WETLAND REPORT FOR THE EAST GROWTH AREA WATER AND SANITARY EXTENSION PROJECT, NORTH LIBERTY, JOHNSON COUNTY, IOWA

GES Project 13-461

August 28, 2014

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EXECUTIVE SUMMARY

Griggs Environmental Strategies, Inc. (GES) undertook an investigation of the boundaries of jurisdictional wetlands and other waters within the project study area pursuant to Section 404 of the *Clean Water Act.* Approximately 6.4 acres of potential jurisdictional wetlands were delineated within or proximal to the project study corridor. Additionally, approximately 6,150 feet of stream corridor within and outside the study corridor was documented. Specific recommendations to avoid and minimize impacts to potentially jurisdictional waters of the U.S. are offered to facilitate project planning and management.

1.0 INTRODUCTION

GES has completed a wetland investigation for the above-referenced project. The principal objective of this investigation was to provide an evaluation of potential jurisdictional waters subject to protection of the *Clean Water Act*, Section 404 (33 U.S.C.§1344). These investigations and this subsequent report were completed by Kevin M. Griggs, Environmental Consultant, and Bill Martin, Environmental Planner.

1.1 Purpose of the Project

The purpose of the East Growth Area Water and Sanitary Extensions Project in North Liberty is to extend water main and sanitary sewer to service future development areas in the eastern part of town.

The sanitary sewer portion of the project will extend 7,200 feet of large diameter (30 inch) trunk sewer, 2,800 feet of smaller diameter (8 to 18 inch) trunk sewer and dual 8-inch forcemains from the existing wastewater treatment plant (1390 South Front Street), along Muddy Creek and its northerly tributary, to North Liberty Road and north along North Liberty Road. A proposed pumping station will be placed at the northern end of this project approximately 0.5 miles north of the intersection of Dubuque Street and North Liberty Road. It will be placed on the east side of the roadway. Once fully built out, the sewer will service 1,425 acres, including three sub-basins (two of which are serviced by pumping stations); future residential land; future industrial/commercial land; and the new North Liberty High School at the northeast corner of Dubuque Street and North Liberty Road, which is currently under construction.

The water main portion of the project extends 12-inch water main from the edge of residential development on Dubuque Street, southeasterly along Dubuque Street to the future high school site. A 12-inch water main also extends from the intersection of Dubuque Street and North Liberty Road to the proposed pumping station (see above) and also along the existing roadway easement referred to as "Naples Avenue" (west of Grace Community Church) and westerly along the future Forevergreen Road right-of-way to the existing wastewater treatment plant where there is a water main connection. This water main portion of the project also includes an emergency connection to Coralville's potable water supply south of the future high school site.

All water mains and sanitary sewers will be placed within city right-of-way or within permanent easement, with temporary construction easements being utilized as needed to construct the project.

The City of North Liberty is proposing the work and has hired FOX Engineering Associates, Inc. (FOX Engineering) to serve as the consulting and design engineer for the project. FOX Engineering will incorporate the results of this study and recommendations into the final project design. Funding for the project is through local funds.

Discharges of dredged or fill material, excavation and mechanized land clearing in waters of the U.S. requires authorization from the U.S. Army Corps of Engineers (Corps) under Section 404 of the *Clean Water Act*. The actual limits of jurisdictional waters for permitting purposes must be verified by the staff of the Corps' Rock Island District Regulatory Branch. The wetland delineations presented in this report may be used for planning and informational purposes. Final authorization for activities in waters of the U.S. must be authorized by the Corps' District Engineer.

Wetland delineations have been conducted in accordance with the Corps of Engineers' *Wetlands Delineation Manual* (Environmental Laboratory, 1987; referred to as '87 Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (U.S. Army Corps of Engineers, 2010; referred to as the Regional Supplement) for non-agricultural wetlands and for agricultural wetlands, the *National Food Security Act Manual*, 5th Addition (United States Department of Agriculture (USDA) – Natural Resources Conservation Service (NRCS), 2010; referred to as NFSAM). All non-agricultural areas were walked and photographed (Appendix A). Delineation data points were recorded in areas containing wetland indicators – specifically hydrology and vegetation.

1.2 Project Description

The proposed utility improvements are located southwest, north and along North Liberty Road NE on the eastern edge of North Liberty, Iowa (Figure 1). The project is located in portions Sections 17, 18, 19, and 20, Township 80N, Range 8W (Penn Township), and it is depicted on the Ely (1994) and Iowa City West (1994) 7.5' series topographic maps (Figure 2). The Universal Transverse Mercator (UTM) coordinate for the center of the project study area is X = 618446, Y = 4621652 (UTM Zone 15, NAD83).

The project will include temporary ground disturbance by excavation; directional drilling; pipe and man-hole access construction; pump and/or lift station construction; final grading; stream

bank protection; final seeding; and erosion control. No off-site borrows or disposal areas were identified for investigation. Construction of the project is expected to begin following the planning, design, approval, and funding of the project.

2.0 JURISDICTIONAL WATERS

2.1 Landscape Setting

The project area is located in Illinois and Iowa Deep Loess and Drift – Major Land Resource Area in eastern Iowa and within the Iowa River HUC 8 Watershed. It is located at the urban/agricultural interface on the eastern edge of North Liberty (see photographs in Appendix A). Land-use patterns are changing rapidly from commodity crop and livestock production to isolated and dense residential development. Currently, land uses include crop and forage production, livestock pasturage, wooded shelter belts along streams, private residences, private conservation areas, and a water treatment facility.

The project area is located on a broad, rolling, northwest/south-east oriented interfluve summit between Muddy Creek and the Iowa River (Coralville Reservoir). The topography is rolling to slightly rugged (Figure 3). The edge of the interfluve below the project area is incised with deeply ephemeral and intermittent streams creating steep to slightly rugged topography. These streams – as well as Muddy Creek – drain immediately into the Iowa River (Coralville Reservoir). The General Land Office survey suggests the area was comprised of a mosaic of bottomland forest, savanna, mesic prairie, and emergent wetland communities at the time of initial European settlement of the area in the late 1830s and early 1840s. Today, the project area is a mosaic of crop production fields, pasture, wooded stream corridors, upland forests, and private residences with well-maintained lawns. Elevations average approximately 780 feet above mean sea level.

2.2 Pre-field Work

Prior to a field investigation, existing data sources were reviewed to assess the project area and identify potential wetlands. The data reviewed included:

- Preliminary project location information from FOX Engineering
- United States Geological Survey 1:24,000 Scale Topographic Maps (Figure 2)
- Soil Survey of Johnson County, Iowa (Figure 3)
- U.S. Fish & Wildlife Service National Wetlands Inventory (NWI) (Figure 3)
- Hydric Soils of Iowa List
- Hydric Soils of the United States List
- Climatological Data from USDA - NRCS (Appendix B)
- Precipitation Data from WeatherUnderground.com (Appendix B)

Soils mapped within the project area are deep, poorly to moderately drained upland glacial till soils in upland positions and entisols along Muddy Creek and ephemeral drainages. Of the 20 soils or soil complexes mapped within the project area, Nodaway silt loam, Arenzville silt loam, Colo-Ely complex, Spillville loam, Maxfield silty clay loam, Franklin silt loam, and Klinger silty clay loam are defined as fully hydric soils for Johnson County (Figure 3).

A forested wetland and a palustrine emergent wetland are mapped along the north side of Muddy Creek at the project's southern end (Figure 3).

All potential wetland and other jurisdictional waters areas within the property boundaries were identified for field survey using this information.

2.3 Field Conditions

Field survey of the project area was completed on June 11 and 12, 2014, by Kevin Griggs and Bill Martin. In the 30-day period from May 11 to June 10, 2014, the North Liberty area received 4.23 inches of precipitation, which is typical compared to the 30-year average of 3.90 inches for May and 4.54 inches for June. The primary source of local hydrology appears to be direct precipitation, overbank flooding along Muddy Creek and other smaller streams, and surface run-off. Recent and historical precipitation data are located in Appendix B.

2.4 Wetland Delineations

Non-agricultural ground within the project area was investigated using the Routine On-Site Determination Method defined in the '87 Manual and 2010 Midwest Regional Supplement. Sample site locations are shown on Figures 4 through 6. Fifteen delineation data sheets were completed for this study and are included in Appendix C.

2.5 Wetland Determination

The agricultural land (which comprises approximately 60 to 70 percent of the project study corridor and includes ground used for row crops, pasture, and forage) was investigated for potential wetland impacts using NFSAM methodology, including the 2010 Iowa Wetland Mapping Conventions. None of the production agricultural ground was defined as wetlands under regulations guiding compliance with the *Food Security Act*.

A wetland determination form is included in Appendix C in the back of the report.

2.6 Investigation Findings and Results

Two forested wetlands (Wetlands NL_1 and NL_2) along and north of Muddy Creek and a palustrine emergent wetland above an unnamed, perennial tributary of Muddy Creek (Wetland NL_3) were delineated as a result of this study. All three appear to be jurisdictional waters of the U.S. given their connectivity with the Iowa River (Coralville Reservoir).

Wetland NL_1 corresponds to one of the wetlands along Muddy Creek on the southern end of the project area. In general, the wetland is comprised of a uneven-aged stand of mature trees (silver maple, cottonwood) in the canopy, overstory, and understory layers; invasive brush in the shrub layer; and a robust ground layer of various grasses, sedges, and forbs. Hydrology is indicated by numerous drift deposits and standing water in meander scars incised into the stream terrace tread. Associated soils are mapped as Spillville loam (hydric). The northern edge is defined by a noticeable terrace scarp lacking hydrological indicators. Given its adjacency and

immediate connectivity to Mud Creek, this wetland is likely jurisdictional. It is provisionally defined as being 2.66 acres in size, though it is likely larger. The proposed sewer line is located above the wetland along the terrace scarp, but a short length of the potable water line may cross through this area as currently conceived.

Like Wetland NL_1, Wetland NL_2 corresponds to one of the wetlands along Muddy Creek on the southern end of the project area. This wetland is also comprised of a uneven-aged stand of mature trees (silver maple, cottonwood) in the canopy, overstory, and understory layers; invasive brush in the shrub layer; and a robust ground layer of various grasses, sedges, and forbs. Hydrology is indicated by numerous drift deposits and standing water in meander scars incised into the stream terrace tread. Associated soils are mapped as Spillville loam (hydric). The northern edge is defined by a noticeable terrace scarp lacking hydrological indicators. This wetland is defined as a 2.92 acre area, but it is much more extensive than reported here. The proposed corridor is located above the wetland along the terrace scarp. Given its adjacency and immediate connectivity to Mud Creek, this wetland is likely jurisdictional.
Wetland NL_3 is a poor-quality palustrine emergent/scrub shrub wetland supporting a low diversity of hydrophytic vegetation dominated by reed canary grass. Hydrology consists of standing water. Associated soils are mapped as Spillville loam. This wetland extends from the edge of the creek to the steeper portion of the side slope covered with glacial till soils and non-hydrophytic vegetation. The study corridor passes through this area, which is an estimated 0.18 acres, though it is likely larger than reported here. Given its adjacency and immediate connectivity to the unnamed perennial stream, this wetland is likely jurisdictional.

In addition to the delineated wetlands, four stream segments were noted within the project study corridor.

The southern-most stream (west of Naples Avenue NE) crossed by the study corridor is depicted on the 7.5' topographic map as a swale with no definable channel. Currently, it is a 2- to 4-wide, 1-foot deep, gravel-covered channel that is actively downcutting. This stream flows into the large, unnamed stream between Naples Avenue NE and North Liberty Road NE a short distance east of the study corridor.

The stream between Naples Avenue NE and North Liberty Road NE is depicted on the 7.5' topographic map as a perennial stream that flows into Muddy Creek southeast of the study area. It has 10 to 12 foot high cut banks that are nearly vertical to sloping. Sloping cutbanks are vegetated with hydrophytic plants (most notably reed canary grass), and the stream bed contains numerous bare to vegetated mud flats and sand bars. The stream bank is approximately 40 to 50 feet wide at the top and tapers to roughly 15 to 20 feet wide at the bottom. The flowing stream channel was 8 to 12 feet wide and 1 to 3 feet deep. A series of pool-riffle-glide complexes occur within the project study corridor, and the substrate consists of silt, sand, gravel, and rock. Elevated stream terraces and side slopes are covered with a mature upland forest community lacking hydrological or hydrophytic vegetation indicators. Based on preliminary conceptual plans, this channel would be crossed four times by the sewer line before it transitioned into the public right-of-way along North Liberty Road NE.

The third stream appears as a perennial stream on the 7.5' series topographic map. It is within an actively used pasture on both side of North Liberty Road NE. It drains into the Iowa River (Coralville Reservoir) approximately 0.5 mile east of the study corridor. The stream bank is approximately 20 to 25 feet wide at the top and tapers to roughly 10 to 15 feet wide at the bottom. The flowing stream channel was 6 to 8 feet wide and 1 to 2 feet deep. A portion of a pool-riffle-glide complex occurs within the project study corridor, and the substrate consists of silt, sand, gravel, and rock. Elevated stream terraces and side slopes are actively used by cattle and were not defined as wetlands. Based on preliminary conceptual plans, this channel would be crossed by the double-force sewer main within the public right-of-way along North Liberty Road NE.

The fourth stream is the northern branch of the previously described stream. It is also depicted as a perennial stream on the 7.5' series topographic map. West of North Liberty Road NE, it is a grass waterway draining the agricultural field in which it is located. It lacks a definable channel and stream banks. East of North Liberty Road NE, it 20 to 25 feet wide at the top and tapers to roughly 10 to 15 feet wide at the bottom. The flowing stream channel was 6 to 8 feet wide and 1 to 2 feet deep. A portion of a several pool-riffle-glide complexes occur within the project study corridor. The substrate consists of silt, sand, gravel, and rock. Elevated stream terraces and side slopes are actively used by cattle and were not defined as wetlands. Based on preliminary conceptual plans, this channel would be crossed by the double-force sewer main within the public right-of-way along North Liberty Road NE and Oak Lane NE.

Except for the southern-most stream, the three streams east of Naples Avenue NE have year-round flow and definable stream channel and cut banks, they are all likely waters of the U.S. and regulated under Section 404 of the *Clean Water Act*.

4.0 CONCLUSIONS

The following study was undertaken to assist FOX Engineering with the planning and permitting of this sewer and potable water line expansion project on the east side of North Liberty. Three potentially jurisdictional wetlands totaling approximately 5.76 acres and three stream segments were investigated during this study. Because project plans are in the early conceptual stage and have not been finalized, it is difficult to determine the types and amounts of impacts to regulated wetlands.

5.0 RECOMMENDATIONS

GES understands that the objective of the proposed project is to improve the City of North Liberty's sewer and potable water infrastructure to meet growing and anticipated needs as the city expands to the east. GES recommends submitting this report to the Corps with a Pre-Construction Notification prior to the start of final design to request their concurrence on Section 404 Authorization.

Specific recommendations to avoid or minimize wetland impacts include:

- The sewer line and potable water line north of Muddy Creek and south of the water treatment plant should be designed to avoid Wetlands NL_1 and NL_2.
- If possible and if needed, the sewer line should be placed in a bore underneath Wetland NL_3 to avoid impacting this wetland or the project should be configured to reduce to the greatest extent possible impacts to this wetland.

6.0 LITERATURE CITED

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FIGURES

Figure 1. General Location Map.

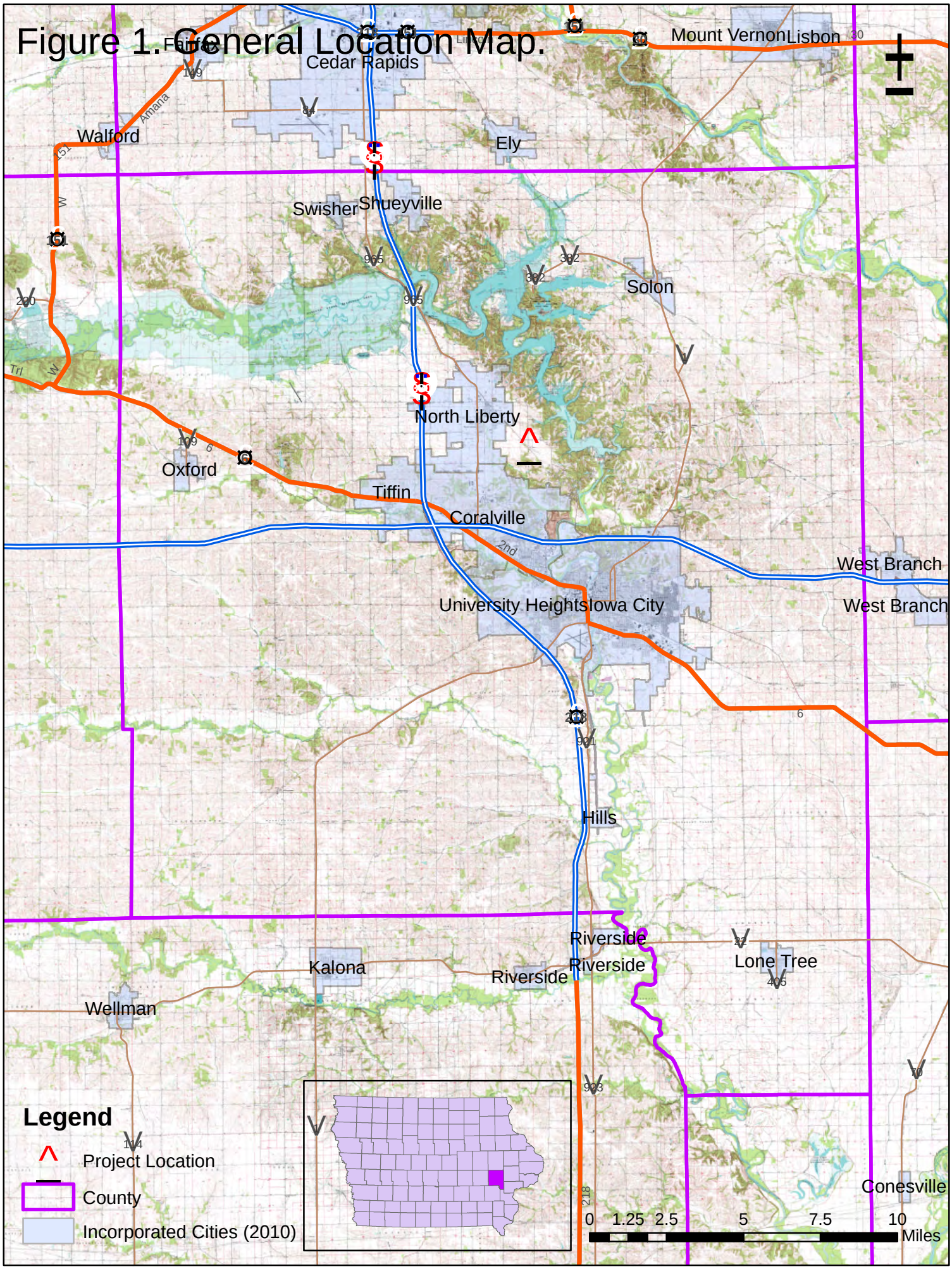

Figure 2. Project Overview Map.

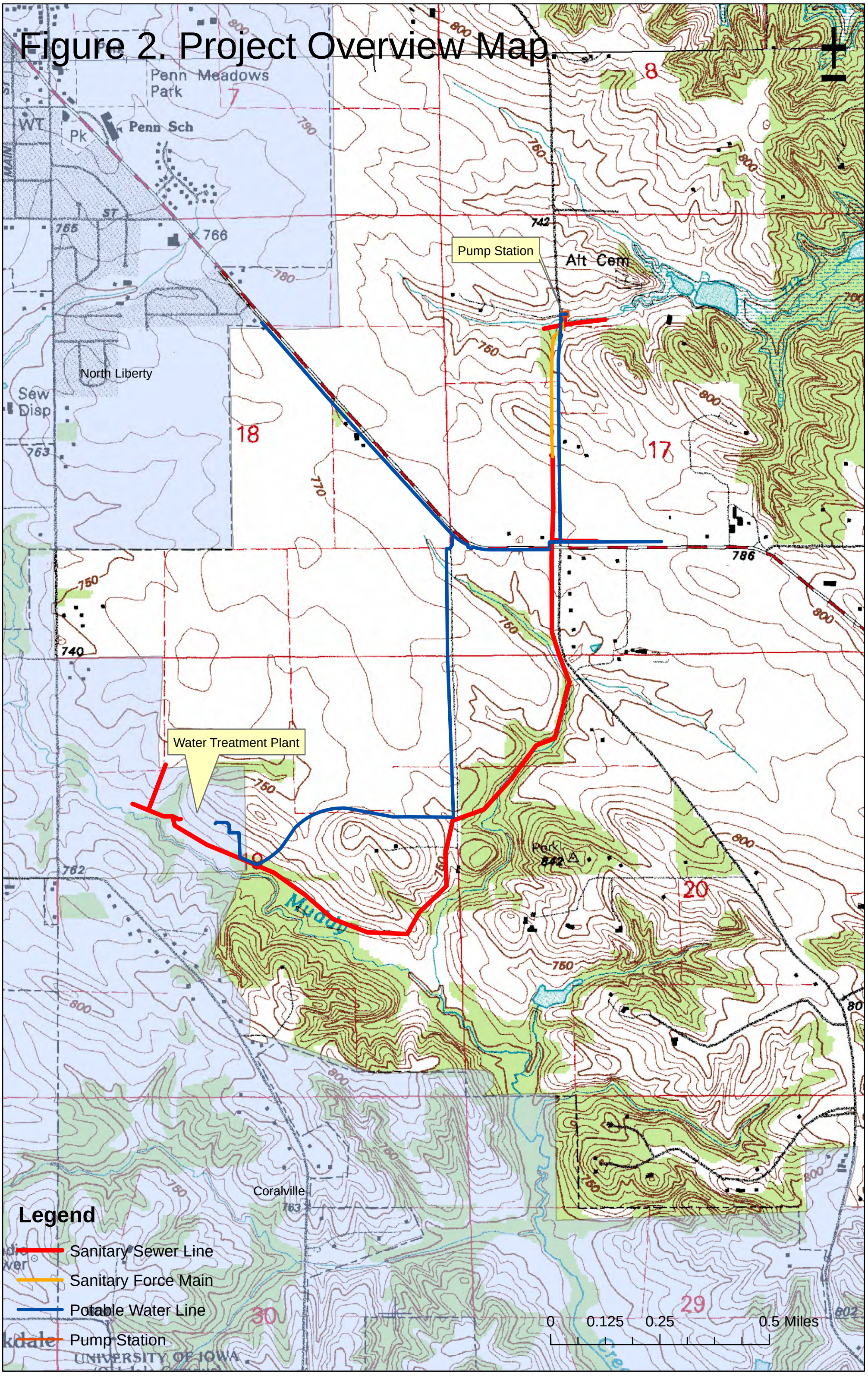

Figure 3. Soils and National Wetland Inventory Map.

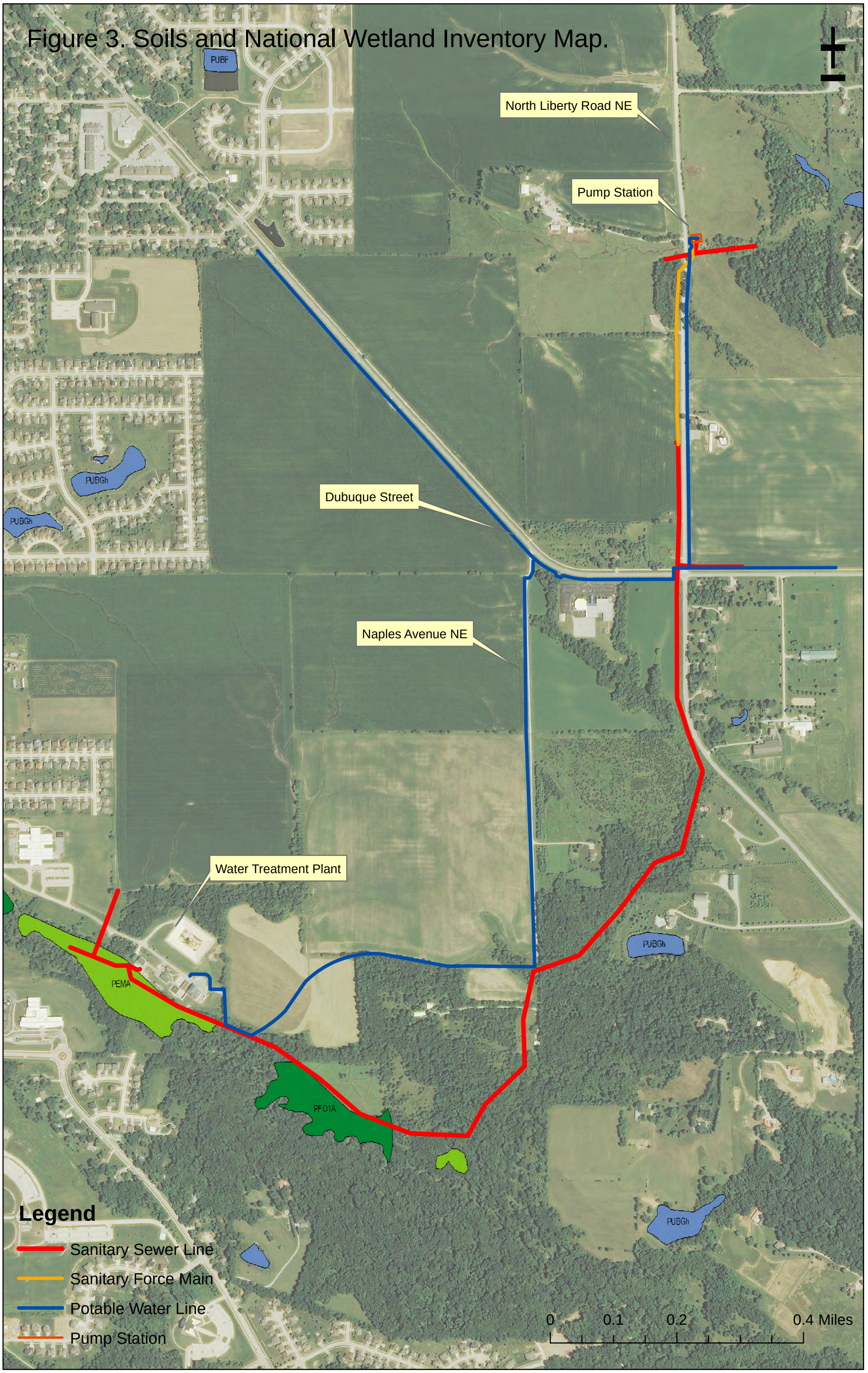

Figure 4. Wetland Delineation Map -- South Half.

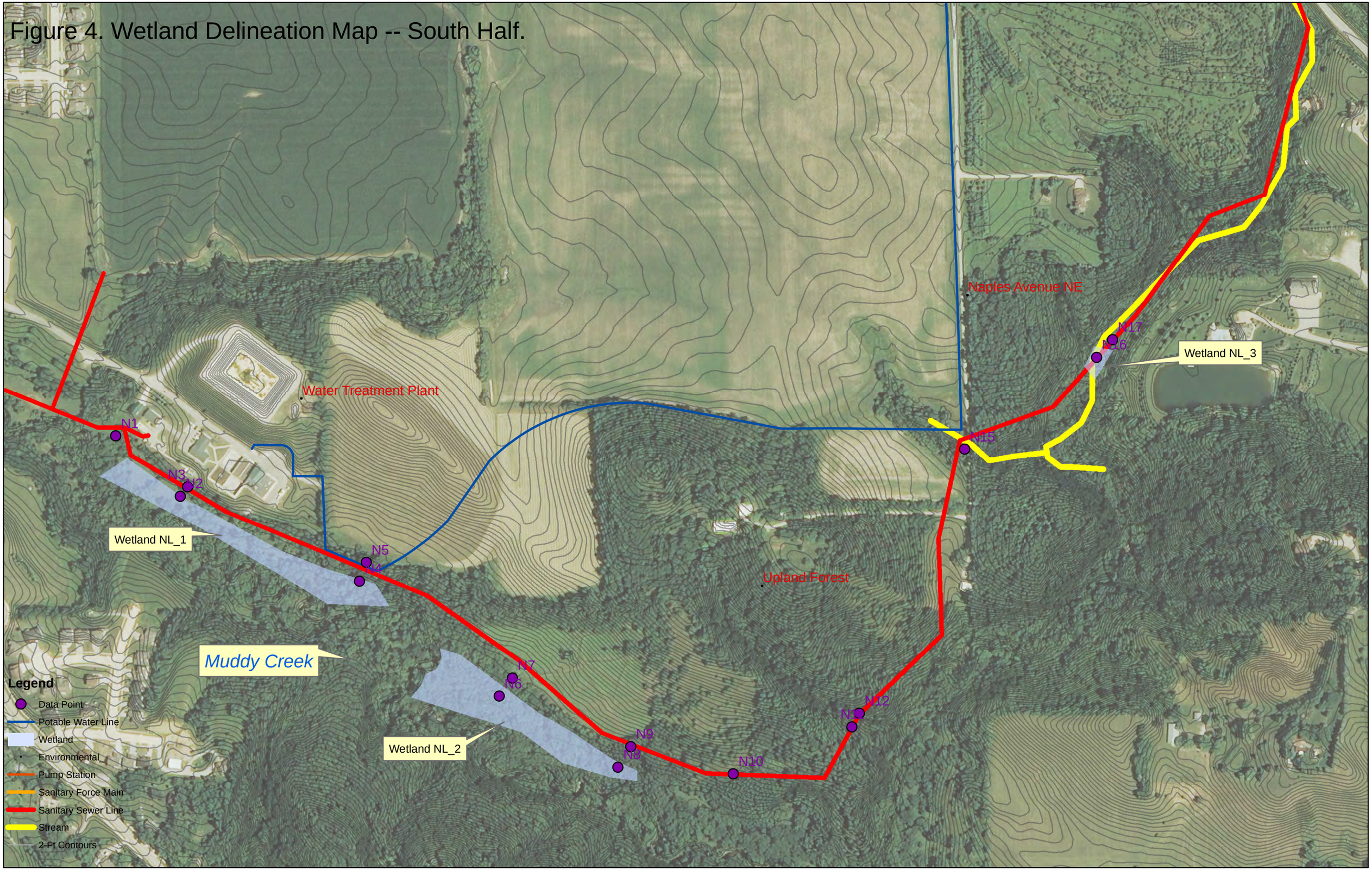

Figure 5. Wetland Delineation Map -- Centerf.

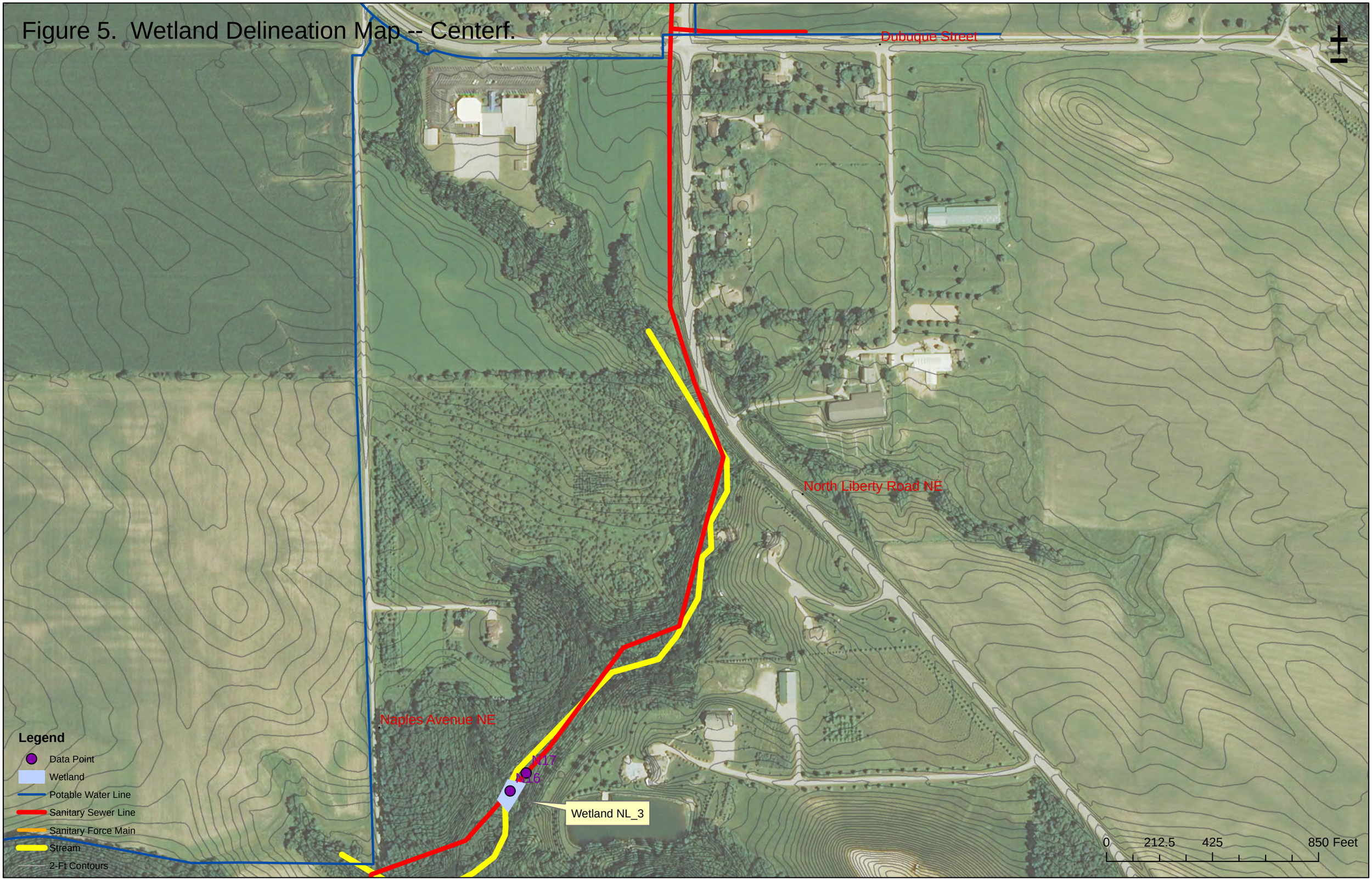

Figure 6. Wetland Delineation Map -- North Half.

Pasture

Pasture

Pasture

North Liberty Road NE

Dubuque Street

Legend

- Potable Water Line
- Sanitary Sewer Line
- Sanitary Force Main
- Stream
- 2-Ft Contours

0 212.5 425 850 Feet

APPENDICES

APPENDIX A: GROUND LEVEL PHOTOGRAPHS

PHOTO 1 – VIEW OF SAMPLE SITE N1 FACING NORTHEAST.

PHOTO 2 – VIEW OF SAMPLE SITE N2 FACING SOUTH.

PHOTO 3 – VIEW OF SAMPLE SITE N3 FACING EAST.

PHOTO 4 – VIEW OF SAMPLE SITE N4 FACING SOUTH.

PHOTO 5 – VIEW OF SAMPLE SITE N5 FACING NORTH.

PHOTO 6 – VIEW OF SAMPLE SITE N6 FACING SOUTH.

PHOTO 7 – VIEW OF SAMPLE SITE N7 FACING EAST.

PHOTO 8 – VIEW OF SAMPLE SITE N8 FACING WEST.

PHOTO 9 – VIEW OF SAMPLE SITE N9 FACING SOUTH.

PHOTO 10 – VIEW OF SAMPLE SITE N10 FACING EAST.

PHOTO 11 – VIEW OF SAMPLE SITE N11 FACING NORTH.

PHOTO 12 – VIEW OF SAMPLE SITE N12 FACING NORTH.

PHOTO 13 – VIEW OF SAMPLE SITE N13 FACING WEST.

PHOTO 14 – VIEW OF SAMPLE SITE N14 FACING WEST.

PHOTO 15 – VIEW OF SAMPLE SITE N15 FACING WEST.

PHOTO 16 – VIEW OF SAMPLE SITE N16 FACING SOUTH.

PHOTO 17 – VIEW OF SAMPLE SITE N17 FACING WEST.

PHOTO 18 – VIEW OF SAMPLE SITE N20 (BACKGROUND) FACING NORTHWEST.

PHOTO 19 – VIEW OF SAMPLE SITE N21 FACING WEST.

PHOTO 20 – VIEW OF SAMPLE SITE N22 FACING NORTHWEST.

PHOTO 21 – VIEW OF SAMPLE SITE N23 FACING SOUTH.

APPENDIX B: CLIMATOLOGICAL DATA

Appendix B: Climate Data for North Liberty, Iowa.

Date	Temperature avg	Precipitation (in) sum	Events
May-June 2014			
11	65	0.14	Rain , Thunderstorm
12	68	1.55	Fog , Rain , Thunderstorm
13	49	0	
14	49	0	
15	49	0.22	Rain
16	46	0.11	Rain
17	49	0	
18	54	0	
19	64	0.01	
20	72	0.22	Thunderstorm
21	73	0.38	Rain , Thunderstorm
22	63	0	
23	65	0	
24	65	0	
25	67	0.01	Rain
26	71	0.05	Rain
27	74	T	Rain , Thunderstorm
28	74	T	Thunderstorm
29	72	0	
30	76	0	
31	77	T	Rain
1	79	0.09	Rain , Thunderstorm
2	75	0.35	Rain
3	71	0.41	Rain , Thunderstorm
4	66	0.21	Rain , Thunderstorm
5	67	0	
6	70	0	
7	70	0.31	Rain
8	65	0	
9	67	T	
10	63	0.17	Rain
Total		4.23	

APPENDIX C: DELINIEATION AND DETERMINATION DATA SHEETS

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N17

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 20/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): Convex

Slope (%): 5 -- 9 | Lat: 618271 | Long: 4620283 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	f yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	60	Y	FACW
2 *Juglans nigra*	40	Y	FACU
3			
4			
5			
	100	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Rosa multiflora*	90	Y	FACU
2			
3			
4			
5			
	90	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	10	Y	FACW
2 *Urtica dioica*	10	Y	FACW
3 *Bromus inermis*	10	Y	FACU
4			
5			
6			
7			
8			
9			
10			
	30	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	140	x 4 =	560
UPL species	0	x 5 =	0
Column totals	220 (A)		720 (B)

Prevalence Index = B/A = 3.27

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Photo 15

SOIL

Sampling Point: N17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N1

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Elevated stream terrace | Local relief (concave, convex, none): None

Slope (%): 0 - 2 | Lat: 617021 | Long: 460177 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Spillvilee loam | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** N
Hydric soil present? N	f yes, optional wetland site ID:
Indicators of wetland hydrology present? N	

Remarks: (Explain alternative procedures here or in a separate report.)

Adjacent to water treatment plant

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer negundo*	40	Y	FAC
2 *Acer saccharinum*	40	Y	FACW
3			
4			
5			
	80	= Total Cover	

Sapling/Shrub stratum (Plot size:)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size:)			
1 *Phalaris arundinacea*	70	Y	FACW
2 *Solidago canadensis*	20	N	FACU
3 *Apocynum cannabinum*	20	N	FAC
4			
5			
6			
7			
8			
9			
10			
	110	= Total Cover	

Woody vine stratum (Plot size:)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	110	x 2 =	220
FAC species	60	x 3 =	180
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column totals	190 (A)		480 (B)

Prevalence Index = B/A = 2.53

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 1

SOIL

Sampling Point: N1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-20	10 YR 2/1	100						

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N2

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Stream terrace | Local relief (concave, convex, none): Concave

Slope (%): 0 - 2 | Lat: 617101 | Long: 4620103 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Spillville loam | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?		f yes, optional wetland site ID:	NL_1

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Salix nigra*	70	Y	OBL
2 *Acer saccharinum*	30	Y	FACW
3			
4			
5			
	100	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	70	Y	FACW
2 *Carex vulpinoidea*	20	Y	FACW
3 *Carex comosa*	10	N	OBL
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	80	x 1 =	80
FACW species	120	x 2 =	240
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	200 (A)		320 (B)

Prevalence Index = B/A = 1.60

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 2

SOIL

Sampling Point: N2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-12	10YR 2/1	70	7.5 YR 4/3	2+	C	M	loam	
12-20	10YR 2/1 - 3//1	70	7.5 YR 4/3	2+	C	M	loam to silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? ___Y___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	X	No	___	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): ___

Indicators of wetland hydrology present? ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N3

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 22/84N/24W

Landform (hillslope, terrace, etc.): Elevated stream terrace | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617108 | Long: 4620116 | Datum: NAD 83 – Zone 15

Soil Map Unit Name: Spillville loam | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	N
Hydric soil present?	N	f yes, optional wetland site ID:	
Indicators of wetland hydrology present?	N		

Remarks: (Explain alternative procedures here or in a separate report.)

Adjacent to water treatment plant

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer negundo*	100	Y	FAC
2			
3			
4			
5			
	100	= Total Cover	

Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	75	Y	FACW
2 *Urtica dioica*	25	Y	FACW
3			
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	

Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	100	x 2 =	200	
FAC species	100	x 3 =	300	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column totals	200	(A)	500	(B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 2

SOIL

Sampling Point: N3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-20	10YR 2/1	90					loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N4

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Stream terrace | Local relief (concave, convex, none): Concave

Slope (%): 0 - 2 | Lat: 671323 | Long: 4619997 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Spillville loam | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	Y
Hydric soil present?	Y	f yes, optional wetland site ID:	NL_1
Indicators of wetland hydrology present?	Y		

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Acer saccharinum*	100	Y	FACW
2			
3			
4			
5			
	100	= Total Cover	

Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	70	Y	FACW
2 *Polygonum erectum*	30	Y	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	100	= Total Cover	

Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66.67% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	170	x 2 =	340	
FAC species	0	x 3 =	0	
FACU species	30	x 4 =	120	
UPL species	0	x 5 =	0	
Column totals	200	(A)	460	(B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 2

SOIL

Sampling Point: N4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-12	10YR 2/1	70	7.5 YR 4/3	2+	C	M	loam	
12-20	10YR 2/1 - 3//1	70	7.5 YR 4/3	2+	C	M	loam to silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	___	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N5

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Elevated stream terrace/Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617331 | Long: 4620021 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N	**Is the sampled area within a wetland?**	N
Hydric soil present?	N	f yes, optional wetland site ID:	
Indicators of wetland hydrology present?	N		

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Celtis occidentalis*	40	Y	FAC
2 *Carya ovata*	20	Y	FACU
3 *Acer saccharinum*	20	Y	FACW
4			
5			
	80	= Total Cover	

Sapling/Shrub stratum (Plot size:)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size:)			
1 *Solidago canadensis*	40	Y	FACU
2 *Urtica dioica*	20	Y	FACW
3 *Gleditsia triacanthos*	20	Y	FACU
4			
5			
6			
7			
8			
9			
10			
	80	= Total Cover	

Woody vine stratum (Plot size:)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	40	x 2 =	80	
FAC species	40	x 3 =	120	
FACU species	80	x 4 =	320	
UPL species	0	x 5 =	0	
Column totals	160	(A)	520	(B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Photo 5

SOIL

Sampling Point: N5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	90					silty clay loam	
8-15+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N6

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Stream terrace | Local relief (concave, convex, none): Concave

Slope (%): 0 - 2 | Lat: 671496 | Long: 4619859 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Spillville loam | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	f yes, optional wetland site ID:	NL_2

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Ulmus americana*	30	Y	FACW
2 *Celtis occidentalis*	30	Y	FAC
3 *Betula nigra*	30	Y	FACW
4			
5			
	90	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	30	Y	FACW
2 *Polygonum erectum*	30	Y	FACU
3 *Carex comosa*	30	Y	OBL
4 *Bidens cernua*	10	N	OBL
5			
6			
7			
8			
9			
10			
	100	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 83.33% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	40	x 1 =	40	
FACW species	90	x 2 =	180	
FAC species	30	x 3 =	90	
FACU species	30	x 4 =	120	
UPL species	0	x 5 =	0	
Column totals	190	(A)	430	(B)

Prevalence Index = B/A = 2.26

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 6

SOIL

Sampling Point: N6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-12	10YR 2/1	70	7.5 YR 4/3	2+	C	M	loam	
12-20	10YR 3//1	70	10YR 5/6	2+	C	M	loam to silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	___	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N7

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617511 | Long: 4619881 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	Y
Hydric soil present?	N
Indicators of wetland hydrology present?	N
Is the sampled area within a wetland?	N
If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	75	Y	FACW
2			
3			
4			
5			
	75	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	50	Y	FACW
2 *Bromus inermis*	20	Y	FACU
3 *Oxalis stricta*	20	Y	FACU
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	125	x 2 =	250
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column totals	165 (A)		410 (B)

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 7

SOIL

Sampling Point: N7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	90					silty clay loam	
8-15+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes ___	No X	Depth (inches): ___		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___		

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N8

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Stream terrace | Local relief (concave, convex, none): Concave

Slope (%): 0 - 2 | Lat: 617641 | Long: 4619769 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Spillville loam | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y		
Hydric soil present?	Y	**Is the sampled area within a wetland?**	Y
Indicators of wetland hydrology present?	Y	f yes, optional wetland site ID:	NL_2

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Quercus macrocarpa*	50	Y	FAC
2 *Celtis occidentalis*	30	Y	FAC
3 *Ulmus americana*	10	N	FACW
4			
5			
	90	= Total Cover	

Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	

Herb stratum (Plot size: ____)			
1 *Bidens cernua*	50	Y	OBL
2 *Podophyllum peltatum*	20	Y	FACU
3 *Phalaris arundinacea*	20	Y	FACW
4			
5			
6			
7			
8			
9			
10			
	90	= Total Cover	

Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 80.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	50	x 1 =	50	
FACW species	30	x 2 =	60	
FAC species	80	x 3 =	240	
FACU species	20	x 4 =	80	
UPL species	0	x 5 =	0	
Column totals	180	(A)	430	(B)

Prevalence Index = B/A = 2.39

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 8

SOIL

Sampling Point: N8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-12	10YR 2/1	70	7.5 YR 4/3	2+	C	M	loam	
12-20	10YR 3//1	70	10YR 5/6	2+	C	M	loam to silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	___	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): ___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N9

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617511 | Long: 4619881 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: Yes

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	Y	**Is the sampled area within a wetland?**	N
Hydric soil present?	N	f yes, optional wetland site ID:	
Indicators of wetland hydrology present?	N		

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Quercus macrocarpa*	70	Y	FAC
2 *Carya ovata*	20	Y	FACU
3 *Celtis occidentalis*	10	N	FAC
4			
5			
	100	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Lonicera tatarica*	40	Y	FACU
2			
3			
4			
5			
	40	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Carex blanda*	30	Y	FAC
2 *Urtica dioica*	20	Y	FACW
3 *Parthenocissus quinquefolia*	20	Y	FACU
4 *Toxicodendron radicans*	20	Y	FAC
5			
6			
7			
8			
9			
10			
	90	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 57.14% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0	
FACW species	20	x 2 =	40	
FAC species	130	x 3 =	390	
FACU species	80	x 4 =	320	
UPL species	0	x 5 =	0	
Column totals	230	(A)	750	(B)

Prevalence Index = B/A = 3.26

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 9

SOIL

Sampling Point: N9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-8	10YR 2/2	90					silty clay loam	
8-15+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches):		
Water table present?	Yes ___	No X	Depth (inches):		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches):		

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N10

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617511 | Long: 4619881 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N		
Hydric soil present?	N	**Is the sampled area within a wetland?**	N
Indicators of wetland hydrology present?	N	If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Status
1 *Robinia pseudoacacia*	100	Y	FACU
2			
3			
4			
5			
	100 = Total Cover		
Sapling/Shrub stratum (Plot size: ____)			
1 *Lonicera tatarica*	40	Y	FACU
2			
3			
4			
5			
	40 = Total Cover		
Herb stratum (Plot size: ____)			
1 *Bromus inermis*	70	Y	FACU
2 *Symphyotrichum pilosum*	20	Y	FACU
3 *Alliaria petiolata*	10	N	FAC
4			
5			
6			
7			
8			
9			
10			
	100 = Total Cover		
Woody vine stratum (Plot size: ____)			
1			
2			
	0 = Total Cover		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	230	x 4 =	920
UPL species	0	x 5 =	0
Column totals	240 (A)		950 (B)

Prevalence Index = B/A = 3.96

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- ____ Dominance test is >50%
- ____ Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Photo 10

SOIL

Sampling Point: N10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N11

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Bench/Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617897 | Long: 4619841 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** N
Hydric soil present? N	f yes, optional wetland site ID:
Indicators of wetland hydrology present? N	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	70	Y	FACW
2 *Robinia pseudoacacia*	30	Y	FACU
3			
4			
5			
	100	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Lonicera tatarica*	20	Y	FACU
2			
3			
4			
5			
	20	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	40	Y	FACW
2 *Carex vulpinoidea*	20	Y	FACW
3 *Urtica dioica*	20	Y	FACW
4			
5			
6			
7			
8			
9			
10			
	80	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 66.67% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	150	x 2 =	300
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column totals	200 (A)		500 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 11

SOIL

Sampling Point: N11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes ___	No X	Depth (inches): ___		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___		

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N12

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Bench/Slope | Local relief (concave, convex, none): Convex

Slope (%): 0 - 3 | Lat: 617992 | Long: 4619858 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	Y
Hydric soil present?	N
Indicators of wetland hydrology present?	N

Is the sampled area within a wetland? N

If yes, optional wetland site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	70	Y	FACW
2 *Acer negundo*	20	Y	FAC
3			
4			
5			
	90	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Lonicera tatarica*	10	Y	FACU
2			
3			
4			
5			
	10	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	50	Y	FACW
2 *Urtica dioica*	20	Y	FACW
3 *Galium aparine*	10	N	FACU
4			
5			
6			
7			
8			
9			
10			
	80	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 80.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	140	x 2 =	280
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column totals	180 (A)		420 (B)

Prevalence Index = B/A = 2.33

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 12

SOIL

Sampling Point: N12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No X	Depth (inches): ___		
Water table present?	Yes ___	No X	Depth (inches): ___		
Saturation present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___		

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N15

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 19/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): None

Slope (%): 0 - 3 | Lat: 618070 | Long: 4620159 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	Y
Hydric soil present?	N
Indicators of wetland hydrology present?	N
Is the sampled area within a wetland?	N
If yes, optional wetland site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	30	Y	FACW
2 *Ulmus americana*	20	Y	FACW
3 *Fraxinus pennsylvanica*	20	Y	FACW
4 *Salix nigra*	20	Y	OBL
5			
	90	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Lonicera tatarica*	40	Y	FACU
2			
3			
4			
5			
	40	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	40	Y	FACW
2 *Urtica dioica*	20	Y	FACW
3 *Bromus inermis*	20	Y	FACU
4			
5			
6			
7			
8			
9			
10			
	80	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across all Strata: 8 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 75.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	20	x 1 =	20
FACW species	130	x 2 =	260
FAC species	0	x 3 =	0
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column totals	210 (A)		520 (B)

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

- ____ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ____ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ____ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 15

SOIL

Sampling Point: N15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes ___	No	X	Depth (inches):	___
Water table present?	Yes ___	No	X	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes ___	No	X	Depth (inches):	___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology present in intermittent stream channel immediately west of and below data point.

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N16

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 20/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): None

Slope (%): 0 - 3 | Lat: 618070 | Long: 4620159 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS

Hydrophytic vegetation present? Y	**Is the sampled area within a wetland?** Y
Hydric soil present? Y	If yes, optional wetland site ID: Wetland NL_3
Indicators of wetland hydrology present? Y	

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	30	Y	FACW
2 *Ulmus americana*	20	Y	FACW
3			
4			
5			
	50	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1			
2			
3			
4			
5			
	0	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	60	Y	FACW
2 *Impatiens capensis*	40	Y	FACW
3 *Urtica dioica*	20	N	FACW
4			
5			
6			
7			
8			
9			
10			
	120	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across all Strata: 4 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	170	x 2 =	340
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column totals	170 (A)		340 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- X Dominance test is >50%
- X Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? Y

Remarks: (Include photo numbers here or on a separate sheet)

Photo 16

SOIL

Sampling Point: N16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-12	10YR 2/2	90					vegetation	Organic matter
12-15	10YR 4/1	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? Y

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	X	No	___	Depth (inches):	___
Water table present?	Yes	X	No	___	Depth (inches):	___
Saturation present? (includes capillary fringe)	Yes	X	No	___	Depth (inches):	___

Indicators of wetland hydrology present? Y

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Griggs Environmental Strategies, Inc.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: SE Growth Area Water & Sanitary | City/County: North Liberty/Johnson | Sampling Date: 6.11.14

Applicant/Owner: City of North Liberty | State: Iowa | Sampling Point: N17

Investigator(s): Kevin M. Griggs and Bill Martin | Section, Township, Range: 20/80W/8W

Landform (hillslope, terrace, etc.): Slope | Local relief (concave, convex, none): Convex

Slope (%): 5 -- 9 | Lat: 618271 | Long: 4620283 | Datum: NAD 83 -- Zone 15

Soil Map Unit Name: Chelesa-Lamont-Fayette complex | NWI Classification: No

Are climatic/hydrologic conditions of the site typical for this time of the year? ____ (If no, explain in remarks)

Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation ____, soil ____, or hydrology ____ naturally problematic?

SUMMARY OF FINDINGS

(If needed, explain any answers in remarks.)

Hydrophytic vegetation present?	N	**Is the sampled area within a wetland?**	N
Hydric soil present?	N	If yes, optional wetland site ID:	
Indicators of wetland hydrology present?	N		

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION -- Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species	Indicator Staus
1 *Betula nigra*	60	Y	FACW
2 *Juglans nigra*	40	Y	FACU
3			
4			
5			
	100	= Total Cover	
Sapling/Shrub stratum (Plot size: ____)			
1 *Rosa multiflora*	90	Y	FACU
2			
3			
4			
5			
	90	= Total Cover	
Herb stratum (Plot size: ____)			
1 *Phalaris arundinacea*	10	Y	FACW
2 *Urtica dioica*	10	Y	FACW
3 *Bromus inermis*	10	Y	FACU
4			
5			
6			
7			
8			
9			
10			
	30	= Total Cover	
Woody vine stratum (Plot size: ____)			
1			
2			
	0	= Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across all Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	140	x 4 =	560
UPL species	0	x 5 =	0
Column totals	220 (A)		720 (B)

Prevalence Index = B/A = 3.27

Hydrophytic Vegetation Indicators:

- ___ Rapid test for hydrophytic vegetation
- ___ Dominance test is >50%
- ___ Prevalence index is ≤3.0*
- ___ Morphogical adaptations* (provide supporting data in Remarks or on a separate sheet)
- ___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? N

Remarks: (Include photo numbers here or on a separate sheet)

Photo 15

SOIL

Sampling Point: N17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 2/2	90					silty clay loam	
6-20+	10YR 5/4	90					silty clay loam	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (explain in remarks)

*Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? N

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (D9)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	___	No	X	Depth (inches): ___
Water table present?	Yes	___	No	X	Depth (inches): ___
Saturation present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Indicators of wetland hydrology present? N

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

DATA FORM

FSA Offsite Determination for Agricultural Lands

(Iowa 2009 Wetland Mapping Conventions for Agricultural Lands for 1985 Food Security Act as Amended and Section 404 Clean Water Act)

Project/Site:	SE Growth Area Water and Sanitary Improvements	Date:	06/30/14
Applicant/Owner:	City of North Liberty	County:	Johnson
Investigator:	Kevin M. Griggs	State:	Iowa

Wetland Site ID	Twp	Range	Section	NWI (Y/N)	WIT (Y/N)	FSA Slides - Enter wetland signature from list below* YR = 85	YR = 86	YR = 87	YR = 88	YR = 89	Meets Wetland Mapping Convention (Y/N)	Final Determination (Y/N)	Acres
						N	W	N	D	N			
-	80N	6W	7	N	NA	-	-	-	-	-	N	N	
-	80N	6W	8	N	NA	-	-	-	-	-	N	N	
-	80N	6W	18	N	NA	-	-	-	-	-	N	N	
-	80N	6W	17	N	NA	-	-	-	-	-	N	N	
-	80N	6W	19	N	NA	-	-	-	-	-	N	N	
-	80N	6W	20	N	NA	-	-	-	-	-	N	N	

*** Wetland Signatures:**

1 = Hydrophytic vegetation (observed as different color than crop or forage)

2 = Surface water (oxbows, depressions, etc.)

3 = Flooded or drowned out crops, wet/base soil within cropped fields

4 = Stressed crops due to wetness (crop stress is seen on the ASCS slides as areas of yellowish tined crop, or sparse canopy coverage of crop, that has been in stress due to wetness)

5 = Difference in vegetation within field due to different planing dates

6 = Inclusion of wet areas as set aside (these generally show on slides as areas of close grown legumes/grasses surrounded by, or bordering areas of row crops)

7 = Patches of greener vegetation during the years of below normal precipitation (use only as a signature for a "dry year" ASCS slide)