARTMENTS
74	14-13-405-291	THE MILL OF SOUTH COUNTY LLC
75	14-13-405-295	THE MILL OF SOUTH COUNTY LLC
76	14-13-405-220	RICH KEITH
77	14-13-405-210	CHARLES AMELL LLC
78	14-13-405-030	SNYDER MELISSA
79	14-13-405-230	FULTON JEROME R & NANCY L
80	14-13-405-240	STAFFORD GEORGE & BEVERLY
81	14-13-405-120	BARTON MICHAEL & RUBY J NICOLE
82	14-13-405-130	GRAY DANA A & TODD A
83	14-13-405-140	DIMOCK BENJAMIN E
84	14-13-405-150	GAUTHIER GARY & MARILYNNE TRUST
85	14-13-405-160	GIULIANO ANALISA
86	14-13-405-170	FANNIE MAE
87	14-13-405-180	BECKER MICHAEL & KATHERINE
88	14-13-405-190	WILE LARRY E JR
89	14-13-405-200	LANG GREG J & JEAN A
90	14-13-405-292	THE MILL OF SOUTH COUNTY LLC
91	14-13-405-090	VILLAGE OF VICKSBURG
92	14-13-405-080	HAMBERG DAVID C & DAWN M
93	14-13-405-070	SALTER BERTRAM R
94	14-13-405-060	BECKER MICHAEL & KATHERINE
95	14-13-405-059	BECKER MICHAEL & KATHERINE
96	14-13-405-051	SPEEDWAY SUPERAMERICA LLC
97	14-13-405-040	SPEEDWAY SUPERAMERICA LLC
98	14-13-405-100	DRAKE RONALD A & JOANN L
99	14-13-440-010	SHEARER LYNN TRUST
100	14-13-440-030	SHEARER LYNN L & CAROL A TRUST
101	14-13-426-011	NATIONAL CITY BANK K-AI4-IK
102	14-13-426-090	SPARTAN STORES
103	14-13-426-040	SPARTAN STORES
104	14-13-426-051	SPARTAN STORES
105	14-13-285-090	ROLFE CLARENCE E & LAVON TRUST
106	14-13-285-100	VANDENOEVER TIMOTHY & JUDY
107	14-13-285-080	SCHMIDT JEFFREY T
108	14-13-289-010	FRANK SUSAN E
109	14-13-289-060	VICKSBURG BRASS & ALUM FNDRY
110	14-13-289-080	COPELAND ERICK & DELINA
111	14-13-289-090	H & W ENTERPRISES
112	14-13-285-041	MAPES JOHN J
113	14-13-285-021	VANKRIMPEN DIRK & CINDY
114	14-13-288-072	WUNDERLIN MICHAEL & HELEN KAY
115	14-13-288-060	DE DIE KENNETH
116	14-13-288-050	WALKER-CONKLIN SHARON
117	14-13-288-030	MILLER ROBERT DOUGLAS TRUST
118	14-13-288-040	MELVIN TIMOTHY W & LYNNE M
119	14-13-288-010	MILLER ROBERT DOUGLAS TRUST
120	14-13-285-070	DOBBIE BRIAN J & MAUREEN M
121	14-13-285-060	STANLEY SCOTT & MARTHA
122	14-13-285-190	DEKKER JOSEPH
123	14-13-285-170	SPRINGER ROBERT K
124	14-13-285-180	KELLOGG DOUGLAS A & BONNIE S
125	14-13-285-160	KEY ETHELINE F & ADAMS DAVID A C
126	14-13-426-100	BANK OF AMERICA CORP
127	14-13-470-041	BRIDGE ORGANICS CO
128	14-13-405-010	HAYWARD INSURANCE AGENCY
129	14-13-405-020	LYTLE DAVID
130	14-13-426-082	SPARTAN STORES
131	14-13-438-010	VILLAGE OF VICKSBURG
132	14-13-285-030	RESSEGUIE ROSEMARY
133	14-13-405-280	ACCRO-SEAL HOLDINGS LLC
134	14-13-405-270	THE MILL OF SOUTH COUNTY LLC
135	15-18-100-024	VILLAGE OF VICKSBURG
136	15-18-100-035	VILLAGE OF VICKSBURG
137	15-18-100-031	MILLER ROBERT D TRUST
138	15-18-100-019	BELL FRANK
139	14-13-288-020	BELL FRANK
140	15-07-100-003	TIMKO JOSEPH & PRUITT LYNN E
141	15-07-100-001	BORGMAN BILL
142	14-13-253-019	VILLAGE OF VICKSBURG
143	14-13-201-150	READING JAMES & GOULD DOUGLAS
144	14-13-201-100	OLKER JOHN C

FIGURE 11

COMPUTATION OF COST OF CONSTRUCTION

COMPUTATION OF COST OF CONSTRUCTION

In the Matter of:

Sunset Lake County Drain

Be it Known, That I, Patricia A.S. Crowley, County Drain Commissioner of the County of Kalamazoo and State of Michigan, in accordance with the statute in such case made and provided, did on the 10th day of July, 2012, made the following computation of the entire cost of said drain, to-wit:

(1) Cost of Laying out and Designating Drainage District, including survey			3	600
(2) Cost of locating, establishing and constructing Drain, including rights of			1	500
(3) Compensation to be Paid Board of Review				
(4) Contracts for Constructing Bridges and Culverts				
(5) Contracts for Construction	tree	removal	4	500
	lake	study	9	000
	Dam	inspect	2	500
(6) Estimated Cost of Appeal of Apportionments				
(7) Estimated Cost of Inspection				
(8) Publishing Notices			1	000
(9) Probate Judge's Fees				750
(10) Attorney Fees				
(11) First Year's Interest on Bonds				
Gross sum of Expenses			22	850
Contingent Expenses (10%-15%)			3	150
Total Computed Cost of Constructing the Drain			26	000

Filed in my office with other papers pertaining to the within mentioned drain.

Dated at 2:00 p.m. This 10th day of July, 2012

County Drain Commissioner of Kalamazoo County