



CROSS ENGINEERING & ASSOCIATES, INC.

PHILIP ESTATES SUBDIVISION

Long Grove, IL

PRELIMINARY STORMWATER MANAGEMENT SUMMARY

Prepared for:

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PROJECT NARRATIVE

1. INTRODUCTION

Canterbury Park Subdivision was previously approved in approximately 2007 for 12 residential lots. The final engineering plans and final stormwater management report were prepared by Atwell-Hicks, and the Plat of Subdivision was recorded on December 22, 2009. As such, an approved Stormwater Management Report was prepared by Atwell-Hicks for the 12-lot subdivision that complied with the Watershed Development Ordinance effective at that time. The Atwell-Hicks report established an on-site BFE of 736.2. Due to market conditions the 12-lot subdivision was not constructed and the site was not disturbed from its undeveloped conditions. The 12-lot subdivision was based on the lots being served with a community wastewater system and individual water wells. Subsequently a plan has been developed to provide municipal sanitary sewer to serve the property, as well as connecting a watermain to a small non-community water system. As a result of these changes, it is now proposed to re-subdivide the Canterbury Park Subdivision to provide approximately 19 residential lots, therefore, the Stormwater Management Plan needs to be updated to reflect the 19-lot subdivision, and also to incorporate any updates that have been made to the Watershed Development Ordinance since the 12-lot subdivision plans were approved.

In addition, the Stormwater modeling in the previously approved report were performed using Win-TR20. The new modeling will be performed using the EPA SWMM package that is an unsteady dynamic hydrologic and hydraulic modeling system that better describes the interaction between the drain tiles and the surface storage. It also provides a better detail of the offsite versus onsite results.

The Canterbury Park development consists of approximately 35.5 acres located just east of Deerwood Drive, south of Cuba Road and north of Spring Valley Road in Long Grove, Lake County, Illinois. The project site is a part of the Buffalo Creek headwaters, and no special storm water discharge restrictions are imposed on the development under the Lake County Watershed Development Ordinance (the Ordinance). The rolling topography of the region results in approximately 37.4 acres of off-site areas from the west draining through the Canterbury Park Subdivision. The Village of Long Grove has adopted the Lake County Watershed Development Ordinance, and under the Ordinance, the low area on the western portion of the site retains more than 0.75 ac-ft of storage during the 100-year storm event and therefore would be classified as floodplain, with a computed 100-year High Water Level. The narrative below provides basic information on the storm water aspects of the proposed Canterbury Park Subdivision.

2. EXISTING CONDITIONS

The on-site storm water runoff collects in, or flows through, three separate locations on the project site. The three areas are: (1) the area tributary to the western low area drained by the draitiles, comprised of approximately 35.3 acres off-site and 20.0 acres on-site, mostly undeveloped land that is within the land that was proposed to be the IL Route 53 extension, (2) the north area tributary to the east property line, which drains south roughly along the property line to the wetland on the southeast boundary of the property, comprises approximately 0.4 acres off-site and 8.6 acres on-

site, and (3) the south area tributary to the east property line and which basically outlets to the wetland on the south east boundary of the property, comprises approximately 1.7 acres off-site and 6.7 acres on-site.

The western area contains a depressed area toward the west property line with no surface outlet but instead drains out by drain tile and some overflow surface flow to the southeastern portion of the site. The aerial photos of this area have a well-drained appearance, indicating open and adequate performance of installed drain tile. The southeastern portion of the property receives the drain tile and surface flow from the western portion of the property as well as surface flow from the southern off-site tributary area. These accumulated drain tile and surface flows outlet to a defined channel that drains to the wetland that is part of a Buffalo Creek headwaters pond just east of the southeast corner of the property. The northeastern portion of the property drains to the east property line. Flow leaving the property at the northeast property line migrates to the south and into the same wetland edge surrounding this portion of the Buffalo Creek headwaters pond to which storm water flows leaving the southeast portion of the property drain.

As was mentioned above, off-site storm water runoff drains to all three of these areas as well. The western low area receives the bulk of off-site flow from north of Cuba Road, west of the property line and Deerwood Road and from south of Spring Valley Road. This off-site area is mostly undeveloped but does contain a few larger lot residential structures and depressional areas. The southeastern portion of the property receives storm water runoff from approximately 1.7 acres south of Spring Valley Road and the northeastern portion receives storm water runoff from a small upslope slice south of Cuba Road and just east of the eastern property line.

See Exhibit 4a for a more complete illustration of the drainage areas. The SWMM models also have an existing conditions background illustration containing the approximate property boundaries and topographic information upon which the drainage areas were established.

3. EXISTING CONDITIONS STORM WATER COMPUTATIONS

The storm water computations for this project have been performed using the US EPA SWMM 5.1 hydrologic and hydraulic program, which allows excellent understanding of the interaction of surface and subsurface flow for properties like the one under study in this narrative. The on-site and off-site areas were subdivided into sub-basins for the purpose of evaluating the impact of existing storage elements within this small watershed. For example, Deerwood Road is a low barrier to flow west of the road surface and pockets of water develop west of Deerwood during significant storm events. The same is true for the area just north of Cuba Road. The off-site area to the southwest (and south of Spring Valley Road) is a larger low area with three outlets consisting of a low flow six-inch drain tile (Huddleston Tile Survey) and two small diameter culverts. This southwest off-site area provides significant storage relative to the size of the off-site drainage area and has a High Water Level somewhat controlled by the conditions in the on-site western low area during large magnitude events.

Using the EPA SWMM program with the identified on-site and off-site drain tile, on-site and off-site drainage areas, storage and surface flow characteristics results in an on-site HWL in the on-site western low area of approximately 736.15 NAVD88 and an existing 100-year discharge into the

headwaters pond of Buffalo Creek of approximately 10.26 cfs (which includes the northeastern tributary drainage area).

4. PROPOSED CONDITIONS

The proposed conditions largely preserve the existing on-site storm water runoff characteristics, since the lot sizes are large with limited grading intended. The proposed plan cuts in the roadway and provides for minimal grading to achieve the proposed lot configurations. The on-site storm water system creates storage and enhances the existing western low area with additional storage through expanding the extent of the low area to meet the detention requirements of the proposed developmental improvements.

There are three proposed storage basins provided on the plan with a total storage amount of approximately 14.91 acre-feet of storm water storage at the proposed design High Water Levels (including the necessary compensatory storage volumes). The basins are divided up across the property according to the topographic divides described in the existing condition narrative above in order to provide water quality benefits as well as necessary and effective storage. The three basins include one for the expanded western low area (Basin 1), one for the northeast section (Basin 3), and one at the southeastern outlet prior to discharge off-site into the Buffalo Creek headwaters pond (Basin 2). It should be noted that the northeastern portion of the site is discharged to the east consistent with the proposed controlled storm water runoff being directed to essentially the same outlet locations as in existing conditions. See Exhibit 4b for a graphic illustration of these stormwater features.

5. PROPOSED CONDITIONS STORM WATER COMPUTATIONS

The EPA SWMM proposed conditions includes the change in land use due to the development, additional storage facilities and volumes with various sizes of restricted outlets to accomplish the objective of storm water control and reduced discharges to the downstream Buffalo Creek headwaters. Using the EPA SWMM program with the identified on-site and off-site drain tile, existing and proposed storage and existing and proposed surface flow characteristics results in an on-site HWL in the on-site expanded western low area of approximately 734.95 NAVD88 and a proposed 100-year discharge (including the northeastern area) into the headwaters pond of Buffalo Creek of approximately 7.03 cfs.

In order to identify the required detention storage, the use of the on-site low area for off-site storage and the allowable release rate, three models were created for establishment of existing and proposed conditions together as follows: (1) an existing model with all the on-site and off-site tributary drainage area and storm water features as discussed under the Existing Conditions section above to determine the on-site storage usage per the Village's direction, (2) an existing model with all the on-site and off-site tributary drainage area and storm water features as discussed under the Existing Conditions section above with the exception that the on-site storm water runoff was excluded from the calculations to determine the existing off-site bypass release from this system only due to contributions from the off-site storm water runoff and (3) a proposed model with all the developed on-site and existing off-site tributary drainage area and storm water features as discussed under the Proposed Conditions section above.

The complete existing conditions model (1 – 170918_CP6FF.INP/RPT) establishes the use of approximately 10.72 acre-feet of storage in the on-site western low area with a corresponding on-site HWL of 736.15 with an existing discharge of 10.26 cfs to the Buffalo Creek headwaters pond. The off-site only existing conditions model (2 – 170918_CP6FF_NO.INP/RPT) establishes the 100-year off-site only discharge of 3.49 cfs. The proposed model (3 – 210210_CP6FF_DEV24.INP/RPT) shows a reduced HWL for the western on-site low area (proposed HWL of 734.95) with a proposed discharge of 7.03 cfs to the Buffalo Creek headwaters pond. The proposed 100-year allowable discharge is computed as 0.15 cfs/ac times the on-site area of 34.82 acres for an on-site allowable discharge of 5.22 cfs. This 5.22 cfs is added to the off-site only 100-year discharge of 3.49 cfs for a total allowable discharge of 8.71 cfs (which is more than the computed proposed condition discharge to the southeast).

The required proposed storage volume consists of adding the depressional storage of 10.72 acre-feet to the Ordinance recommended developmental storage volume of 0.21 acre-feet per acre of development times 34.82 acres for an on-site detention volume of 7.31 acre-feet (see the following annotated chart, **Figure 5.1**).

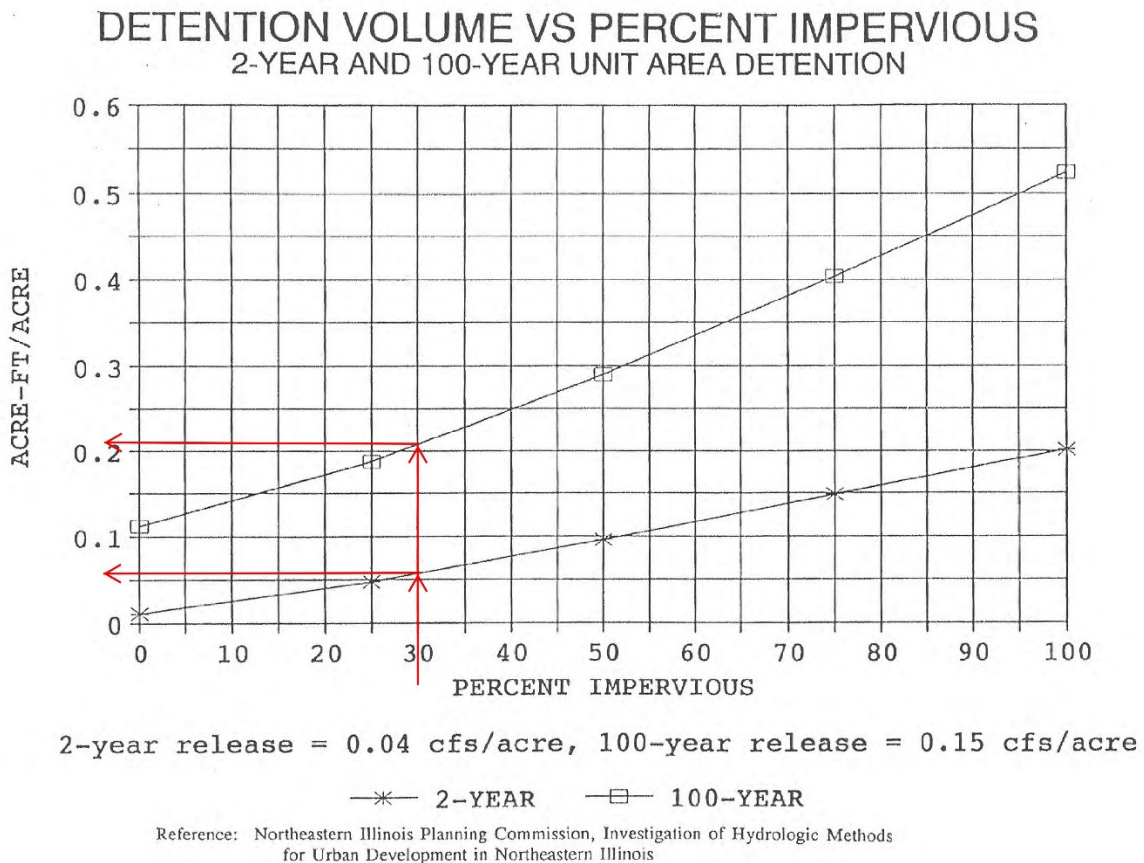


Figure 5.1 WDO Appendix K Required Detention Chart

Also, the Section 508 Detention Volume Safety Factor is computed as off-site area divided by on-site area times 0.05 or 1.0538 (calculated as $\{37.4 \text{ ac} / 34.82 \text{ ac} \times 0.05 + 1 = 1.0538\}$), which leads to a computed total required detention volume of 7.71 acre-feet ($7.31 \text{ ac-ft} \times 1.0538 = 7.71 \text{ ac-ft}$). This total required volume of 7.71 acre-feet added to the existing depressional storage volume 10.72 ac-ft plus the compensatory volume of approximately 0.6 ac-ft gives you 19.03 ac-ft, which is less than the combined storage volume of all three basins of approximately 22.40 acre-feet. The excess storage volume provide is approximately 3.37 ac-ft.

In order to achieve the storm water controls proposed, the main-line western storage basin will have an 18-inch diameter restrictor control with a 6-foot wide overflow weir. The 6-foot overflow weir is designed to provide the critical duration (24-hour) inflow discharge at the BFE plus one-foot without damage to adjacent properties (which this report interprets to be the existing condition west basin BFE of $736.2 + 1\text{-foot}$ or 737.2). The reason for this selection is that for such an extreme event, the existing condition flooding would be well above 737.2 since the existing depressional surface overflow outlet is nearly 740 feet of elevation. For this elevation, the proposed weir capacity is approximately 39.8 cfs [$Q_{\text{weir}} = 2.7 * L * H^{(3/2)} = 2.7 * 6 * (1.7)^{(3/2)} = 39.8 \text{ cfs}$; where $L = 6 \text{ ft}$ and $H = 737.2 - 735.5 = 1.7$]. Considering that the weir would overflow into a 24-inch diameter culvert it is understood that orifice flow for a 4 foot by 6 foot open box (24 sq.ft. opening) completely submerged would have much greater capacity for conveyance than the downstream 24-inch pipe (3.14 sq. ft. opening). Inlet control and outlet control charts for the 24-inch culvert under this head are provided in **Figure 5.2** and **Figure 5.3** below and show the inlet and outlet control capacities of the proposed 24-inch diameter culvert under the roadway are greater than the required 24.7 cfs (inflow amount to the west basin, taken from the proposed computed total inflow for SWMM Node N_CWLow).

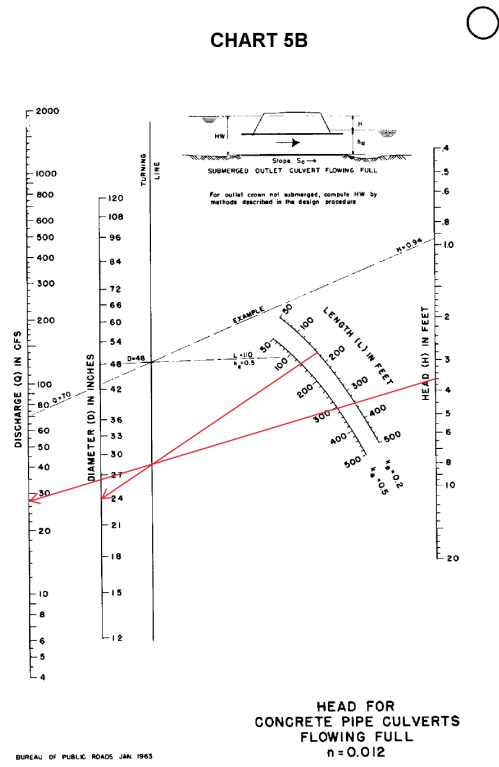
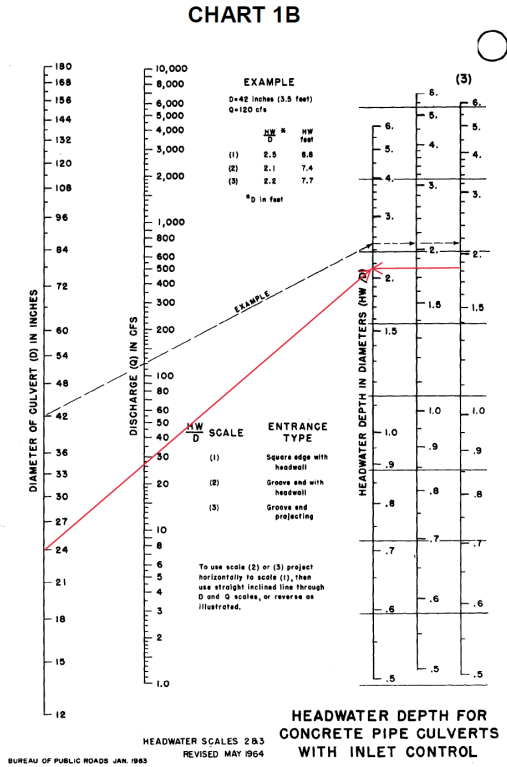


Figure 5.2 Inlet Control Chart for Culvert (26 cfs capacity)

Figure 5.3 Outlet Control Chart for Culvert (28 cfs capacity)

It should be noted that this 737.2 feet of elevation is also well below the proposed Flood Protection Elevation (FPE) of 738.2, which is two feet above the BFE, under the WDO and therefore provides additional protection against potential on-site flooding due to extreme events..

The southeastern storage basin will have a 9-inch diameter restrictor control for the 100-year discharge and an overflow weir one foot above the storage basin HWL. The northeast basin (Basin 3) will have a 4-inch diameter restrictor control to minimize discharge to the east property line while minimizing restrictor maintenance problems.

The discharge characteristics will ultimately be split into the two-year and 100-year controls in the final plan development phase, with corresponding two and 100-year storage allocation. The models will be revised as necessary for discharge accounting and would include the (1) off-site model (already included and no changes expected - to be used for comparison and to show no increases above existing), (2) the off-site only model (already included and no changes expected - to be used to determine the discharges due only to off-site contribution given the existing storage and drainage system), and (3) the proposed model (to show that the addition of the compensatory storage to the proposed detention volumes with the design restrictors are sufficient to control the discharges so that allowable discharges are not exceeded in the proposed condition).

6. WETLAND REVIEW

An updated Wetland Delineation Report, dated May 20, 2017, was prepared by Midwest Ecological. The report identified a single wetland totaling approximately 0.37 acres in size at the southeast

corner of the property. This wetland, identified as Wetland A, is part of a larger off-site wetland complex located to the east. Wetland A is jurisdictionally connected to Buffalo Creek. The proposed plan does not include any impacts to Wetland A. A partial copy of the Wetland Delineation Report is included in this report in Appendix A.

7. REGULATORY FLOODPLAIN

The subject property is tributary to Buffalo Creek which runs to the south of the property. The 100-year Base Flood Elevation (BFE) across the southern boundary of the property is elevation 730. Based on the existing topography, the 100-year floodplain encroaches minimally into the southeast corner of the property. The proposed grading will not impact the Buffalo Creek 100-year floodplain. See Exhibit 2 for the FEMA Firmette.

8. DRAINTILE INVESTIGATION

A draitile investigation was originally completed in 2006 by Huddleston-McBride Co. The draitile investigation was subsequently updated in 2015. The 2015 updated investigation revealed some sections of the existing tiles that had become clogged and caused a blow-out. The sections of tiles were repaired using polyethylene drain tile and a revised Draitile Investigation Record Drawing was issued and is dated October 8, 2015. See Exhibit 3 for the Draitile Investigation Plan.

9. SOILS

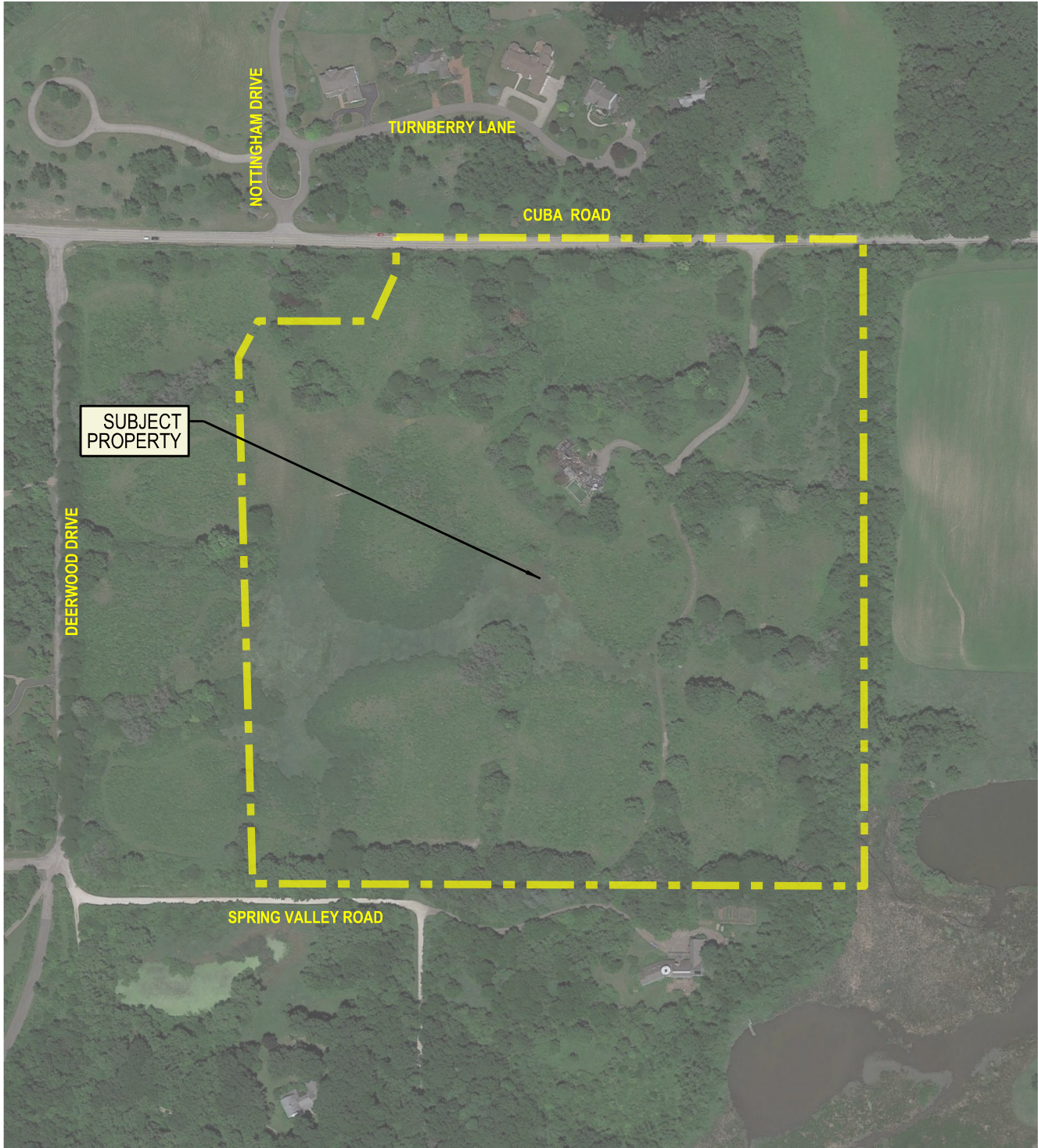
See Wetland Delineation Report for soil maps and information.

Exhibit 1

Aerial Photo



SCALE IN FEET



SUBJECT
PROPERTY

SOURCE IMAGE:
GOOGLEARTH 2016



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Tel: 847/498-0800

Prepared for:

Canterbury Parc, LLC.
8150 W. 159th Street
Orland Park, IL 60462

Title: **Aerial Photo**

Project: **Canterbury Parc Re-subdivision**

Project #: **1291**

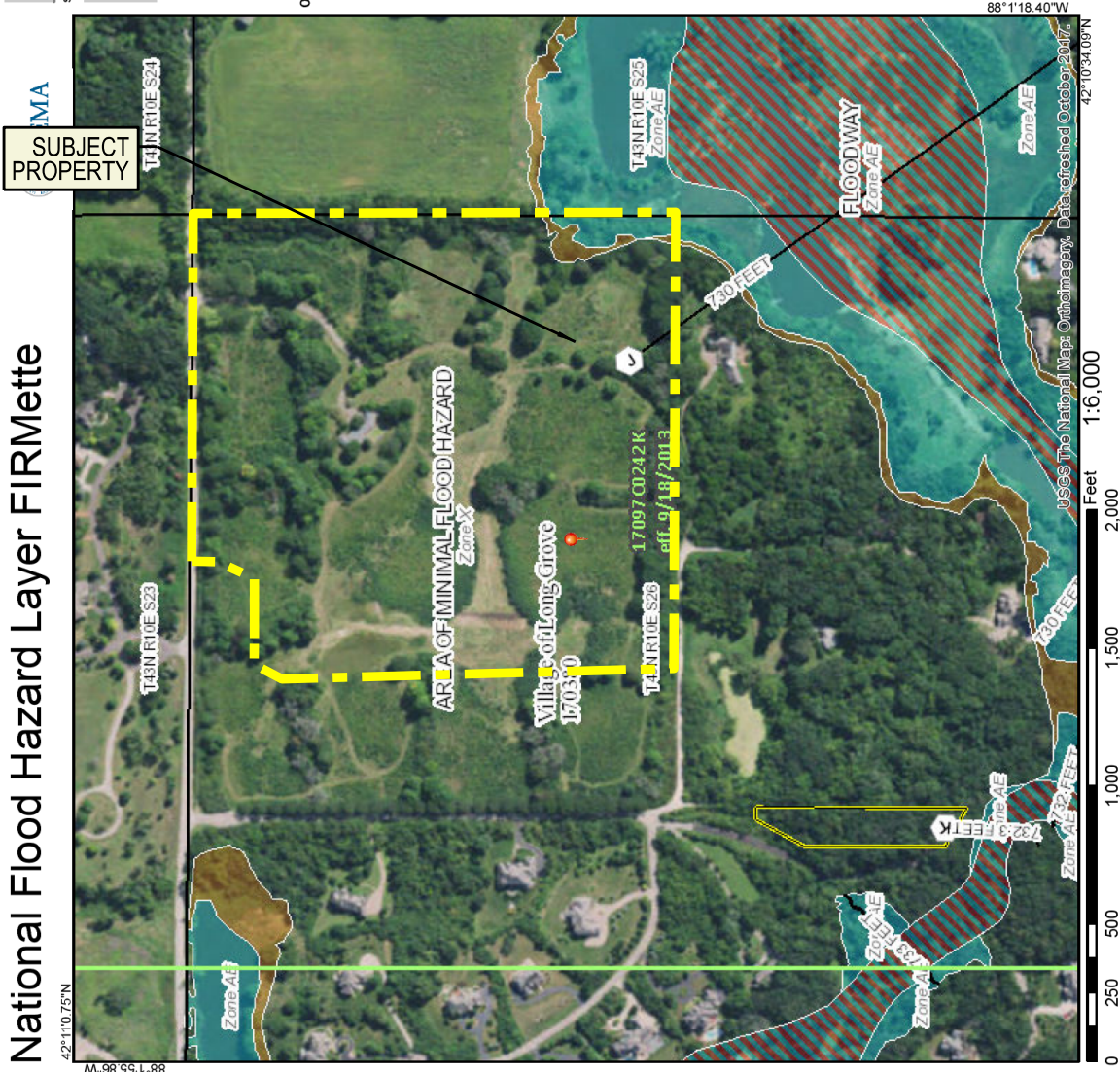
Date: **8/17/18**

Sheet #: **Exhibit 1**

Exhibit 2

FEMA Firmette

National Flood Hazard Layer FIRMette



Legend
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
- With BFE or Depth Zone AE, AH, AE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard. Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes, Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS

- Area of Minimal Flood Hazard Zone X
- Effective LOMIRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- Cross Sections with 1% Annual Chance
- Water Surface Elevation
- Coastal Transsect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transsect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/18/2018 at 12:04:33 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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Title: FEMA Firmette	
Project: Canterbury Parc Re-subdivision	
Project #: 1291	Date: 8/17/18
Sheet #: Exhibit 2	

Exhibit 3

Drain Tile Investigation Plan

AGRICULTURAL EXISTING DRAIN TILE INVESTIGATION PLAN

CANTERBURY PARK

PREPARED FOR JOE RIZZA ENTERPRISES

SECTION NO. 26, ELA TWP., LAKE CO., IL.

RECORD DRAWING

EXISTING SUBSURFACE AGRICULTURAL DRAIN TILE INVESTIGATION REPORT

CANTERBURY PARK

JOE RIZZA ENTERPRISES

CANTERBURY PARK / JOE RIZZA ENTERPRISES, FIELD FILE NO. 10-6-26, DATE: 9/29/2006.
IN ACCORDANCE WITH LAKE COUNTY STORM WATER COMMISSION DRAIN TILE INVESTIGATION STANDARDS
COPYRIGHT © 2006, BY HUDDLESTON-McBRIDE DRAINAGE COMPANY

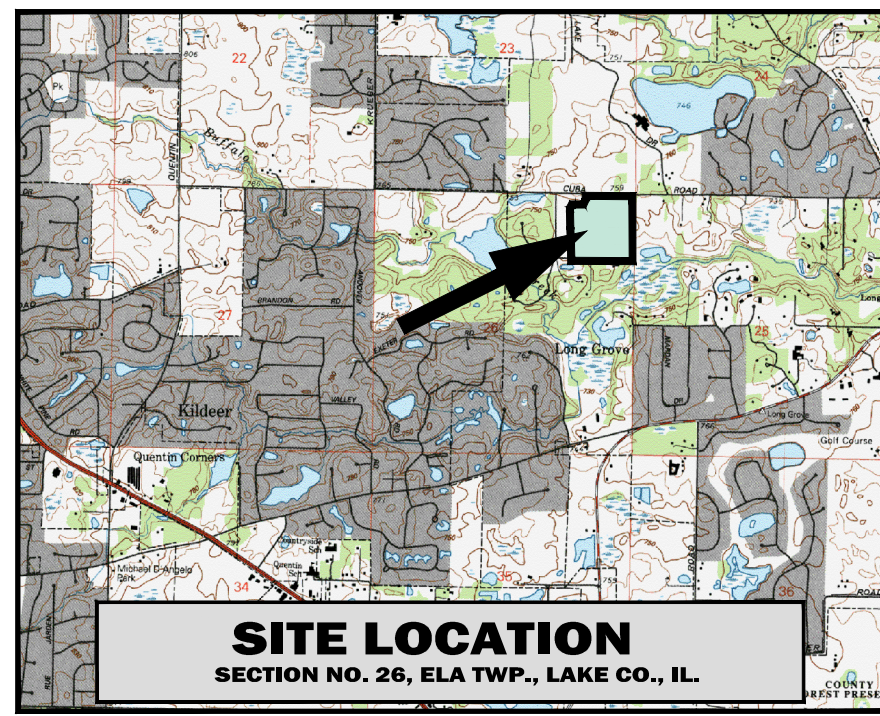
DESCRIPTION CHART NO. 1A:

ID NO.	SZ.	TYPE / QUALITY	FLOW %	SILT %	DEPTH (GRD/INV)	FIELD NOTES:
A	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
B	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
C1	4"	CLAY / FAIR	NONE	10%	18"	SILT RESTRICTED / NO CAPACITY
D1	6"	CONC. / GOOD	SLIGHT	30%	39"	ACTIVE FLOW RATE AND CAPACITY
D2	6"	CLAY / POOR	NONE	FULL	24"	SILT RESTRICTED / NO CAPACITY
D3	6"	CONC. / GOOD	FLOODED	SLIGHT	44"	RESTRICTED FLOW AND SURCHARGED
D4	6"	CLAY / POOR	NONE	80%	25"	SILT RESTRICTED / PARTIAL CAPACITY
D5	6"	CLAY / POOR	NONE	FULL	24"	SILT RESTRICTED / NO CAPACITY
D6	6"	CONC. / POOR	SLIGHT	30%	39"	ACTIVE FLOW RATE AND CAPACITY
E	3"	CLAY / FAIR	NONE	70%	24"	ACTIVE FLOW RATE AND CAPACITY
F	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
G	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
H	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
I	10"	CONC. / GOOD	20%	SLIGHT	—	ACTIVE FLOW RATE AND CAPACITY
J	10"	CLAY / POOR	NONE	30%	30"	ACTIVE FLOW RATE AND CAPACITY
K	10"	CLAY / FAIR	NONE	10%	SLIGHT	ACTIVE FLOW RATE AND CAPACITY
L	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED
M	—	NO DRAIN TILE	—	—	—	NO DRAIN TILE LOCATED

ID NO.	SZ.	TYPE / QUALITY	FLOW %	SILT %	DEPTH (GRD/INV)	FIELD NOTES:
1	6"	CLAY / POOR	NONE	10%	31"	LATERAL AT PROPERTY INGRESS
2	4"	CLAY / POOR	NONE	FULL	26"	LATERAL AT PROPERTY EGRESS
3	6"	CLAY / POOR	NONE	80%	33"	MAINLINE AT PROPERTY INGRESS
4	8"	CONC. / GOOD	FLOODED	SLIGHT	50"	MAINLINE AT PROPERTY INGRESS
5	6"	CLAY / POOR	NONE	FULL	36"	LATERAL AT PROPERTY INGRESS
6	4"	CLAY / FAIR	NONE	FULL	31"	LATERAL AT PROPERTY INGRESS
7	6"	CONC. / GOOD	SLIGHT	30%	45"	LATERAL AT PROPERTY INGRESS
8	4"	CLAY / FAIR	NONE	FULL	30"	LATERAL AT PROPERTY INGRESS

DESCRIPTION CHART NO. 1B:

DATA POINT	SZ.	TYPE / QUALITY	FLOW %	SILT %	DEPTH (GRD/INV)	FIELD NOTES:
1	6"	CLAY / POOR	NONE	10%	31"	LATERAL AT PROPERTY INGRESS
2	4"	CLAY / POOR	NONE	FULL	26"	LATERAL AT PROPERTY EGRESS
3	6"	CLAY / POOR	NONE	80%	33"	MAINLINE AT PROPERTY INGRESS
4	8"	CONC. / GOOD	FLOODED	SLIGHT	50"	MAINLINE AT PROPERTY INGRESS
5	6"	CLAY / POOR	NONE	FULL	36"	LATERAL AT PROPERTY INGRESS
6	4"	CLAY / FAIR	NONE	FULL	31"	LATERAL AT PROPERTY INGRESS
7	6"	CONC. / GOOD	SLIGHT	30%	45"	LATERAL AT PROPERTY INGRESS
8	4"	CLAY / FAIR	NONE	FULL	30"	LATERAL AT PROPERTY INGRESS



MAP LEGEND:

- EXISTING DRAIN TILE FLOW DIRECTION
- EX. POLYETHYLENE MAINLINE OR SYSTEM PART
- EX. CLAY DRAIN TILE MAINLINE OR SYSTEM PARTS
- EX. CONCRETE DRAIN TILE MAINLINE OR SYSTEM PART
- EXISTING DRAIN TILE CONTINUES TO UPLAND WATERSHED
- EXISTING DRAIN TILE OUTLETS TO SURFACE
- EXIST. DRAIN TILE (1) INSPECTION STRUCTURE / (2) CATCH BASIN
- EXIST. DRAIN TILE (1) LOCATED END / (2) ASSUMED END
- EXISTING DRAIN TILE CONTINUES TO OFF-SITE OUTLET SYSTEM
- EXISTING DRAIN TILE FAILURE - FLOW SURCHARGE TO SURFACE
- EXISTING DRAIN TILE MAPPED BY SPECULATION AND ASSUMPTION
- EXISTING DRAIN TILE ABANDONED (NOT FUNCTIONAL)
- EXISTING DRAIN TILE - BLOCKED / FLOW SURCHARGE TO SURFACE
- HAND PROBE OR ELECTRONIC SCAN FOR DRAIN TILE LOCATION
- INVESTIGATION SLIT TRENCH FOR INVESTIGATION
- SPECIFIC PIT EXCAVATION FOR INVESTIGATION
- SURVEY DATA POINTS
- REPORT IDENTIFICATION NUMBER

REPORT LEGEND:

- ID NO. POINT OF EXCAVATION FOR SPECIFIC DRAIN TILE INVESTIGATION
- SZ. (SIZE) DRAIN TILE INTERNAL DIAMETER IN INCHES
- MATERIAL / QUALITY TYPE OF TILE MATERIALS, PIPE QUALITY - GOOD, FAIR & POOR
- FLOW % PERCENTAGE OF TILE DIAMETER OCCUPIED BY ACTIVE FLOW
- SILT % RESTRICTED OR BACKED UP FLOW, SURCHARGED CONDITION
- PERCENTAGE OF TILE DIAMETER OCCUPIED BY RESTRICTIVE SILT
- ABANDONED, FILLED WITH SILT BLOCKAGE, NO FLOW POTENTIAL
- DEPTH MEASUREMENT FROM EXISTING GROUND LEVEL TO PIPE INVERT

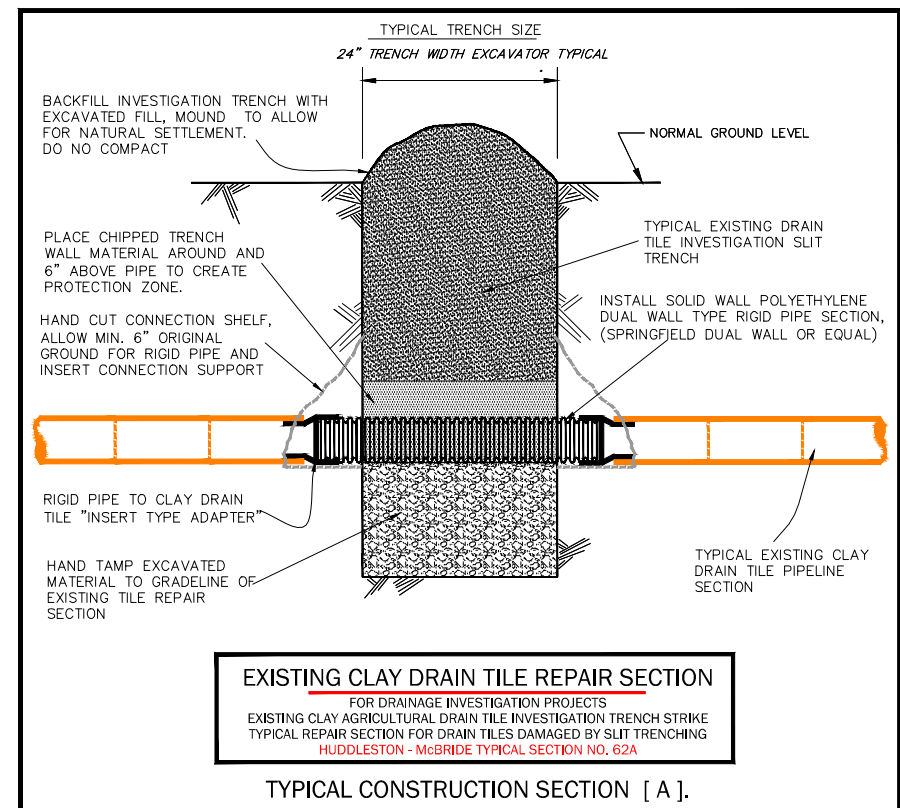
(GENERAL NOTES)

- MAINLINE TILE TRUNK LINE OR MUTUAL DRAIN, COLLECTOR OF SUB-SYSTEMS
- SUB-MAIN TILE SECONDARY TRUNK LINE OR RANDOM SYSTEM COLLECTOR
- LATERAL TILE FEEDER LINE, SERVICE TILE OR SYSTEM SPUR
- *BLOWOUT* EXISTING SYSTEM PIPE FAILURE OR RESTRICTION
- DRAIN TILE ENDS MAINLINE, SUB-MAIN OR LATERAL PLANNED TERMINATION, SLIT TRENCH INVESTIGATION TRENCH, TYPICAL 2'-0" WIDE x 6'-0" DEPTH

SPECIAL NOTES:

- ALL EXISTING AGRICULTURAL DRAIN TILES LOCATED DURING THIS INVESTIGATION SURVEY HAVE BEEN IDENTIFIED ON THIS PLAN AND FIELD STAKED AT 50' INTERVALS. IN SOME OCCASIONS CERTAIN EXISTING LOCAL DRAIN TILE SECTIONS MAY BE SPECULATED AND CONSIDERED AS AN ASSUMED ROUTE.
- ALL EXISTING DRAIN TILES DAMAGED DURING THE INVESTIGATION PROCESS SHALL BE REPAIRED TO THEIR ORIGINAL STATE IN ACCORDANCE WITH NATURAL RESOURCE CONSERVATION SERVICE STANDARDS FOR DRAIN TILE INSTALLATION AND REPAIR. (HUDDLESTON-McBRIDE (R24) TYPICAL STANDARD 'A')
- ALL EXISTING DRAIN TILE LOCATION DIMENSIONS HAVE BEEN SCALED ON THIS PLAN ACCORDING TO AERIAL PHOTO SIGNATURE AND TOPOGRAPHICAL CONTOURS, AND THEREFORE SHOULD BE VERIFIED BY THE PROJECT SURVEYOR PRIOR TO FINAL DESIGN.
- THIS DRAIN TILE INVESTIGATION REPORT IS INTENDED TO IDENTIFY EXISTING DRAIN TILE MAINLINE SYSTEMS ONLY WITH ADDITIONAL PRIORITY ON DRAIN TILES WHICH MAY SERVICE THE UPLAND PROPERTY OF OTHERS OR WITH MUTUAL DRAINAGE STATUS.
- THIS DRAIN TILE INVESTIGATION REPORT SHALL BE FILED WITH HUDDLESTON-McBRIDE LAND DRAINAGE CO., AND WILL BE REPRODUCED AND DISBURSED ONLY BY PERMISSION OF THE CONTRACT PRINCIPALS.

TOM HUDDLESTON, HUDDLESTON-McBRIDE DRAINAGE CO.



THESE SYMBOLS REPRESENT SURVEY DATA POINTS WHICH HAVE BEEN STAKED IN THE FIELD FOR THE SPECIFIC PURPOSE OF ELECTRONIC LOCATION AND ELEVATION DETERMINATION BY THE PROJECT SURVEYOR.

THESE DATA POINTS CONSIST OF A 2" x 2" GROUND NAIL AND A 3" O.D. ONLINE LOCATION STAKE WHICH INCLUDES DATA POINT IDENTIFICATION NUMBER, SEPARATION MEASUREMENT FROM HUB TO PIPE INVERT, AND PIPE SIZE.

ALL EXISTING DRAIN TILE ROUTES HAVE BEEN FIELD STAKED WITH 'EXISTING DRAIN TILE' PIN FLAGS AT 50' INTERVALS AND DOUBLE FLAGS AT INTERSECTIONS.

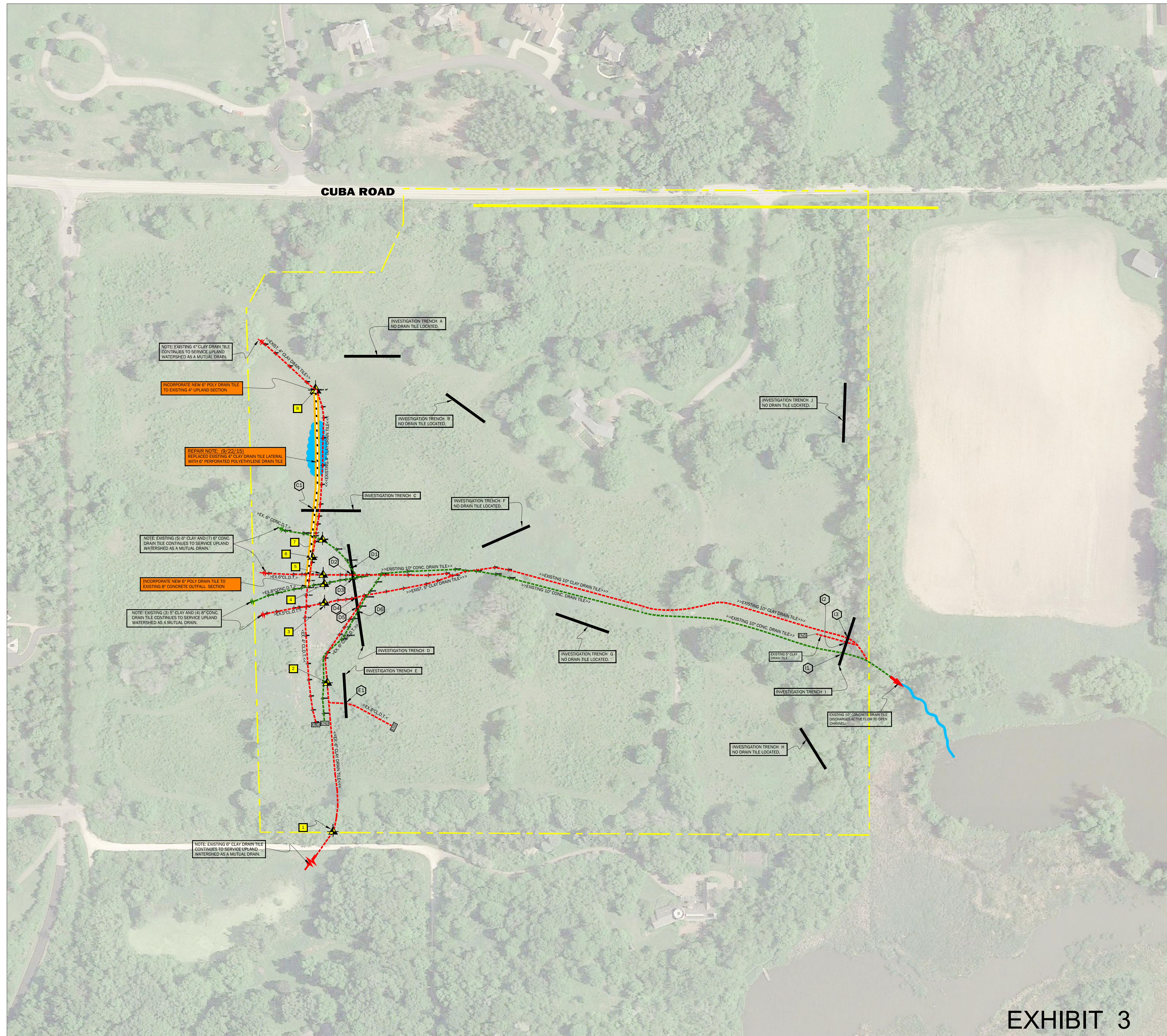
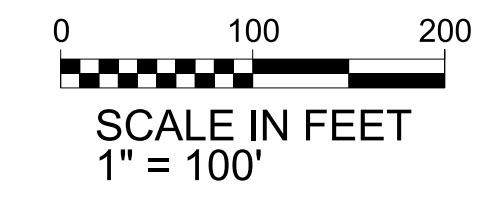


EXHIBIT 3

PROJECT CLIENT: JOE RIZZA ENTERPRISES CATHY MILLER, PROJECT MANAGER 8450 WEST 159TH STREET, ORLAND PARK, IL., 60462	APPROVED BY AND DATE: TOM HUDDLESTON 9/29/2006	PROJECT DATE: 9/29/2006	DATE: 8/22/2015 BY: TLH3 DESCRIPTION: ADD PROPOSAL AND CURRENT EVALUATION INFO.		
ACKNOWLEDGMENTS: HUDDLESTON-McBRIDE MAPPING SYSTEM	FIELD FILE NO.: 10-6-26	DATE: 10/8/2015 BY: TLH3 DESCRIPTION: ADD DRAIN TILE REPLACEMENT NOTES			
DRAWN BY AND DATE: TOM HUDDLESTON 9/29/2006	DRAWING NO.: 10-6-26	WEATHER CONDITIONS: SUNNY / WARM - 50s	DRAWING SCALE: 1" TO 100'	SHEET NO.: ONE OF ONE	CANTERBURY PARK HUDDLESTON-McBRIDE PROFESSIONAL LAND DRAINAGE SERVICES 9504 FOWLER RD., ROCHELLE, ILLINOIS PHONE 815-562-6007

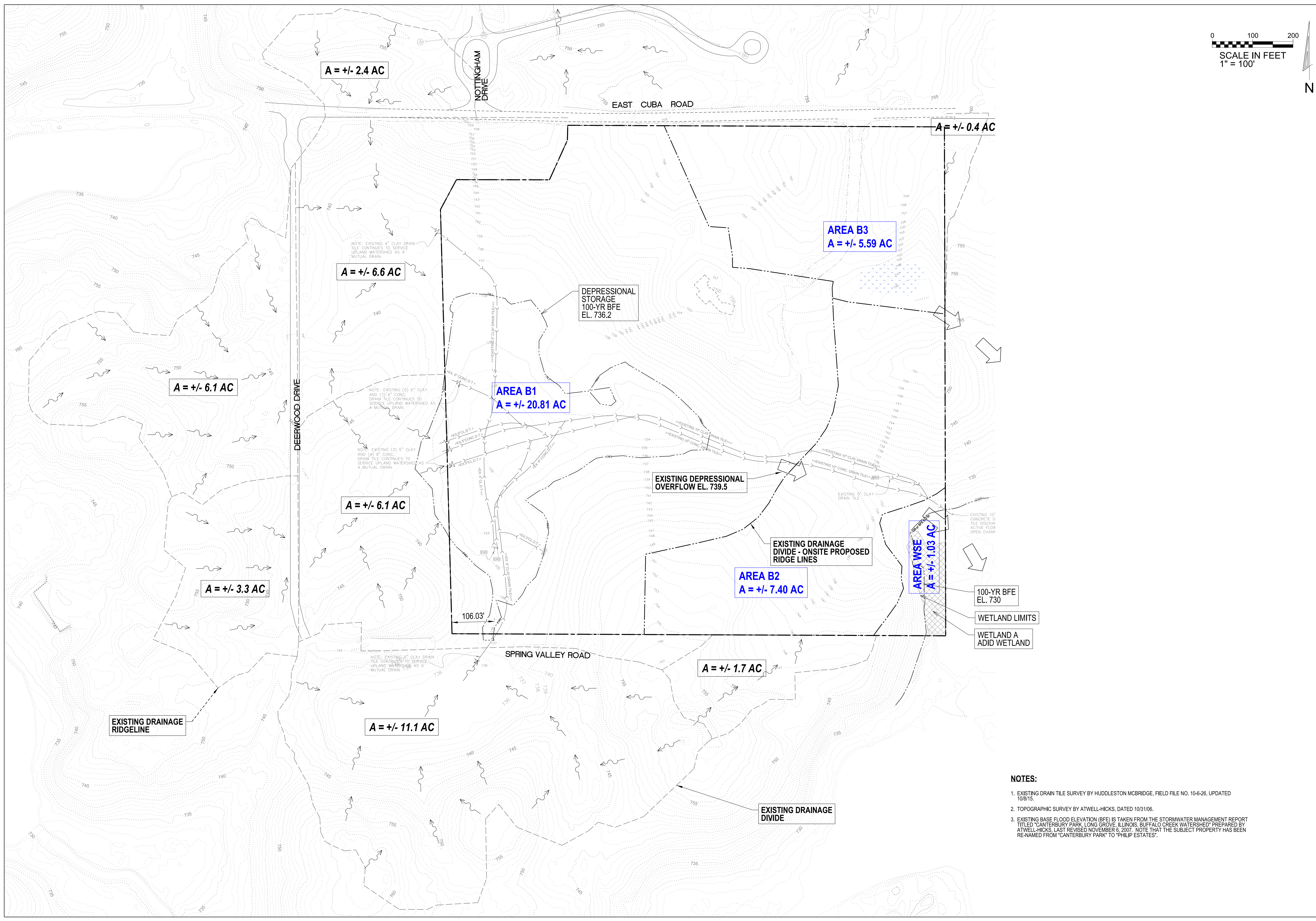
Exhibit 4

Preliminary Stormwater Management Plans

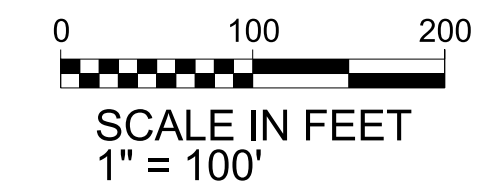


NO.	DATE	DESCRIPTION
2	1/28/21	Rev. Per LCSAC
1	3/11/20	Date Issued

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- NOTES:**
- EXISTING DRAIN TILE SURVEY BY HUDDLESTON MCBRIDGE, FIELD FILE NO. 10-6-26, UPDATED 10/8/15.
 - TOPOGRAPHIC SURVEY BY ATWELL-HICKS, DATED 10/31/06.
 - EXISTING BASE FLOOD ELEVATION (BFE) IS TAKEN FROM THE STORMWATER MANAGEMENT REPORT TITLED "CANTERBURY PARK, LONG GROVE, ILLINOIS, BUFFALO CREEK WATERSHED" PREPARED BY ATWELL-HICKS, LAST REVISED NOVEMBER 6, 2007. NOTE THAT THE SUBJECT PROPERTY HAS BEEN RE-NAMED FROM "CANTERBURY PARK" TO "PHILIP ESTATES".



PRELIMINARY STORMWATER STORAGE CALCULATIONS
 Note: All elevations shown are based on Project Datum.

BASIN 1		AREA DATA			VOLUME CALCULATIONS		WEST
Elev.	Depth (FT)	Pond Surface Area (sf)	Pond Surface Area (ac)	Average Surface Area (ac)	Incr. Storage (ac-ft)	Cumulative Storage (ac-ft)	Notes
736.20	0.20	245,000	5.62	5.62	1.12	16.53	Existing BFE, UHWL
735.00	1.00	244,840	5.62	5.15	5.15	15.41	
732.00	0.05	202,804	4.68	4.64	0.23	18.26	
734.95	0.95	202,600	4.65	4.38	4.06	10.03	HWL
734.00	0.50	170,164	3.91	3.67	1.84	5.96	
733.50	0.50	150,000	3.44	3.23	1.61	4.12	Outlet Elevation
733.00	1.00	131,096	3.01	2.51	2.51	2.51	
732.00	0.00	87,625	2.01	0.00	0.00	0.00	Drain tile discharge
					Total	16.53	ac-ft

BASIN 2		AREA DATA			VOLUME CALCULATIONS		EAST-CENTRAL
Elev.	Depth (FT)	Pond Surface Area (sf)	Pond Surface Area (ac)	Average Surface Area (ac)	Incr. Storage (ac-ft)	Cumulative Storage (ac-ft)	Notes
736.20	1.20	55,000	1.26	1.22	1.46	4.41	UHWL
735.00	0.18	51,002	1.17	1.17	0.21	2.95	
734.82	0.82	51,002	1.17	1.11	0.91	2.74	HWL
734.00	1.00	45,307	1.04	0.98	0.98	1.83	
732.00	1.00	34,540	0.79	0.85	0.85	0.85	
732.00	0.00	34,540	0.79	0.00	0.00	0.00	Outlet Elevation
					Total	4.41	ac-ft

BASIN 3		AREA DATA			VOLUME CALCULATIONS		EAST-NORTH
Elev.	Depth (FT)	Pond Surface Area (sf)	Pond Surface Area (ac)	Average Surface Area (ac)	Incr. Storage (ac-ft)	Cumulative Storage (ac-ft)	Notes
749.00	0.71	24,014	0.55	0.53	0.37	1.71	UHWL
748.19	0.19	21,994	0.50	0.50	0.14	1.23	
748.00	1.00	21,152	0.49	0.45	0.45	1.19	HWL
747.00	1.00	18,450	0.42	0.39	0.39	0.73	
746.00	1.00	15,900	0.37	0.34	0.34	0.34	
745.00	0.00	13,510	0.31	0.00	0.00	0.00	Outlet Elevation
					Total	1.71	ac-ft

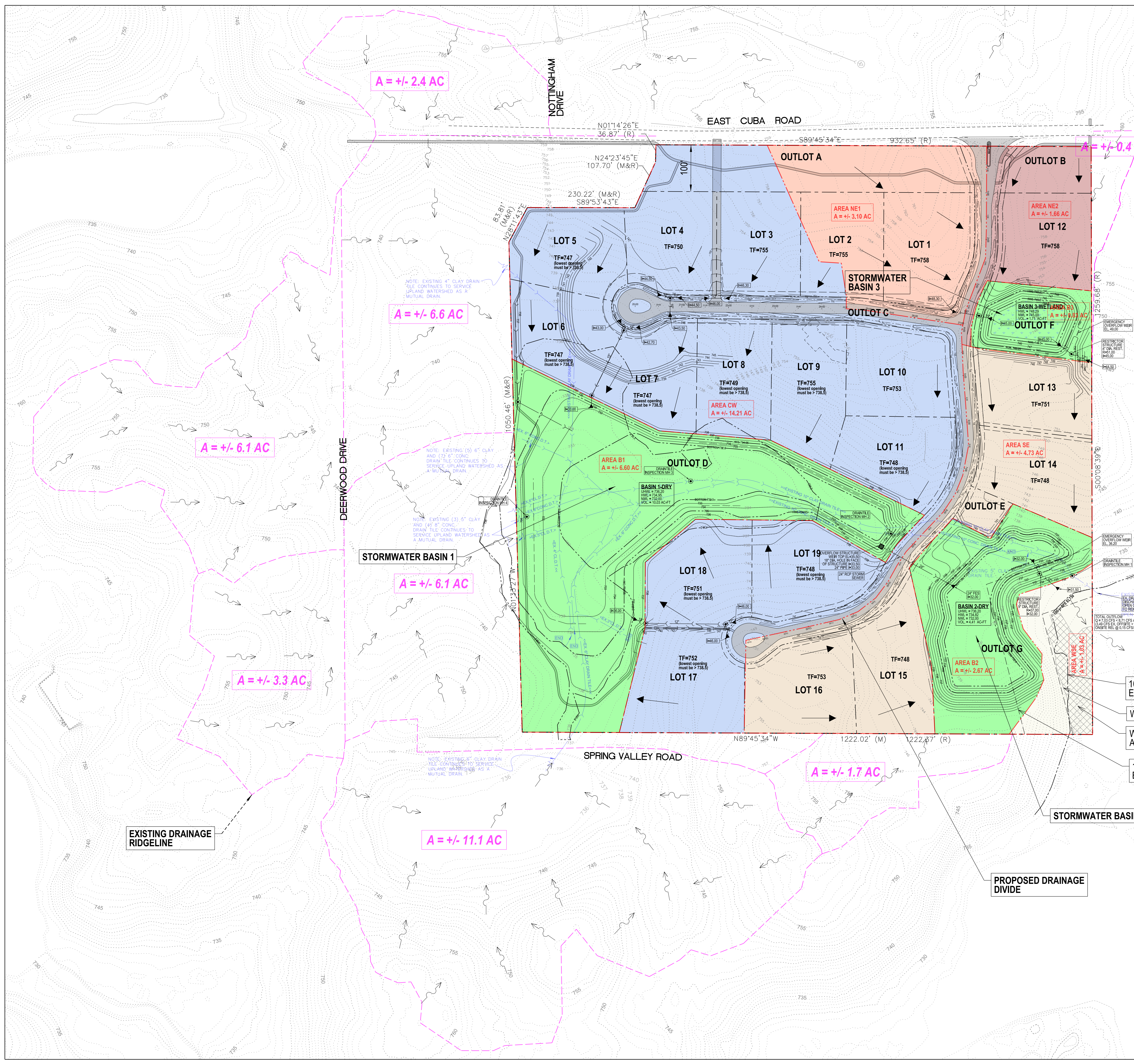
STORMWATER SUMMARY FOR TOTAL STORAGE PROVIDED TO DESIGN HWL						TOTAL VOLUME TO EX. BFE 736.2	
BASIN	1	2	3	HWL	NWL	DEPTH (ft)	STORAGE (ac-ft)
BASIN 1	735.00	732.00	735.00	3.00	10.26	736.20	16.53
BASIN 2	735.00	732.00	735.00	3.00	2.95	736.20	4.41
BASIN 3	748.29	745.00	745.00	3.29	1.71	748.29	1.33
TOTAL STORMWATER STORAGE TO HWL							22.27

DEPRESSIONAL STORMWATER STORAGE CALCULATIONS
 Note: All elevations shown are based on Project Datum.

BASIN 1		AREA DATA			VOLUME CALCULATIONS		WEST
Elev.	Depth (FT)	Depressional Surface Area (sf)	Surface Area (ac)	Average Surface Area (ac)	Incr. Storage (ac-ft)	Cumulative Storage (ac-ft)	Notes
736.20	0.20	253,392	5.82	5.61	1.12	10.72	100-yr BFE
736.00	1.00	235,672	5.41	4.49	4.49	9.59	
735.00	1.00	155,438	3.57	2.87	2.87	5.11	
734.00	1.00	94,217	2.16	1.59	1.59	2.24	
733.00	1.00	44,407	1.02	0.65	0.65	0.65	
732.00	0.00	12,099	0.28	0.00	0.00	0.00	BOTTOM
					Total	10.72	ac-ft

NOTES:

- STORMWATER MANAGEMENT: THE STORMWATER MANAGEMENT SYSTEM HAS BEEN DESIGNED TO COMPLY WITH THE CURRENT LAKE COUNTY WATERSHED DEVELOPMENT ORDINANCE USING A SERIES OF DETENTION BASINS.
- THERE IS EXISTING DEPRESSIONAL STORAGE WITHIN BASIN 1 THAT WILL BE MAINTAINED WITHIN THE PROPOSED BASIN DESIGN.
- THE ROADWAYS WILL BE PRIVATE ROADS DESIGNED WITH A RURAL CROSS-SECTION. DITCHES WILL BE PROVIDED ON BOTH SIDES OF THE ROAD TO CONVEY STORMWATER TO THE DETENTION BASINS. CULVERTS WILL BE PROVIDED UNDER ALL DRIVEWAYS AND AT ROADWAY INTERSECTIONS.



PROJECT:
 PHILIP ESTATES SUBDIVISION
 CUBA ROAD, LONG GROVE, IL

PREPARED FOR:
 PHILIP ESTATES, LLC
 8150 W. 159th Street
 Orland Park, IL 60462

NO.	DATE	DESCRIPTION
1	11/11/20	Date Issued
2	1/28/21	Rev. Per LCSAC

PRELIMINARY
 STORMWATER
 MANAGEMENT
 PLAN -
 PROPOSED
 CONDITIONS

Appendix A

Wetland Delineation Report

(Partial)

WETLAND DELINEATION REPORT

PREPARED FOR:

Joe Rizza Enterprises Inc.
8150 W. 159th Street
Orland Park, IL 60462

SUBJECT SITE:

Renamed "Philip Estate Subdivision"

~~Canterbury Park~~

3699 Canterbury Drive
Long Grove, Lake County Illinois
Latitude 42.181047 Longitude -88.026801

May 20, 2017
Updated November 6, 2020



PO BOX 321 | GILBERTS, ILLINOIS 60136 | 847-514-5476

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WETLAND DELINEATION REPORT

EXECUTIVE SUMMARY

In response to the request of Cross Engineering, Midwest Ecological, Inc. (MEI) has performed and completed a Wetland Delineation for the 35 acre parcel located off of Cuba Road, Long Grove, Lake County Illinois. The study area is located within Section 26, Township 43 North, Range 10 East of the Third Principal Meridian within Ela Township, Lake County, Illinois. Utilizing the methods and criteria established by the U.S. Army Corps of Engineers (COE) in their Corps of Engineers Wetlands Delineation Manual (1987), Midwest Regional Supplement (2008), United States Department of Agriculture/Natural Resource Conservation Service, in their Wetland Mapping Conventions – NRCS, Illinois (1998) a wetland investigation of the property was performed. Based on the on-site investigation using the information obtained from the field samples Midwest Ecological, Inc. (MEI) identified one (1) wetland area totaling **0.37 acres** in size.

Site	On-site Acreage	Native Mean Conservatism	Floristic Quality Index	Anticipated Regulatory Agency	ADID (Y/N)
Wetland A	0.37 acres	2.44	15.21	USACE	Y

Please Note: Wetland A is larger than identified within this report. Wetland A is part of a large wetland complex located to the East. Wetland A is jurisdictionally connected to Buffalo Creek. The acreages & quality of the wetlands noted within this report only pertain to the areas found within the property boundary.

It should be noted that under the current guidelines, any disturbance of a wetland area requires a permit through the US Army Corps of Engineers and/or Lake County Stormwater Management Commission. However, mitigation may or may not be required, depending on the overall impact (> 0.10) to the wetland, Waters of the United States or Isolated Wetland of Lake County. This jurisdiction of the identified wetland is at the discretion of the ACOE.

PURPOSE OF VISIT

The purpose of the site visit is to determine if any Wetlands (various types), Open water pockets, Creeks or Rivers exist on-site and to determine their approximate size, location, quality and jurisdiction. Wetlands encountered were delineated using standard methods sanctioned by the United States Army Corps of Engineers in their Corps of Engineers Wetlands Delineation Manual (1987), Regional Supplement (2008) and Wetland Mapping Conventions – NRCS, Illinois (1998).

DEFINITION OF A WETLAND

The U.S. Army Corps of Engineers (ACOE) and the U.S. Environmental Protections Agency (EPA) define wetlands as:

“areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions...” (33 CFR 328.3[b], 1977).

Although not defined by regulation, “normal circumstances” are interpreted by both the ACOE and the Natural Resources Conservation Service to be “the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed” (7 CFR 12.31[b][2][i]).

METHODOLOGY

Prior to visiting the site, Midwest Ecological, Inc. (MEI) performed a review of the aforementioned National Wetland Inventory map, Lake County Soil Survey map and aerial photograph in order to determine existing site conditions. Site visits were then conducted by an Environmental Wetland Specialist from MEI on November 16, 2016, September 21 & 25, 2020. The USACE Wetland Delineation Manual, dated January 1987, identifies the mandatory technical criteria for wetland identification. The three essential characteristics of a wetland are: 1) hydrophytic vegetation; 2) hydric soils; and 3) wetland hydrology. These characteristics are described below:

Hydrophytic Vegetation: The hydrophytic vegetation criterion is based on a separation of plants into five basic groups:

- 1) Obligate wetland plants (OBL) almost always occur (estimated probability >99%) in wetlands under natural conditions;
- 2) Facultative wetland plants (FACW) usually occur in wetlands (estimated probability 67-99%), but occasionally are found in non-wetlands;
- 3) Facultative plants (FAC) are equally likely to occur in wetland or non-wetlands (estimated probability 34-66%);
- 4) Facultative upland plants (FACU) usually occur in non-wetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%); and
- 5) Obligate upland plants (UPL) almost always occur (estimated probability >99%) in non-wetlands under natural conditions.

Within each data point, vegetation is sampled in plots of varying size based on the type of vegetation being sampled. The following plot sizes are recommended by the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual for the Midwest Region:

Trees	- 30-ft radius
Saplings/Shrubs	- 15-ft radius
Herbaceous Plants	- 1 m ² plot
Woody vines	- 30-ft radius

If greater than 50% of the plants present in each stratum or layer of the plant community are FAC (with the exception of FAC-), FACW, or OBL the subject area is considered a wetland in terms

of vegetation (Dominance Test). If the vegetation does not meet the requirements of the Dominance Test, the Prevalence Index (PI) should be utilized.

The PI evaluates the coverage, on a weighted basis of coverage over all strata, of the vegetation within the plot. The PI ranges between 1.0 and 5.0, with a 3.0 or less indicating hydrophytic vegetation is present. If the PI is greater than 3.0, the dominance test is failed, but there are still hydric soil and wetland hydrology presence, the observation of morphological adaptations by vegetation can be used to indicate that the hydrophytic vegetation criteria is met. Morphological adaptations are changes in the structure of vegetation in response to conditions outside the normal character of the plant. These adaptations include adventitious roots, multi-stemmed trunks, shallow root systems developed at or near the surface, and buttressing in tree species. To meet this indicator, more than 50% of the individuals of FACU species must exhibit the morphological adaptations. Care must be given that the adaptations observed are due wetter conditions that the species is used to as opposed to other factors such as shallow roots present because of erosion of the surface.

Hydric Soils: Hydric soils are defined in the manual as "soils that are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions in the upper part." Hydric soil indicators are distinctive characteristics that persist in the soil during both wet and dry periods, and are used to identify hydric soils in the field. Field indicators include color, mottling, gleying, and sulfidic odor. A specific set of indicators has been developed by the USDA Natural Resource Conservation Service (Field Indicators of Hydric Soils in the United States) which provides a detailed description of how to identify the indicators in during a site visit. A soil meets the definition of a hydric soil if it exhibits at least one of these indicators.

Wetland Hydrology: Indicators of hydric soil and hydrophytic vegetation typically reflect the middle and long-term conditions of a site, but not the short term conditions. The wetland hydrology criterion is often the most difficult to determine because of climatological variation. Typically, the presence of water for a week or more during the growing season creates anaerobic conditions indicative of wetland hydrology. Anaerobic conditions lead to the prevalence of wetland plants. The 2010 USACE Regional Supplement for the Midwest Region provides specific indicators in four different groups for wetland hydrology: Observation of Surface Water or Saturated Soils, Evidence of Recent Inundation, Evidence of Current or Recent Soil Saturation, and Evidence from Other Site Conditions or Data. If a site exhibits 1 primary indicator or 2 secondary indicators, then it meets the hydrology criteria for a wetland.

REFERENCE MATERIALS

The following materials were reviewed and utilized to assist in the field reconnaissance and completion of this report. See Appendix A for the Reference Materials (Exhibits 1 through 7).

Location

The site is located at common address 3699 Canterbury Drive, Long Grove Illinois. Geographically, the site can be located in Section 26, Township 43 North, Range 10 East of the

Third Principal Meridian within Ela Township, Lake County, Illinois (Latitude 42.181047 Longitude -88.026801).

National & Lake County Advanced Identification Wetland Inventory Maps

The National & Lake County Advanced Identification Wetland Maps were reviewed to determine the location of wetland areas on the subject site. It should be noted that these maps are only large scale guides, actual wetland locations and types may vary. Ultimate qualification occurs during field reconnaissance.

Per our review of the NWI map, the study area contains one wetland area:

PEMF: Palustrine, Emergent, Semi-permanent

Per our review of the Lake County Advanced Identification Map, The study area does contain one High Quality Aquatic Wetland (ADID 180) area.

Based on onsite investigation the site does not conform to the ADID wetland map. MEI did not identify any wetland area within the center or western portion of the property.

Lake County Soil Survey Map

The Soil Survey of Lake County, Illinois was investigated to determine the location of hydric soils on the subject site. Mapped hydric soils can indicate wetland areas. The following soils were found to be present on the subject site during our investigation.

- 232 A – Ashkum silty clay loam, 0-2% slopes (**poorly drained, hydric**)
- 330 A – Peotone silty clay loam, 0-2% slopes (**very poorly drained**)
- 370 B – Saylesville silt loam, 2-4% slopes (moderately well drained)
- 530 D3 – Ozaukee silt loam, 6-12% slopes (moderately well drained)
- 696 C2 – Zurich silt loam, 4-6% slopes (moderately well drained)
- 840 C2 – Zurich and Ozaukee silt loams, 4-6% slopes (moderately well drained)
- 1107 A – Sawmill silty clay loam, 0-2% slopes (**poorly drained**)

United States Geological Survey Map

The United States Geological Survey Map & Hydrological Atlas (HA-208) as illustrated on the Lake Zurich Quad U.S.G.S. Map and Hydrological Atlas. These maps were reviewed to determine the historical local drainage patterns.

All drainage noted (surface and subsurface) on-site is conveyed to the East into Wetland A. A series of draitiles are found within the center of the property conveying water to the East. Wetland A is part of a larger wetland complex that continues to the South and West. Wetland A is directly connected to Buffalo Creek.

Flood Insurance Rate Map

The Flood Insurance Rate Maps (F.I.R.M.), for Lake County, Illinois, Community Panel No. 17097C0242 L effective date September 18, 2013 was reviewed to determine the location of regulatory floodplains and floodways within the subject site. Mapped floodplains can be indicative of wetland hydrology.

Based on the F.I.R.M. Maps, the study area does contain a Zone AE flood plain. The flood plain is found within Wetlands A and Buffalo Creek to the East.

WETLAND FIELD DELINEATION

An on-site wetland delineation of the property was conducted on November 16, 2016, September 21 & 25, 2020. Wetland boundaries were determined using the ACOE guidelines and the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) guidelines, as stated previously. The routine method of wetland delineation was used, incorporating information on vegetation, hydrology and soils. The full width of the property was traversed and when a suspected wetland was encountered, the plant species present were determined by making several random passes through the area. If wetland plant species were found to be comprised of 50% or more of plant cover (i.e., wetland vegetation was dominant), the suspected wetland was further examined for the necessary field indicators of hydric soil and hydrology. The wetland boundaries were then defined and all observed plant species were recorded.

The plant taxonomic nomenclature and the Natural Area Index (NAI) used in this report follow's the Chicago Region FQA Index (2017). A more detailed survey would be necessary for a more complete plant list and while more species might be obtained from additional surveys, this would not change the areas delineated as wetlands.

Study Area: The 35 acre study area and consists of primarily vacant land with one estate style single family home. The site consists of rolling terrain from grasslands to scattered woodlands. Common buckthorn and other volunteer woody species were being removed at the time of our investigation. The tree removal process consists of cutting at the base and mulching the tree. According to the Lake County ADID wetland map, ADID 180 comprises of approximately 25% of the site. MEI investigated this area and did not identify a wetland where the ADID map identifies a wetland. A wetland was noted at the SE corner of the site and is connected to the large wetland complex of Buffalo Creek, however a wetland was not found within the center of the property. A series of draitiles, ranging from 4"-10" in size, have been identified that could be drawing down the ground water within this area. The draitiles discharge into the off-site wetland complex. The ADID wetland location appears to be a mapping error.

Wetland A: Wetland A is a scrub shrub/marsh wetland that is found at the southeast corner of the study area. The wetland is part of the larger Buffalo Creek wetland Complex. Wetland A is characterized by data point 1A & 3A and is **0.37 acres** in size. The flagged wetland is a lowland area surrounded by steep slopes that continues to the east. The Lake County Advanced Identification Map shows this area as High Quality Aquatic Resource # 180. A draitile outfall

was observed within the woody area prior to discharge off the site. The dominant vegetation (within this area) was determined to be Common cattail (*Typha latifolia*), Narrow-leaved Cattails (*Typha angustifolia*), Reed Canary Grass (*Phalaris arundinacea*), Common Buckthorn (*Rhamnus cathartica*) & Orange Jewel Weed (*Impatiens capensis*). During our investigation positive wetland hydrology is met with the primary indicators of Surface Water (A1), Saturation (A3) & Inundation visible on aerial imagery (B7). The mapped soil profile for this wetland is identified as Sawmill silty clay loam (1107A) which is a very poorly drained hydric soil. Primary soil indicators of thick dark surface (A12) was noted within the flagged boundary.

Said vegetation soils and hydrology information noted above can be found in the datasheets section of this report. Please note data sheets 1A-3A reference wetland A.

Study Information

Site: Canterbury Park
 Locale: Wetland A
 By: Robert Vanni

Conservatism-Based Metrics

Mean C (native species)	2.44
Mean C (all species)	1.86
Mean C (native trees)	3.20
Mean C (native shrubs)	1.33
Mean C (native herbaceous)	2.52
FQAI (native species)	15.21
FQAI (all species)	13.30
Adjusted FQAI	21.30
% C value 0	0.31
% C Value 1-3	0.47
% C value 4-6	0.20
% C value 7-10	0.02

Additional Metrics

Species Richness (all)	51.00
Species Richness (native)	39.00
% Non-native	0.24
Wet Indicator (all)	-0.37
Wet Indicator (native)	-0.56
% hydrophyte (Midwest)	0.73
% native perennial	0.65
% native annual	0.08
% annual	0.08
% perennial	0.86

Species Acronym	Species Name (NWPL/Mohlenbrock)	Common Name	C Value	Midwest WET indicator	WET indicator (numeric)	Habit	Duration	Nativity
aceneg	<i>Acer negundo</i>	Ash-Leaf Maple	0	FAC	0	Tree	Perennial	Native
agrgy	<i>Agrimonia gryposepala</i>	Tall Hairy Grooveburr	2	FACU	1	Forb	Perennial	Native
agralb	<i>Agrostis gigantea</i>	Black Bent	0	FACW	-1	Grass	Perennial	Adventive
allpet	<i>Alliaria petiolata</i>	Garlic-Mustard	0	FAC	0	Forb	Biennial	Adventive
apocan	<i>Apocynum cannabinum</i>	Indian-Hemp	2	FAC	0	Forb	Perennial	Native
ascinc	<i>Asclepias incarnata</i>	Swamp Milkweed	4	OBL	-2	Forb	Perennial	Native
betnig	<i>Betula nigra</i>	River Birch	7	FACW	-1	Tree	Perennial	Native
bidfro	<i>Bidens frondosa</i>	Devil's-Pitchfork	1	FACW	-1	Forb	Annual	Native
boeeyl	<i>Boehmeria cylindrica</i>	Small-Spike False Nettle	2	OBL	-2	Forb	Perennial	Native
exblan	<i>Carex blanda</i>	Eastern Woodland Sedge	1	FAC	0	Sedge	Perennial	Native
cxvulp	<i>Carex vulpinoidea</i>	Common Fox Sedge	2	FACW	-1	Sedge	Perennial	Native
celocc	<i>Celtis occidentalis</i>	Common Hackberry	3	FAC	0	Tree	Perennial	Native
cirarv	<i>Cirsium arvense</i>	Canadian Thistle	0	FACU	1	Forb	Perennial	Adventive
conarv	<i>Convolvulus arvensis</i>	Field Bindweed	0	UPL	2	Forb	Perennial	Adventive
corrac	<i>Cornus racemosa</i>	Gray Dogwood	1	FAC	0	Shrub	Perennial	Native
epicol	<i>Epilobium coloratum</i>	Purple-Leaf Willowherb	3	OBL	-2	Forb	Perennial	Native
erian	<i>Erigeron annuus</i>	Eastern Daisy Fleabane	0	FACU	1	Forb	Biennial	Native
eutmac	<i>Eutrochium maculatum</i>	Spotted Trumpetweed	4	OBL	-2	Forb	Perennial	Native
geucan	<i>Geum canadense</i>	White Avens	1	FAC	0	Forb	Perennial	Native
haevir	<i>Hackelia virginiana</i>	Beggar's-Lice	0	FACU	1	Forb	Biennial	Native
impcap	<i>Impatiens capensis</i>	Spotted Touch-Me-Not	3	FACW	-1	Forb	Annual	Native
irivir	<i>Iris virginica var. shrevei</i>	Virginia Blueflag	5	OBL	-2	Forb	Perennial	Native
lemmio	<i>Lemna minor</i>	Common Duckweed	5	OBL	-2	Forb	Annual	Native
lontat	<i>Lonicera tatarica</i>	Twinsisters	0	FACU	1	Shrub	Perennial	Adventive

moralb	<i>Morus alba</i>	White Mulberry	0	FAC	0	Tree	Perennial	Adventive
parins	<i>Parthenocissus inserta</i>	Thicket-Creeper	1	FACU	1	Vine	Perennial	Native
parqui	<i>Parthenocissus quinquefolia</i>	Virginia-Creeper	2	FACU	1	Vine	Perennial	Native
polhyd	<i>Persicaria hydropiper</i>	Mild Water-Pepper	2	OBL	-2	Forb	Annual	Native
phaaru	<i>Phalaris arundinacea</i>	Reed Canary Grass	0	FACW	-1	Grass	Perennial	Adventive
popdel	<i>Populus deltoides</i>	Eastern Cottonwood	2	FAC	0	Tree	Perennial	Adventive
rhaeat	<i>Rhamnus cathartica</i>	European Buckthorn	0	FAC	0	Shrub	Perennial	Adventive
rosmul	<i>Rosa multiflora</i>	Rambler Rose	0	FACU	1	Shrub	Perennial	Adventive
rubocc	<i>Rubus occidentalis</i>	Black Raspberry	2	UPL	2	Shrub	Perennial	Native
rudlac	<i>Rudbeckia laciniata</i>	Green-Head Coneflower	5	FACW	-1	Forb	Perennial	Native
saglat	<i>Sagittaria latifolia</i>	Duck-Potato	4	OBL	-2	Forb	Perennial	Native
salnig	<i>Salix nigra</i>	Black Willow	4	OBL	-2	Tree	Perennial	Native
samcan	<i>Sambucus nigra ssp. canadensis</i>	Black Elder	1	FACW	-1	Shrub	Perennial	Native
fesela	<i>Schedonorus pratensis</i>	Meadow Fescue	0	FACU	1	Grass	Perennial	Adventive
solcar	<i>Solanum carolinense</i>	Carolina Horse-Nettle	0	FACU	1	Forb	Perennial	Adventive
solalt	<i>Solidago altissima</i>	Tall Goldenrod	1	FACU	1	Forb	Perennial	Native
solgg	<i>Solidago gigantea</i>	Late Goldenrod	4	FACW	-1	Forb	Perennial	Native
spapcc	<i>Spartina pectinata</i>	Freshwater Cord Grass	4	FACW	-1	Grass	Perennial	Native
astsim	<i>Symphytichum lanceolatum</i>	White Paniced American-Aster	3	FAC	0	Forb	Perennial	Native
astnov	<i>Symphytichum novae-angliae</i>	New England American-Aster	4	FACW	-1	Forb	Perennial	Native
astpil	<i>Symphytichum pilosum</i>	White Oldfield American-Aster	0	FACU	1	Forb	Perennial	Native
rhurad	<i>Toxicodendron radicans</i>	Eastern Poison-Ivy	2	FAC	0	Vine	Perennial	Native
typang	<i>Typha angustifolia</i>	Narrow-Leaf Cat-Tail	0	OBL	-2	Forb	Perennial	Adventive
typlat	<i>Typha latifolia</i>	Broad-Leaf Cat-Tail	1	OBL	-2	Forb	Perennial	Native
urtdio	<i>Urtica dioica ssp. gracilis</i>	Tall Nettle	2	FACW	-1	Forb	Perennial	Native
viosor	<i>Viola sororia</i>	Hooded Blue Violet	3	FAC	0	Forb	Perennial	Native
vitrip	<i>Vitis riparia</i>	River-Bank Grape	2	FACW	-1	Vine	Perennial	Native

Wetland A Jurisdictional Determination Opinion: The Corps of Engineers has taken jurisdiction and concurred with the boundary of wetland A (LRC 2017-00690). The Jurisdictional Determination and boundary verification is valid until September 15, 2022.

CONCLUSIONS

The site was evaluated using U.S. Army Corps of Engineers and USDA guidelines for identifying wetlands. After evaluation of all data obtained, the site does contain one (1) ADID wetland areas totaling **0.37 acres** in size.

FEDERAL REGULATIONS

Jurisdictional Waters of the United States will be regulated under Section 404 of the Clean Water Act and the Section 401 Water Quality Certification requirements. Under Section 404, the United States Army Corps of Engineers regulates the discharge of dredged or fill material into jurisdictional Waters of the United States (WOUS).

Letter of No-Objection (LONO): The project may require a letter of No-Objection (LONO) from the Chicago District Army Corps of Engineers to facilitate the development. If the proposed project avoids impact to the wetlands or WOUS then a LONO can be petitioned.

Regional Permit 1 (RP1) authorizes the construction of residential, commercial and institutional developments and associated infrastructure, such as roads, utilities, detention areas, and recreation areas. Authorization under RP1 is subject to the following requirements which shall be addressed in writing and submitted with the notification:

- a. The impact to waters of the U.S. shall not exceed 1.0 acre. For projects that impact over 0.10 acres of waters of the U.S., the permittee is required to provide compensatory mitigation.

- b. Projects that impact no more than 0.5 acres of waters of the U.S., and do not impact any high-quality aquatic resources, will be processed under Category I.
- c. Projects that impact over 0.5 acres up to 1.0 acre of waters of the U.S., or impacts high-quality aquatic resources, will be processed under Category II.

The permittee shall establish and/or enhance an upland buffer of native plants (or other appropriate vegetation approved by the District) adjacent to all created, restored, enhanced or preserved waters of the U.S., including wetlands. Created buffers should be established on 6:1 (horizontal: vertical) or gentler slopes. The following buffer widths are required:

- 1) For any waters of the U.S. determined to be a high-quality aquatic resource, the buffer shall be a minimum of 100 feet.
- 2) For any waters of the U.S. that do not qualify as wetland (e.g. lakes, rivers, ponds, etc.), the buffer shall be a minimum of 50 feet from the Ordinary High Water Mark (OHWM).
- 3) For any jurisdictional wetland from 0.25 acres up to 0.50 acres in size, the buffer shall be a minimum of 30 feet.
- 4) For any jurisdictional wetland over 0.50 acres in size, the buffer shall be a minimum of 50 feet.

The District may allow buffer widths below the above-required minimums on a case by case basis. However, it is the responsibility of the applicant to provide supporting documentation as to why the buffer requirement could not be met. Stormwater retention/detention facilities and nature trails may be located within the outer 50% of the buffer. The District may allow Best Management Practices, small boat launches and piers/docks to be located in buffers.

Regional Permit 7 (RP7) authorizes temporary impacts to wetlands or WOUS to facilitate a project as long as the temporary impacts are restored to preconstruction conditions. Temporary structures and discharges necessary for construction activities including, access, temporary fill and dewatering devices are allowable under this permit.

Regional Permit 8 (RP8) authorizes the construction, maintenance and repair of utility line activities and associated facilities in waters of the United States. This includes trenching and backfilling activities for utility lines and fill activities for construction of substations and related appurtenances temporary and permanent access roads, construction pads, stormwater management facilities, fencing, parking lots, etc.), poles, pads, anchors, outfall structures, and foundations for overhead utility line towers, utility lines under (e.g., through directional drilling) or over navigable waters (regulated under Section 10 waters only), and outfalls and associated intakes which are authorized, conditionally authorized, specifically exempted, or are otherwise in compliance with the National Pollutant Discharge Elimination System program (Section 402 of the Clean Water Act).

LAKE COUNTY REGULATIONS

The four categories of wetland type regulated under the Lake County Unified Development ordinance (UDO), and Lake County Watershed Development Ordinance (WDO) are as follows:

- (a) Category-I: Wetland impacts less than or equal to 1 acre and does not impact high-quality aquatic resources;
- (b) Category-II: Wetland impacts greater than 1 acre and less than 2 acres and does not impact high-quality aquatic resources;
- (c) Category-III: Wetland impacts greater than or equal to 2 acres or impacts high-quality aquatic resources; and
- (d) Category-IV: Wetland impacts for the restoration, creation and enhancement of wetlands provided that there are net gains in aquatic resource function. Category-IV activities include shoreline and stream bank erosion restoration described in Article IV, Section C.2.d.3.

The WDO requires mitigation for wetland impacts greater than or equal to 0.10 acre of Isolated Wetlands of Lake County (IWLC). Mitigation shall provide replacement of the wetland environment lost to development at the following proportional rates (i.e., creation acreage to wetland impact acreage):

- 1) A minimum of 1.5:1 for wetland impacts under Categories I, II and III that are not high quality aquatic resources, except 1:1 for approved and fully certified wetland mitigation bank credits;
- 2) A minimum of 3:1 for wetland impacts that are high quality aquatic resources;
- 3) A minimum of 6:1 for wetland impacts that are forested wetlands.

Mitigation credit may also be obtained for enhancement. For example, the enhancement of farmed wetlands meeting the size criteria of the WDO may be used for up to 80% of the mitigation requirement. Enhancement of existing non-farmed wetlands may be credited up to 25% of the enhanced wetland acreage completed, provided the wetland impacted acreage created on-site is a minimum 1:1 ratio. Buffer width requirements for water bodies are as follows:

- 1) For all water bodies or wetlands with a total surface area greater than one third (1/3) acre but less than one (1) acre, a minimum buffer width of thirty (30) feet shall be established.
- 2) For all water bodies or wetlands with a total surface area greater than or equal to one (1) acre but less than two and one half (2 ½) acres, a minimum buffer width of forty (40) feet shall be established.
- 3) For all water bodies or wetlands with a total surface area greater than or equal to two and one half (2½) acres, a minimum buffer width of fifty (50) feet shall be established.
- 4) Non-linear high quality aquatic resources shall have a minimum buffer width of one hundred (100) feet.

Linear buffers shall be designated along both sides of all channels meeting the definition of Wetlands of Lake County. The buffer width shall be determined as follows:

- 1) When the channel has a watershed greater than 20-acres but less than one square mile, the minimum buffer shall be 50 feet on each side of the channel.
- 2) When the channel has a watershed greater than one square mile, the minimum buffer shall be 30 feet on each side of the channel.

3) Linear high quality aquatic resources and streams with an Index of Biotic Integrity (IBI) greater than 40 shall have a minimum buffer width of 100 feet on each side of the channel. (Initial IBI based on IEPA Illinois Water Quality Report, biannual. A site-specific IBI assessment may override this report.)

Should you have any questions, please do not hesitate to contact our office.

Sincerely,

Midwest Ecological, Inc. (MEI)

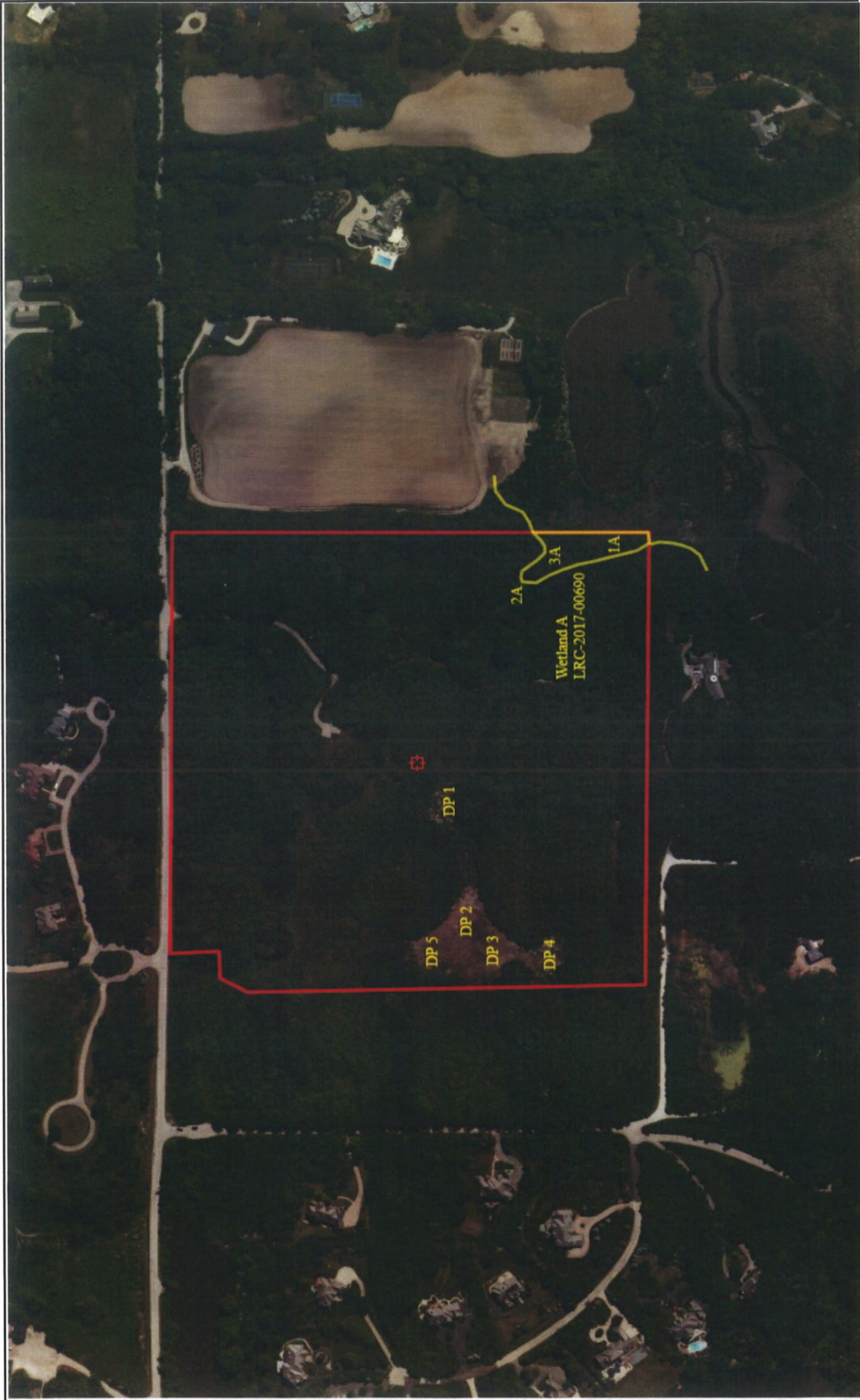


Robert L. Vanni
Wetland Specialist

Lake County Certified #C-059

APPENDIX A

Exhibits

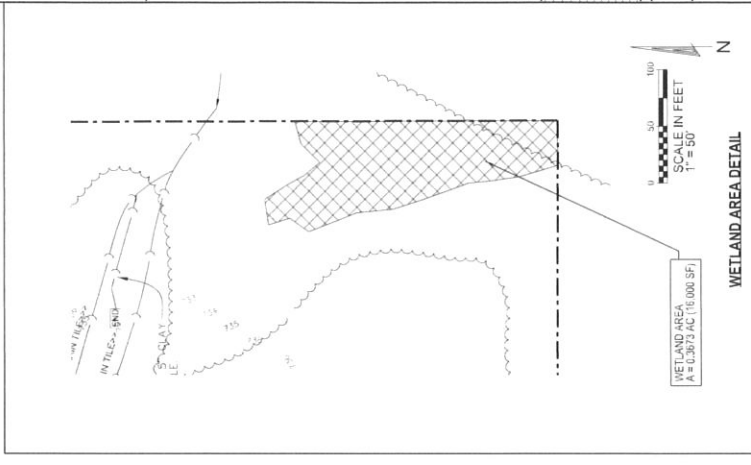
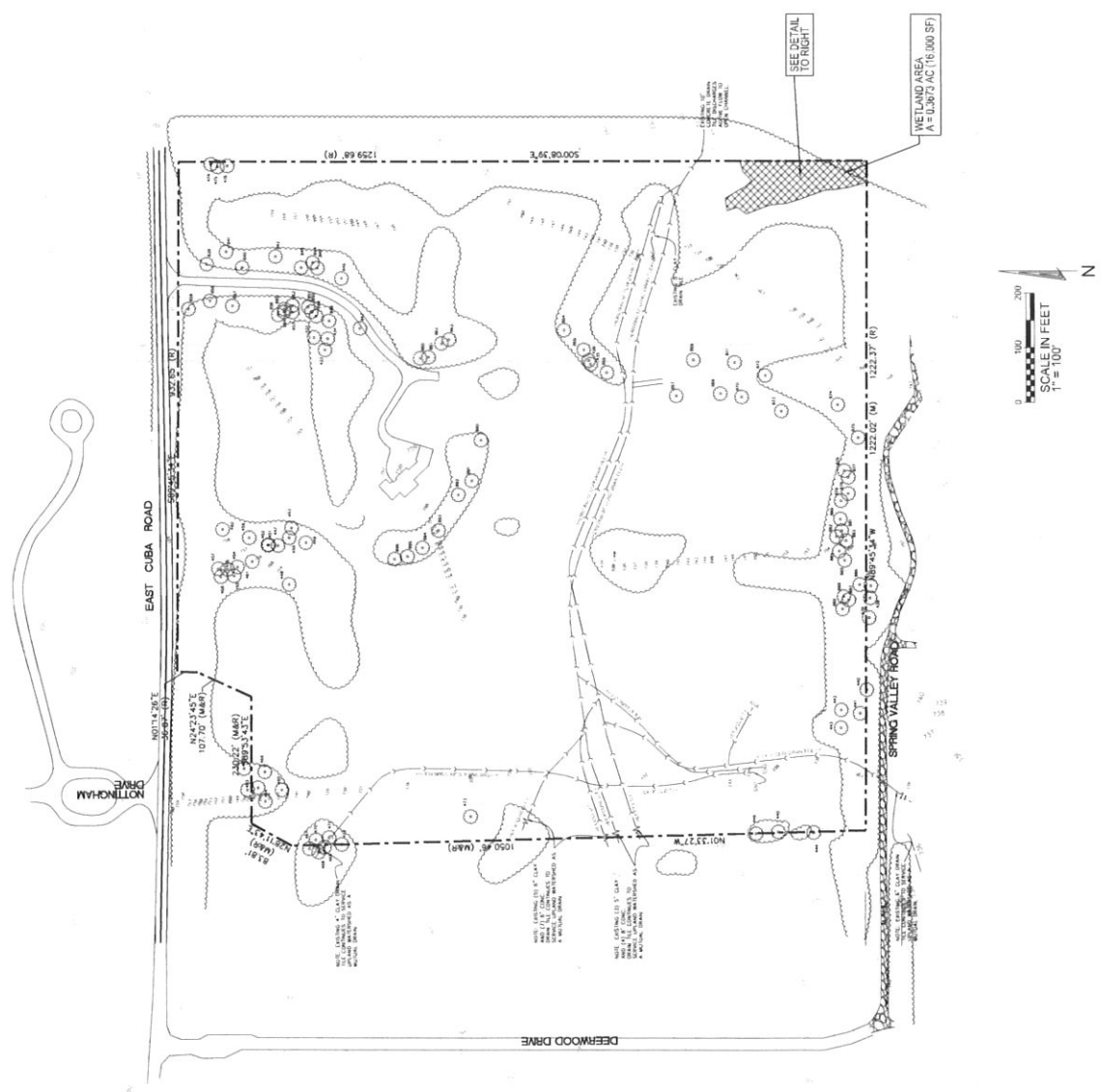


Source: Pictometry Aerial Photograph (2019)

Final Wetland Location Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
8150 W. 159th Street
Orland Park, IL 60462







Location Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
8150 W. 159th Street
Orland Park, IL 60462

Source: Bing Street Finder Map





ADID Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462

Source: Lake County Advanced Identification Wetland Map



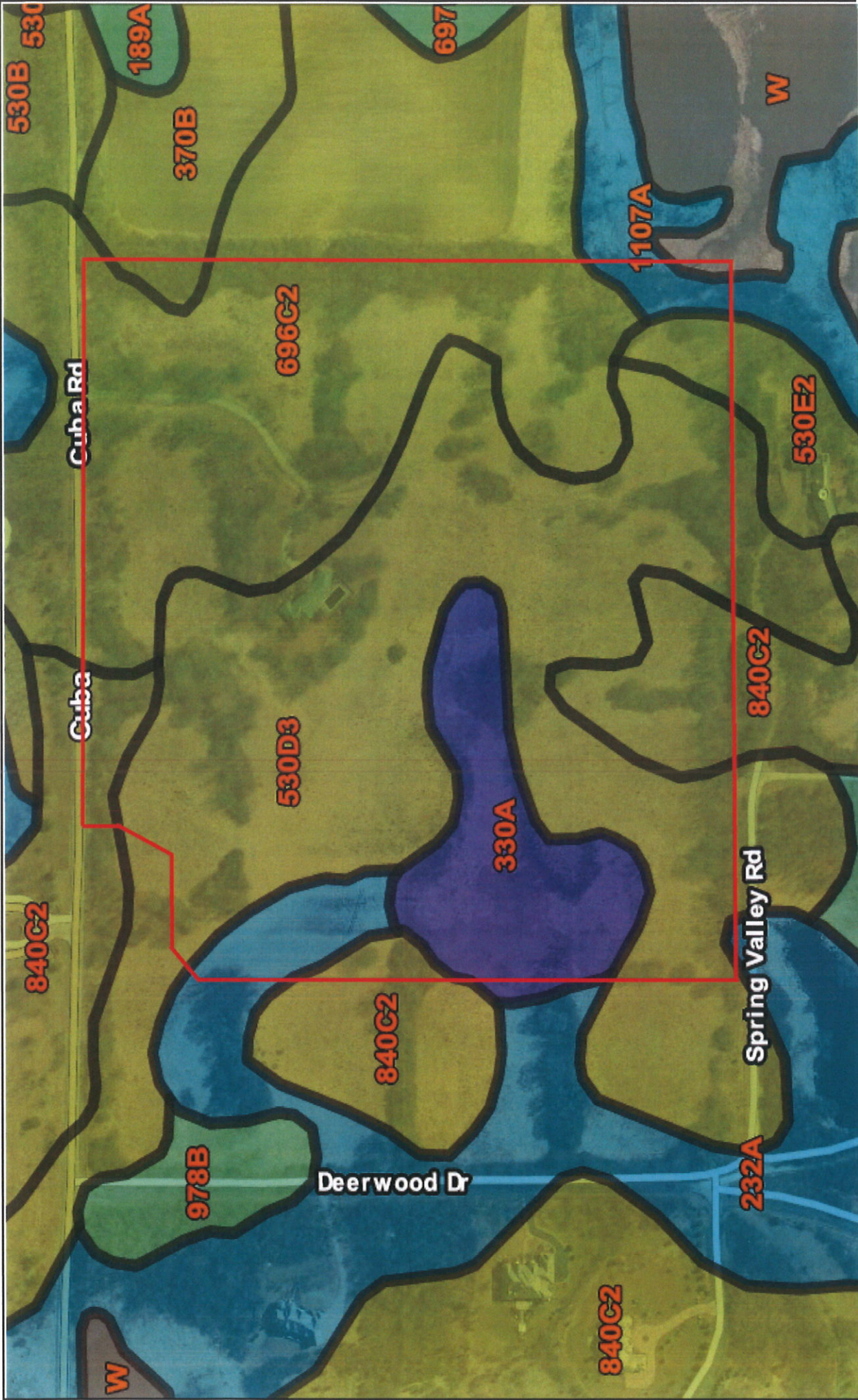


Source: National Wetland Inventory Map

N.W.I. Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462

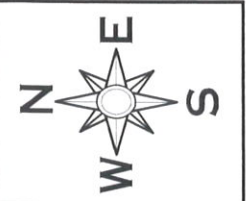


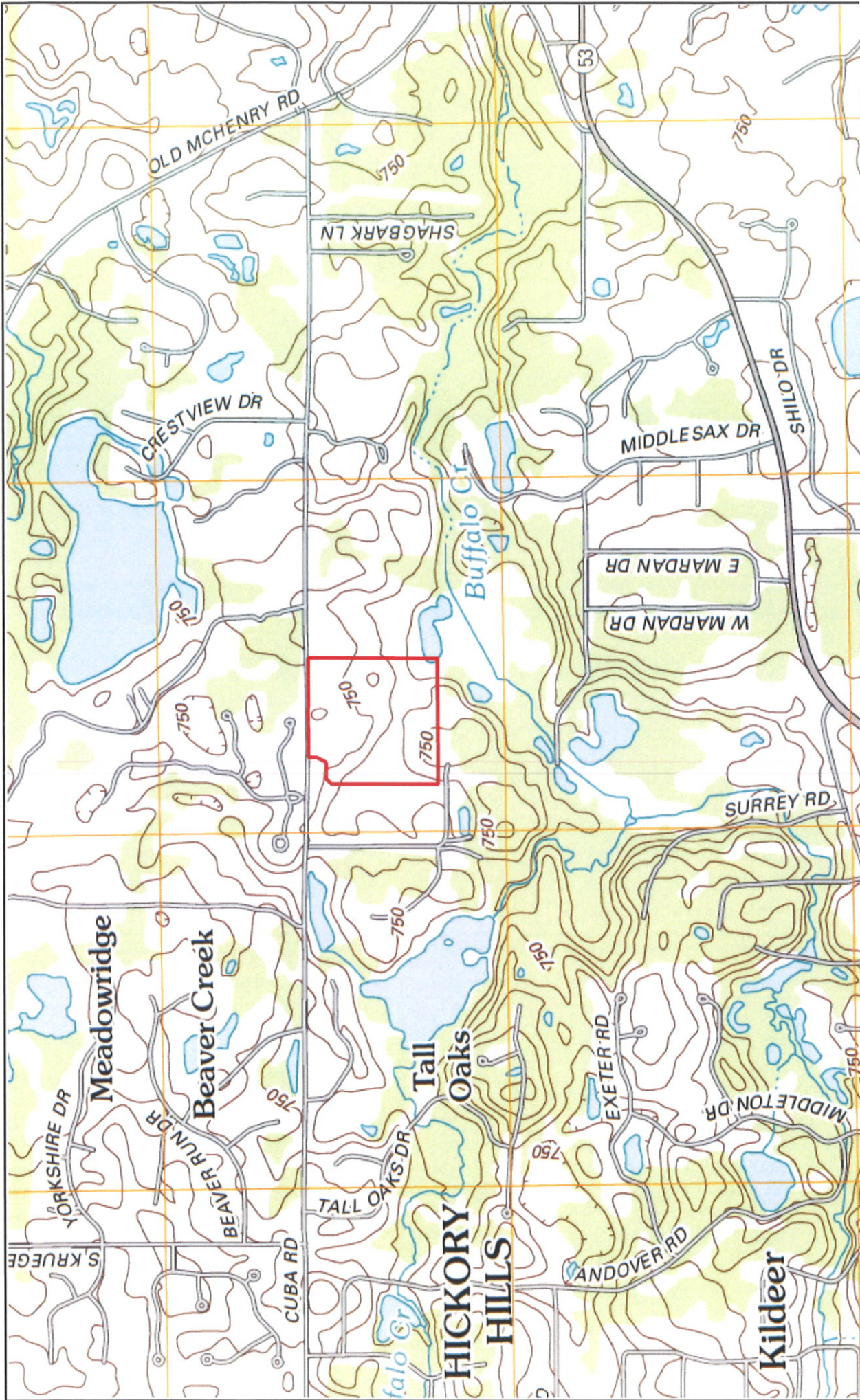


Source: Websoil Lake County Soil Survey, Drainage Class Map

Lake County Drainage Class Soils Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462



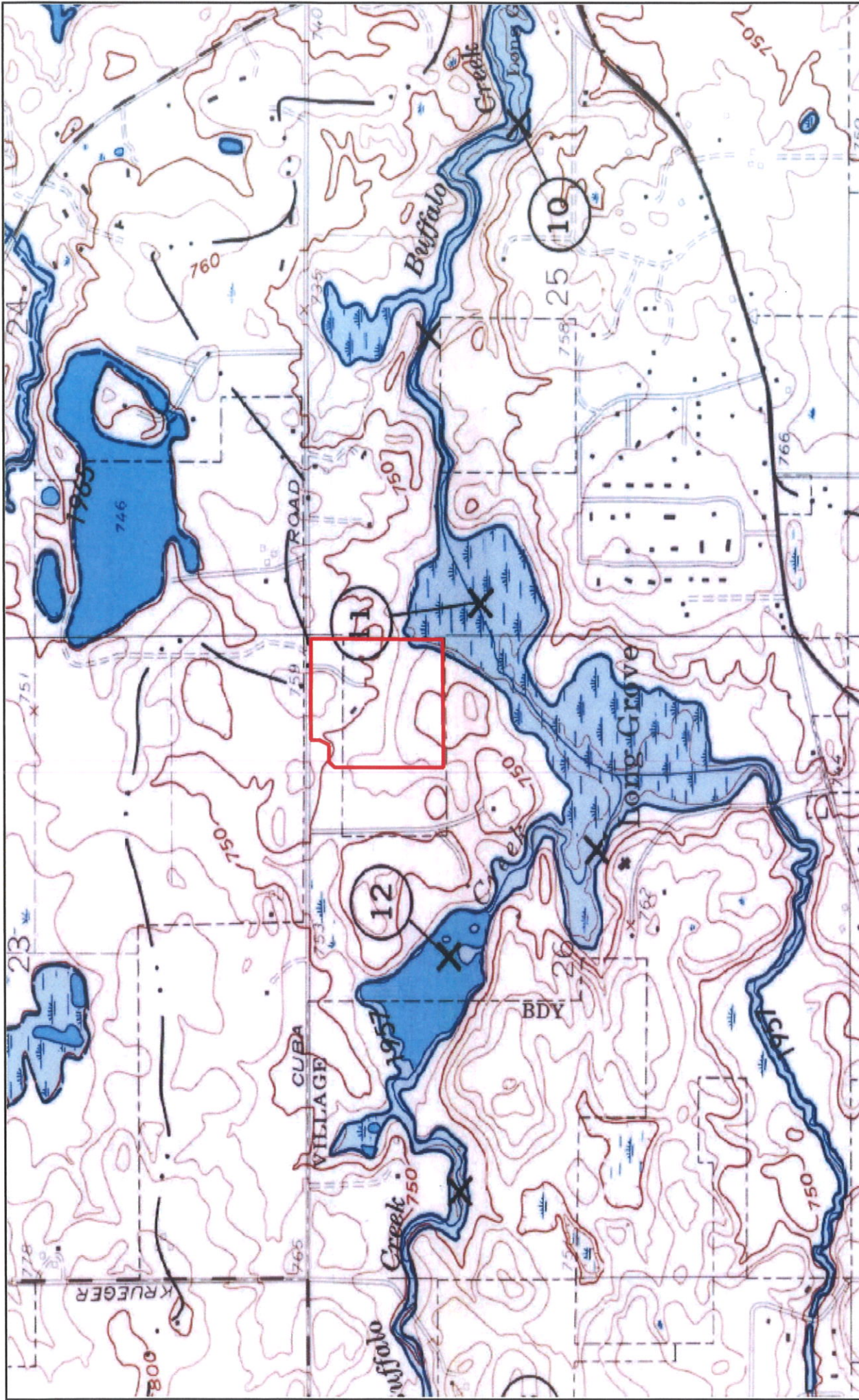


U.S.G.S. Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462

Source: United States Geological Survey Map (2012)

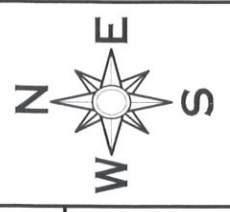




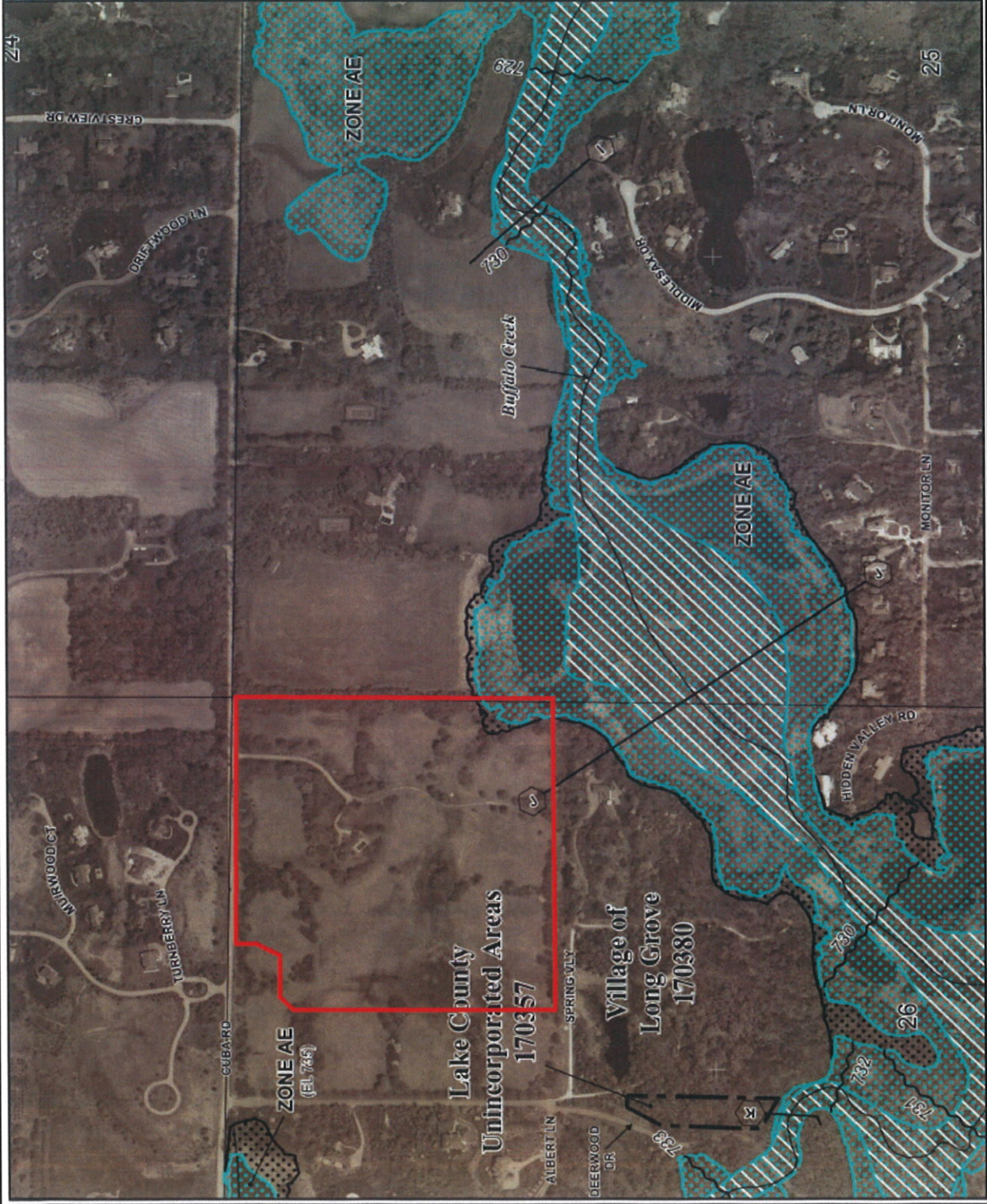
Source: United States Geological Survey, Hydrological Atlas Map (HA-208)

Hydrological Atlas Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462



6620



MAP SCALE 1" = 500'



NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0242K

FIRM
 FLOOD INSURANCE RATE MAP
 LAKE COUNTY,
 ILLINOIS
 AND INCORPORATED AREAS

PANEL 242 OF 295
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:
 COMMUNITY: LAKE COUNTY
 LONG GROVE VILLAGE OF

NUMBER PANEL SHEETS
 170357 0242 K
 170360 0242 K

Notice to User: This Map Number shows before and after the most recent zoning map change. The Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
 17097C0242K
 MAP REVISED
 SEPTEMBER 18, 2013

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-Info Ch-Line. This map does not reflect changes or amendments which may have occurred since the date of the original map. For the latest information about National Flood Insurance Program flood maps, check the FEMA Flood Map Store at www.msc.fema.gov



F.I.R.M. Map

Client: Mr. Dan McMillan, Joe Rizza Enterprises, Inc.
 8150 W. 159th Street
 Orland Park, IL 60462

Source: Flood Insurance Rate Map

