

# Wetland Determination Report Palmer's Creek Wind Farm

*Prepared for:*



501 West Highway 212  
Granite Falls, MN 56241



Responsive partner.  
Exceptional outcomes.

*Prepared by:*

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# 1.0 Introduction

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Wenck Associates, Inc. (Wenck) staff performed a Level 1 Off-Site Wetland Determination for the proposed Palmer's Creek Wind Farm project site in February 2017. Two tasks were performed to assess the potential presence and extent of wetlands within the project area; a preliminary desktop review of available data to determine areas potentially meeting wetland criteria and an off-site determination following MN Board of Water and Soil Resources and US Army Corps of Engineers Guidance for Offsite Hydrology/Wetland Determinations on cropland. A follow up field verification visit was performed on July 19, 2017 to further investigate offsite wetland areas that would potentially be impacted by the project.

## 2.0 Site Description

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The investigation area includes portions of an approximately 6,160 acre proposed wind farm north of Granite Falls, Minnesota. The investigation area focused primarily on areas in the immediate vicinity of components of the wind farm, including turbine pads, access roads, and collector lines. The property spans Sections 4-10, 15-18, 20-22, 27, and 28 of Township 116N, Range 39W, and Sections 1, 12, and 13 of Township 116N, Range 40W, Granite Falls and Sparta Townships, Chippewa County, MN (Figure 1).

Land use within the project area is agricultural, the majority of which is used for cultivated crops or grazing. Other cover types include pasture, grassland, and developed open space with some deciduous forest. The cover types other than cultivated crops are typically associated with rural residences including windbreaks, lawn, and pasture and grassland.

## 3.0 Methods

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The following Tasks were performed in this Level 1 off-site wetland determination:

### 3.1 TASK 1 – PRELIMINARY DESKTOP REVIEW

The first task of the wetland investigation included a preliminary desktop review of selected aerial photographs (Appendices A-D), the 2013 Revised National Wetland Inventory (NWI) and Public Waters Inventory (Figures 2a-i), site topography data (LIDAR) (Figures 3a-i), soil survey data (Figure 4a-i), and other applicable data to determine areas of potential wetland for further investigation. The project site was divided into review areas for the offsite determination by wind turbine, access road, and collector line.

If areas appeared to potentially meet wetland criteria (topographically depressional areas, NWI basins, hydric soil series, wetness signatures on cropland) they were further investigated under Task 2. Areas assessed under Task 1 were broken up into sample units as part of Task 2. Note that areas identified as having hydric soils but not meeting any of the other criteria were not investigated in Task 2. Potential wetland areas identified by Task 1 were developed into sample units and are further discussed in Section 4. For sites where preliminary review of information indicates that wetlands are likely not present, the findings of the review serve as documentation that these areas are non-wetland.

### 3.2 TASK 2 – OFFSITE DETERMINATION

For portions of the project area that contain potential wetland areas in active cropland, the appropriate method for determining wetland boundaries includes the analysis of aerial imagery to determine the presence/absence of wetland hydrology signatures in the context of antecedent precipitation data. This analysis was conducted according to regulatory guidance in the US Army Corps of Engineers (USACE) and Minnesota Board of Water and Soil Resources (BWSR) Guidance for Offsite Hydrology/Wetland Determinations (2016).

This method requires the analysis of historic aerial imagery to determine the presence/absence of wetland hydrology signatures in the context of antecedent precipitation data. If areas demonstrate wetland hydrology signatures in more than 50% of normal precipitation years, they are typically determined to be wetland. A date of July 1 was used to determine antecedent precipitation conditions (Normal, Wet, or Dry) unless otherwise noted. The normal monthly precipitation values from the period from 1981-2010 were used for comparison. A summary of precipitation data is found in Appendix E.

Wenck analyzed available historic aerial photographs from the Farm Service Agency and other sources between 1981-2015 (Appendix A) for wetland hydrology signatures. Wetland hydrology signatures include crop stress (CS), drowned out crops (DO), areas not cropped due to wetness (NC), standing water (SW), altered cropping patterns (AP), signatures of saturated soil (SS) and signatures of wetland vegetation (WS). Areas with normal cropping patterns without wetness signatures were identified as normal vegetation (NV). Some signatures, such as standing water and drowned out crops, are stronger indicators that wetland hydrology is present. By comparison, some apparent signatures of wetness such as crop stress and altered cropping patterns may occur as a result of other factors besides wetness and are weaker indicators of wetland hydrology.

Boundaries of wetlands in active cropland were determined electronically during the off-site investigation according to the regulatory protocol. Most of the project area is located in active cropland. For potential wetland areas identified outside of active cropland, information gathered during the preliminary desktop review was used to estimate the extent of wetlands.

The boundaries identified in this analysis are offsite boundaries and are subject to change if onsite investigation is performed.

### **3.3 TASK 3 – ONSITE VERIFICATION**

Several areas were field investigated after the offsite wetland determination was complete. These areas were chosen for onsite verification based on identification of potential wetland areas within the proposed project impact area. Onsite investigation was conducted by using the on-site methodology set forth in the 1987 U.S. Army Corps of Engineers (COE) Wetlands Delineation Manual (1987 Manual) and the 2010 U.S. Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Regional Supplement). Potential wetland areas were examined according to guidelines set forth in these documents and wetland boundaries were determined through analysis of the vegetation, soils, and hydrology. As many of these areas are farmed, hydrology was supported by the offsite wetland determination. Field verification in these areas consisted primarily of a hydric soil determination, with observations of vegetation and on-site indicators of hydrology also documented.

## 4.0 Results

### 4.1 TASK 1 – PRELIMINARY DESKTOP REVIEW

As stated previously, each wind turbine location, access road, and collector line were analyzed for the presence or absence of wetland through a review of selected aerial photographs, soil survey data, topography data, 2013 Revised National Wetland Inventory (NWI), and other applicable data to determine areas of potential wetland for further investigation. A summary of the preliminary review of these data sets and findings are described below and shown in Table 1a for the turbine locations and access roads (abbreviated as AR), and Table 1b for collector lines.

The NWI (Figures 2a-i) was used to determine whether a wind turbine, access road, or collector line or access road was located in NWI basins. Three areas along access roads and wind turbines and eight areas along collector lines were identified as being within, crossing, or being adjacent to NWI wetland.

The Minnesota Public Waters Inventory shows several public waters within the project area (Figures 2a-i). The PWI inventory was assessed to determine if any sample units occurred within or crossed PWI waters. Four access road and wind turbine areas and seven collector line areas met this criteria.

LIDAR data maps (2' contours) were used to identify topographically low areas or depressions likely to retain and/or pond water (Figures 3a-i). LIDAR depressions and landscape position were documented for each area. Four wind turbine and access road areas and six collector line areas were found in topographic depressions.

The Chippewa County Soil Survey was used to determine the location and prevalence of hydric soil in each sample unit (Figures 4a-i). Twenty-one wind turbine and access road areas were identified as occurring in hydric soils. Hydric soils were considered any soil map unit that met the criteria of "mostly hydric" (50-90%) or "all hydric" (90-100%). Ten collector line areas were identified as containing hydric soil.

Additionally, a recent photo from a year with wetter than normal precipitation (Appendix B - 2013) was used to determine the presence or absence of hydrology signatures in the vicinity of project features. These are indicated in Table 1a as Wetness Signatures and were additionally used to determine candidacy for Task 2, and to develop the sample unit boundaries for Task 2. Ten wind turbine and access roads and eight collector lines identified in Task 1 were further analyzed in Task 2, as shown in the tables below. Sample units were developed in Task 2 based on the results of Task 1.

**Table 1a – Task 1 Preliminary Review Results: Turbine Locations and Access Roads**

Sample Unit	NWI Wetland	Hydric Soils	PWI Waterbody	Wetness Signatures (2013)	LiDAR Depression	Landscape Position	Candidate for Task 2?
WTG-1	N	N	N	N	N	Summit/Shoulder	N
WTG-1 AR	N	Y	N	Y	N	Backslope	Y

WTG-2	N	N	N	N	N	Backslope	N
WTG-2 AR	N	Y	N	N	N	Backslope	N
WTG-3	N	N	N	N	N	Backslope	N
WTG-3 AR	N	N	N	N	N	Backslope	N
WTG-4	N	N	N	N	N	Summit/ Shoulder	N
WTG-4 AR	N	Y	Y	N	N	Summit/ Shoulder	Y
WTG-5	N	N	N	N	N	Backslope	N
WTG-5 AR	N	Y	N	N	N	Backslope	N
WTG-6	N	N	N	N	N	Backslope	N
WTG-6 AR	N	Y	N	N	N	Backslope	N
WTG-7	N	N	N	N	N	Summit/ Shoulder	N
WTG-7 AR	N	Y	N	N	N	Toeslope	Y
WTG-8	N	N	N	N	N	Backslope	N
WTG-8 AR	N	Y	Y	Y	Y	Toeslope	Y
WTG-9	N	N	N	N	N	Backslope	N
WTG-9 AR	N	Y	N	N	N	Backslope	N
WTG-10	N	Y	N	N	N	Backslope	N
WTG-10 AR	N	N	N	N	N	Backslope	N
WTG-11	N	N	N	N	N	Summit/ Shoulder	N
WTG-11 AR	N	Y	N	N	N	Summit/ Shoulder	N
WTG-12	N	Y	N	N	Y	Footslope	Y
WTG-12 AR	N	Y	Y	N	N	Backslope	Y
WTG-13	N	N	N	N	N	Backslope	N
WTG-13 AR	N	N	N	N	N	Backslope	N
WTG-14	N	Y	Y	N	N	Footslope	N
WTG-14 AR	Y	Y	N	Y	Y	Toeslope	Y
WTG-15	N	Y	N	N	N	Backslope	N
WTG-15 AR	N	Y	N	N	N	Summit/ Shoulder	N
WTG-16	Y	Y	N	N	N	Backslope	Y
WTG-16 AR	Y	Y	N	N	N	Shoulder	Y
WTG-17	N	Y	N	Y	N	Backslope	Y
WTG-17 AR	N	Y	N	N	N	Backslope	N
WTG-18	N	N	N	N	N	Summit/ Shoulder	N
WTG-18 AR	N	Y	N	N	N	Summit/ Shoulder	N



**Table 1b – Task 1 Preliminary Review Results: Collector Lines**

Collector Line Object ID #	Crosses NWI Wetland?	Crosses Hydric Soils?	Waterbody?	Wetness Signatures? (2013)	LiDAR Depression?	Candidate for Task 2?
1	Y	Y	Y	Y	Y	Y
2	Y	Y	N	Y	N	Y
3	Y	Y	N	Y	N	Y
4	N	Y	Y	N	N	Y
5	N	Y	N	Y	Y	Y
6	N	N	N	N	N	N
7	Y	Y	Y	Y	Y	Y
8	Y	Y	Y	Y	Y	Y
9	Y	Y	Y	Y	Y	Y
10	Y	Y	Y	Y	Y	Y
11	Y	Y	Y	Y	Y	Y

**4.2 TASK 2 – OFFSITE DETERMINATION**

Ten turbine and access road sample units and 20 collector line sample units were developed and analyzed in the Task 2 off-site assessment (Figures 5a-i). Some of the sample units were combined to form one sample unit that spanned both an access road or turbine and a collector line, totaling 27 reviewed sample units. As previously stated, this assessment included the analysis from normal years aerial photographs. The summary results of this hydrology determination are included in Table 2a for turbine locations and access roads and Table 2b for the collector lines. A summary table of the complete aerial photograph analysis is included in Appendix B, with aerial photographs included in Appendix A.

Based on the results from the Task 2 offsite hydrology determination, 16 sample units were identified as offsite wetlands, 11 were found to be non-wetland. Offsite wetlands were primarily identified along collector line paths, with three sample units located along access roads and in the proximity of turbine locations. Several sample units were identified in non-cropland areas and are considered natural features, which may contain wetland. The boundaries of the offsite sample units are included in Figures 5a-i.

**Table 2a. Summary of Offsite Hydrology Determinations: Turbine Locations and Access Roads**

	WTG-1 AR	WTG-4 AR	WTG-7 AR	WTG-8 AR (ditch feature)	WTG-12	WTG-12 AR	WTG-14 AR	WTG-16	WTG-16 AR	WTG-17
#Normal Yrs.	13	13	13	13	13	13	13	13	13	13
#Normal Yrs with wet signatures	1	5	4	12	3	4	12	2	5	1
% Normal Yrs with wet signatures	8%	38%	31%	92%	23%	31%	92%	15%	38%	8%
Wetland Hydrology ≥ 50% (Y/N)	N	N	N	Y	N	N	Y	N	N	N

Based on the results of Task 2 (Figures 5a-i), two turbine and access road sample units meet wetland hydrology criteria.

**Table 2b. Summary of Offsite Hydrology Determinations: Collector Lines**

	CL 1	CL 2	CL 3	CL 5, 7b	CL 7a	CL 7c	CL 7d	CL 7e/ 11e	CL 7f/ 11f	CL 7g
#Normal Yrs.	Natural Feature/ No Offsite	4	4	4	4	4	4	Natural Feature/ No Offsite	4	4
#Normal Yrs with wet signatures	Natural Feature/ No Offsite	4	2	4	4	1	1	Natural Feature/ No Offsite	3	3
% Normal Yrs with wet signatures	-	100%	50%	100%	100%	25%	25%	-	75%	75%
Wetland Hydrology ≥ 50% (Y/N)		Y	Y	Y	Y	N	N		Y	Y

**Table 2b. Summary of Offsite Hydrology Determinations: Collector Lines**

	CL 7h	CL 8a	CL 8b	CL 8c	CL 8d	CL 9a	CL 9b	CL 9c	CL 9d	CL 10
#Normal Yrs.	4	Natural Feature/ No Offsite	4	4	Natural Feature/ No Offsite	4	4	4	4	Natural Feature/ No Offsite
#Normal Yrs with wet signatures	1	Natural Feature/ No Offsite	1	3	Natural Feature/ No Offsite	3	3	4	1	Natural Feature/ No Offsite
% Normal Yrs with wet signatures	25%	-	25%	75%	-	75%	75%	100%	25%	-
Wetland Hydrology ≥ 50% (Y/N)	N		N	Y		Y	Y	Y	N	

Based on the results of Task 2 (Figure 5a-i), 10 collector line sample units meet wetland criteria. Five of the sample units occurred in non-cropland, naturally vegetated areas, or ditches and waterbodies and are assumed to meet wetland criteria. Some of the sample units assessed for the collector lines are also located along access roads.

### 4.3 TASK 3 – ONSITE VERIFICATION

The following table shows sample units which were investigated in the field for confirmation of wetland criteria. These areas were selected for field verification based on their potential to be impacted by the proposed project. Other sample unit areas will be avoided.

**Table 3. Summary of Field Verification Findings**

Sample Unit	Determination	Intersects
CL 3	Non-Wetland	Collector Line
CL 7h	Non-Wetland	Collector Line
CL 8d	Waterbody/Non-Verified	Collector Line
CL 9b/WTG-7 AR	Non-Wetland	Collector Line, Access Road

CL 9d	Non-Wetland	Collector Line
WTG-16/WTG-16 AR	Non-Wetland	Access Road
WTG-17	Non-Wetland	Access Road, Turbine
WTG-4 AR	Non-Wetland	Access Road

All sample units investigated in the field were determined to be non-wetland or a non-wetland waterbody, which were not delineated. Waterbodies identified within the project area will not be impacted by the proposed project; these areas will be avoided by boring underneath. Sample units with obvious upland vegetation were not further investigated. Sample units with cropped vegetation were further investigated and data sheets are included in Appendix E. A summary table of wetland determination after field investigation is included below.

**Table 4. Summary of All Sample Unit Wetland Determinations**

Sample Unit	Determination
CL 1	Waterbody/Non-Verified
CL 10	Wetland
CL 2	Wetland
CL 3	Non-Wetland
CL 4, 5 & 7b/WTG 14 & WTG-14 AR	Wetland
CL 7a	Wetland
CL 7c	Non-Wetland
CL 7d	Non-Wetland
CL 7e/11e	Waterbody/Non-Verified
CL 7f/11f	Wetland
CL 7g	Wetland
CL 7h	Non-Wetland
CL 8a	Waterbody/Non-Verified
CL 8b	Non-Wetland
CL 8c	Wetland
CL 8d	Waterbody/Non-Verified
CL 9a/WTG-6 AR	Wetland
CL 9b/WTG-7 AR	Non-Wetland
CL 9c	Wetland
CL 9d	Non-Wetland
WTG-1 AR	Non-Wetland
WTG-12	Non-Wetland
WTG-12 AR	Non-Wetland
WTG-16/WTG-16 AR	Non-Wetland
WTG-17	Non-Wetland
WTG-4 AR	Non-Wetland
WTG-8 AR	Wetland

## 5.0 Conclusion

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The boundaries of 10 wetlands were identified per the scope of this report. An additional 13 potential wetland areas that were investigated were determined to be non-wetland. Four waterbodies were also identified. Activities which impact or potentially impact wetlands may be regulated by the USACE (under Section 404 of the Clean Water Act), Minnesota DNR and by the Local Government Unit administering the Wetland Conservation Act. No grading or filling in wetland basins or other jurisdictional waters should commence until all necessary permits have been obtained or a finding of no jurisdiction has been obtained from applicable regulatory agencies. This wetland delineation meets the standards and criteria described in the US Army Corps of Engineers (USACE) and Minnesota Board of Water and Soil Resources (BWSR) Guidance for Offsite Hydrology/Wetland Determinations (2016).

Sincerely,

**Wenck Associates, Inc.**



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August 15, 2017

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Meaghan Watson  
Certified Wetland Delineator In-Training, #5202



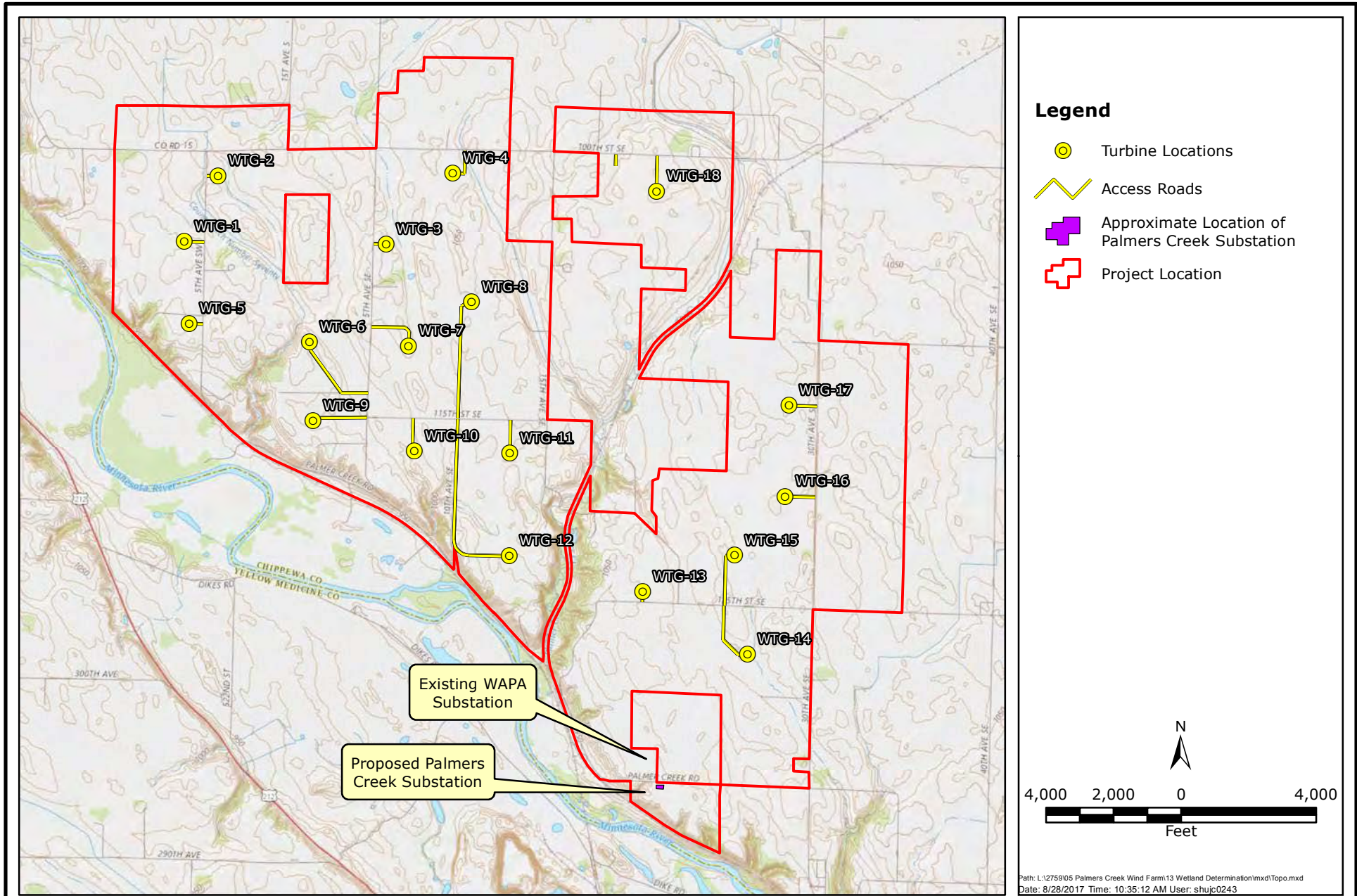
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August 15, 2017

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Wes Boll  
Certified Wetland Delineator, MN #1005

## Figures

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- 1 Site Location Map
- 2 National Wetlands Inventory/Public Waters Inventory Map
- 3 Site Topography Map (LIDAR)
- 4 Soil Survey Map
- 5 Offsite Wetlands Map



PALMER'S CREEK WIND FARM, LLC  
 Site Location Map



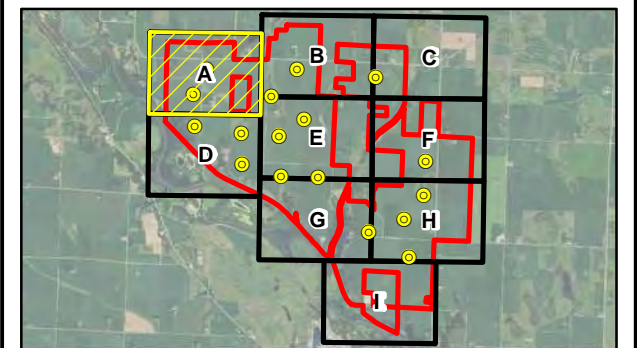
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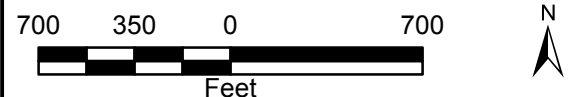


**Legend**

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
- Revised NWI**
- Seasonally Flooded (Type 1)
  - Wet Meadow (Type 2)
  - Shallow Marsh (Type 3)
  - Deep Marsh (Type 4)
  - Shallow Open Water (Type 5)
  - Shrub Swamp (Type 6)
  - Wooded Swamp (Type 7)
  - Bogs (Type 8)
  - Municipal and Industrial Activities
  - Riverine Systems
  - Public Water Watercourse
  - Public Ditch/Altered Natural Watercourse
  - Public Waters Basins



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



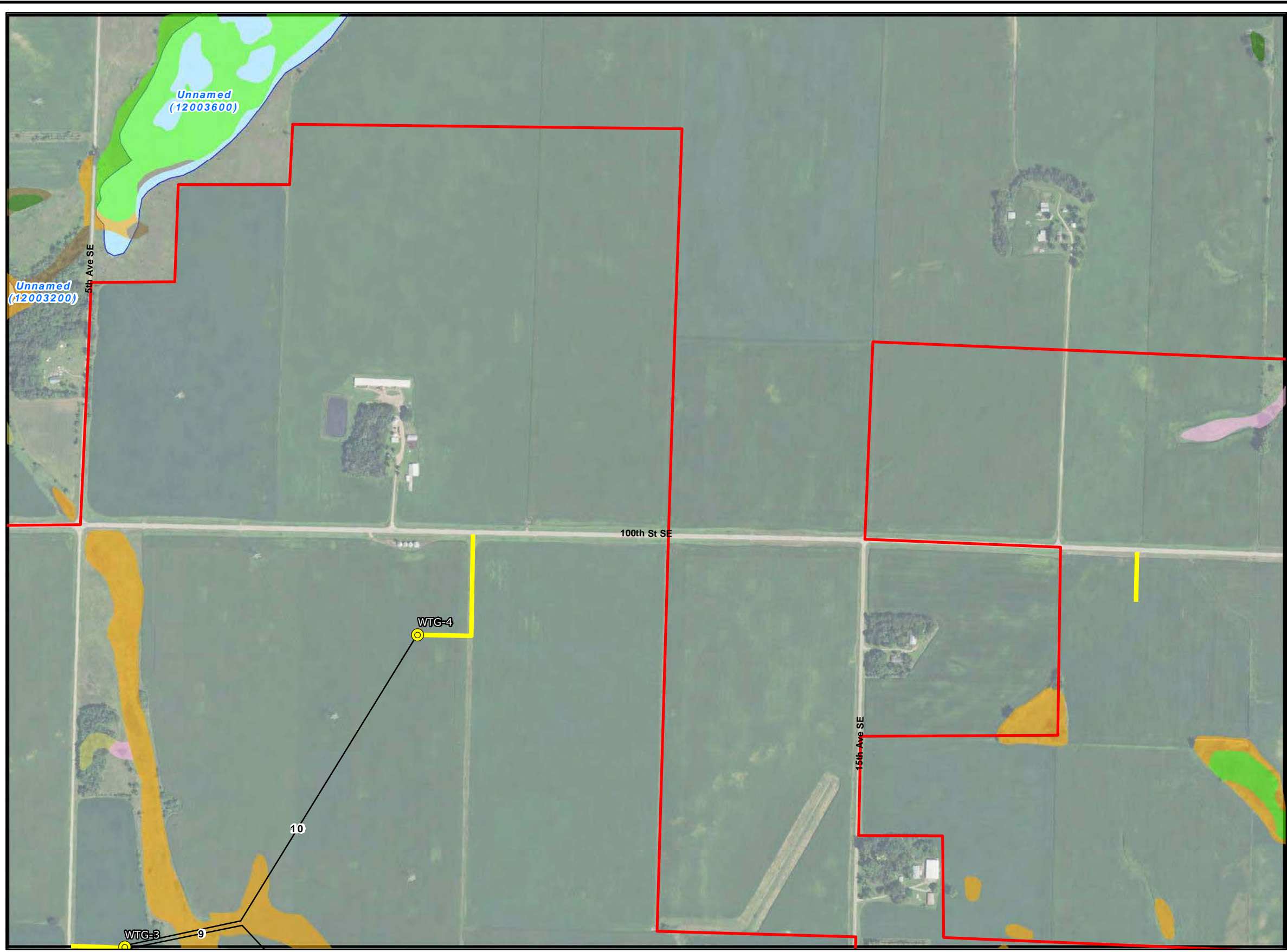
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



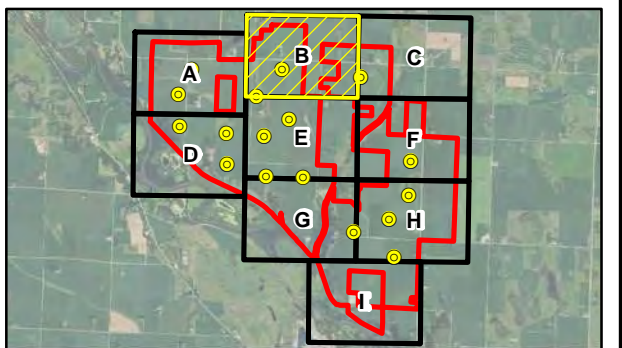
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Figure 2-A



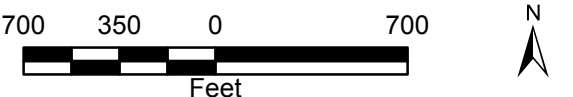


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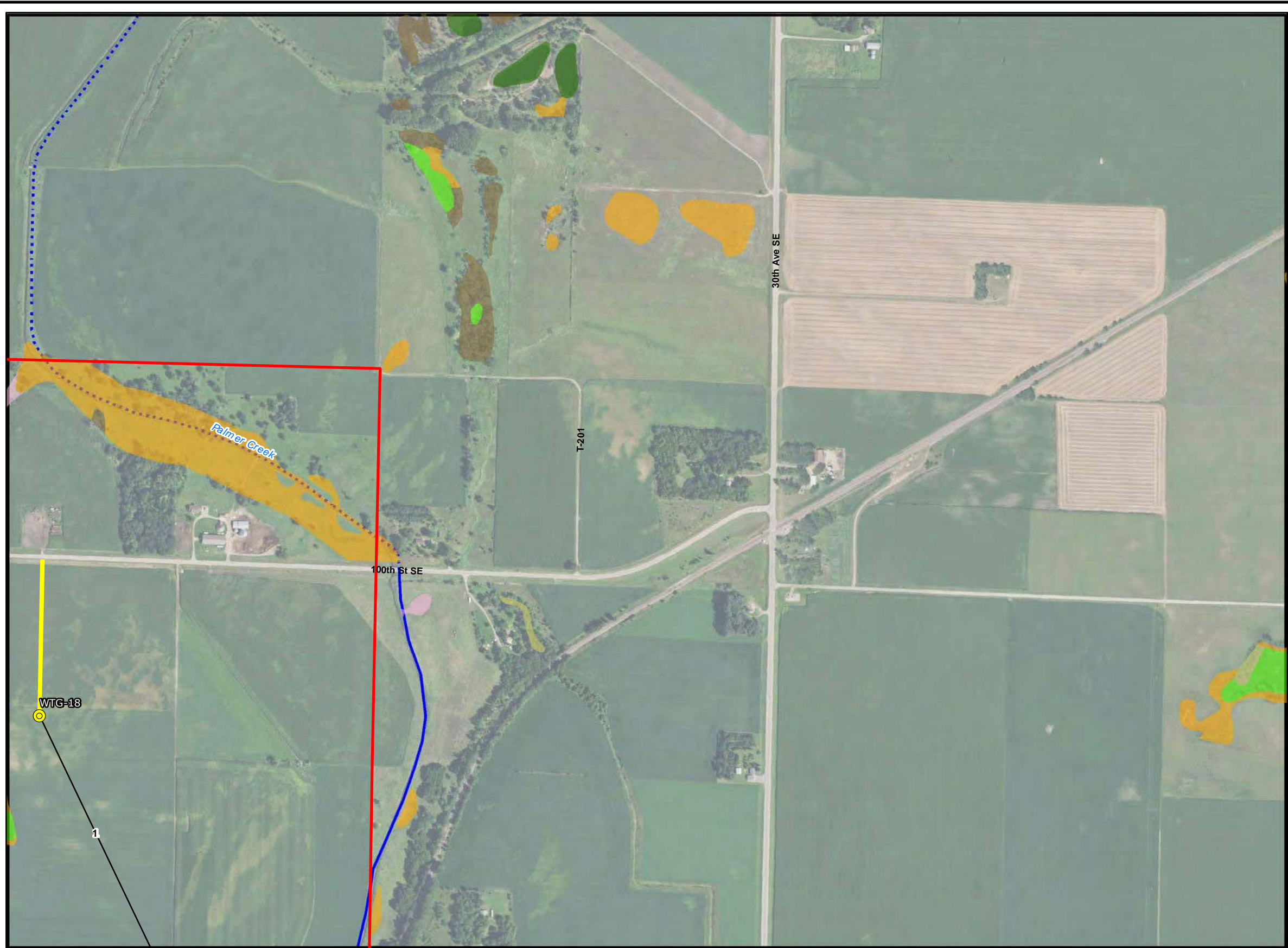
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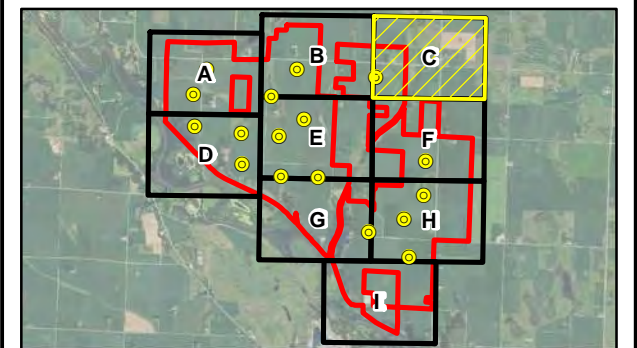
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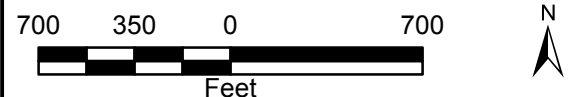


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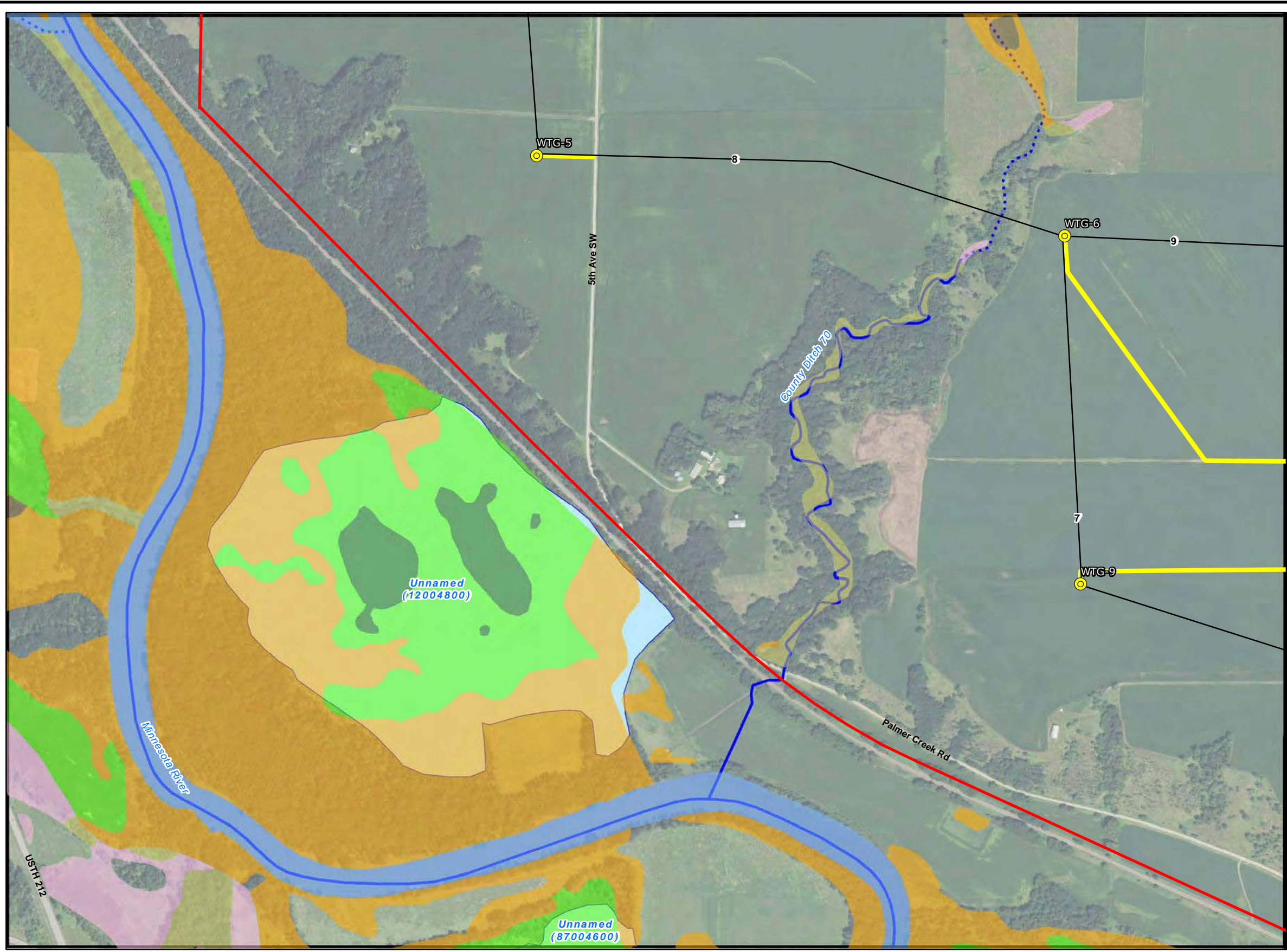
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



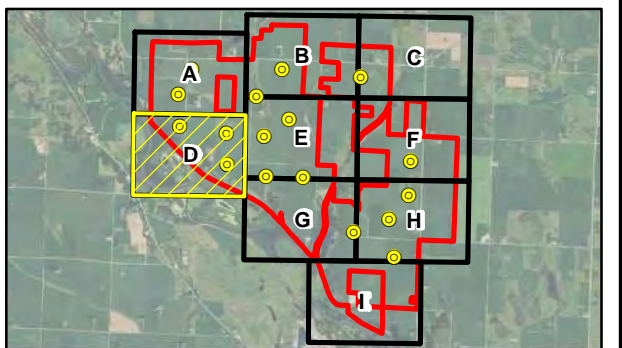
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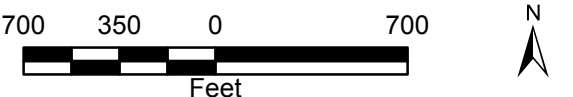


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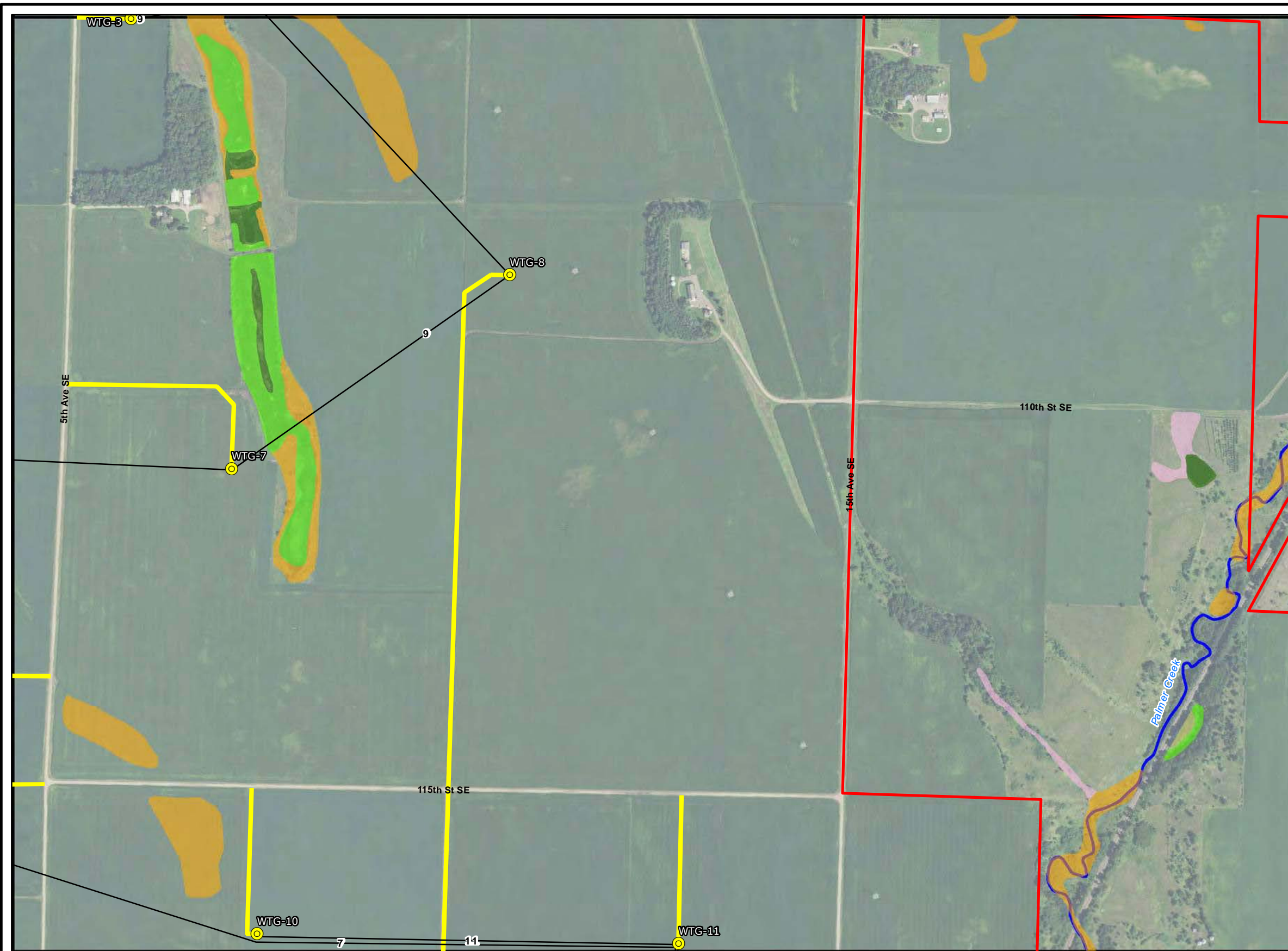
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National Wetlands Inventory Map



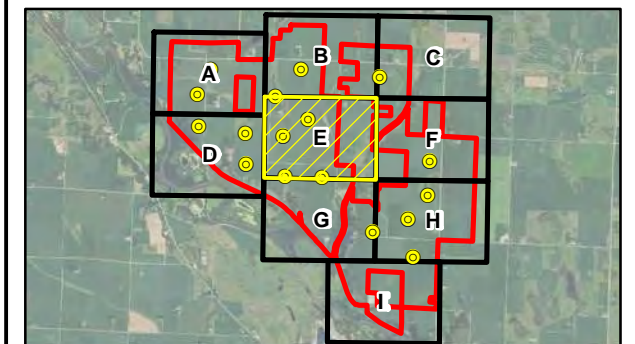
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Figure 2-D





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Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



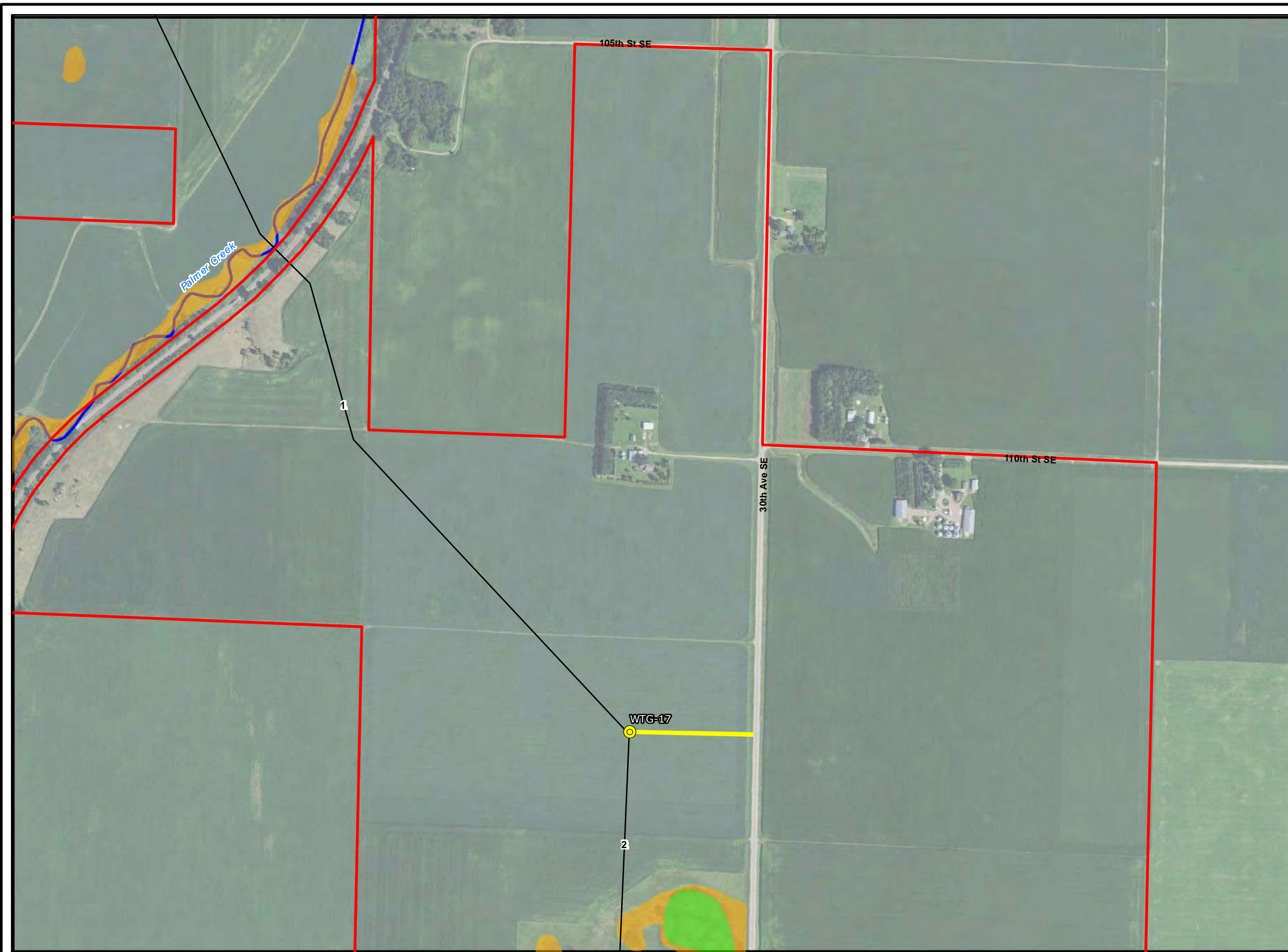
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



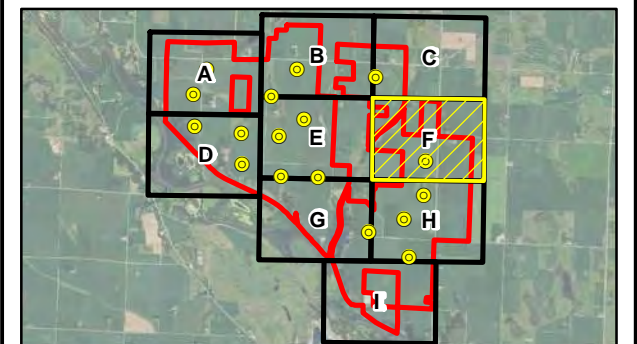
AUG 2017  
Figure 2-E





**Legend**

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
- Revised NWI**
- Seasonally Flooded (Type 1)
  - Wet Meadow (Type 2)
  - Shallow Marsh (Type 3)
  - Deep Marsh (Type 4)
  - Shallow Open Water (Type 5)
  - Shrub Swamp (Type 6)
  - Wooded Swamp (Type 7)
  - Bogs (Type 8)
  - Municipal and Industrial Activities
  - Riverine Systems
  - Public Water Watercourse
  - Public Ditch/Altered Natural Watercourse
  - Public Waters Basins



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

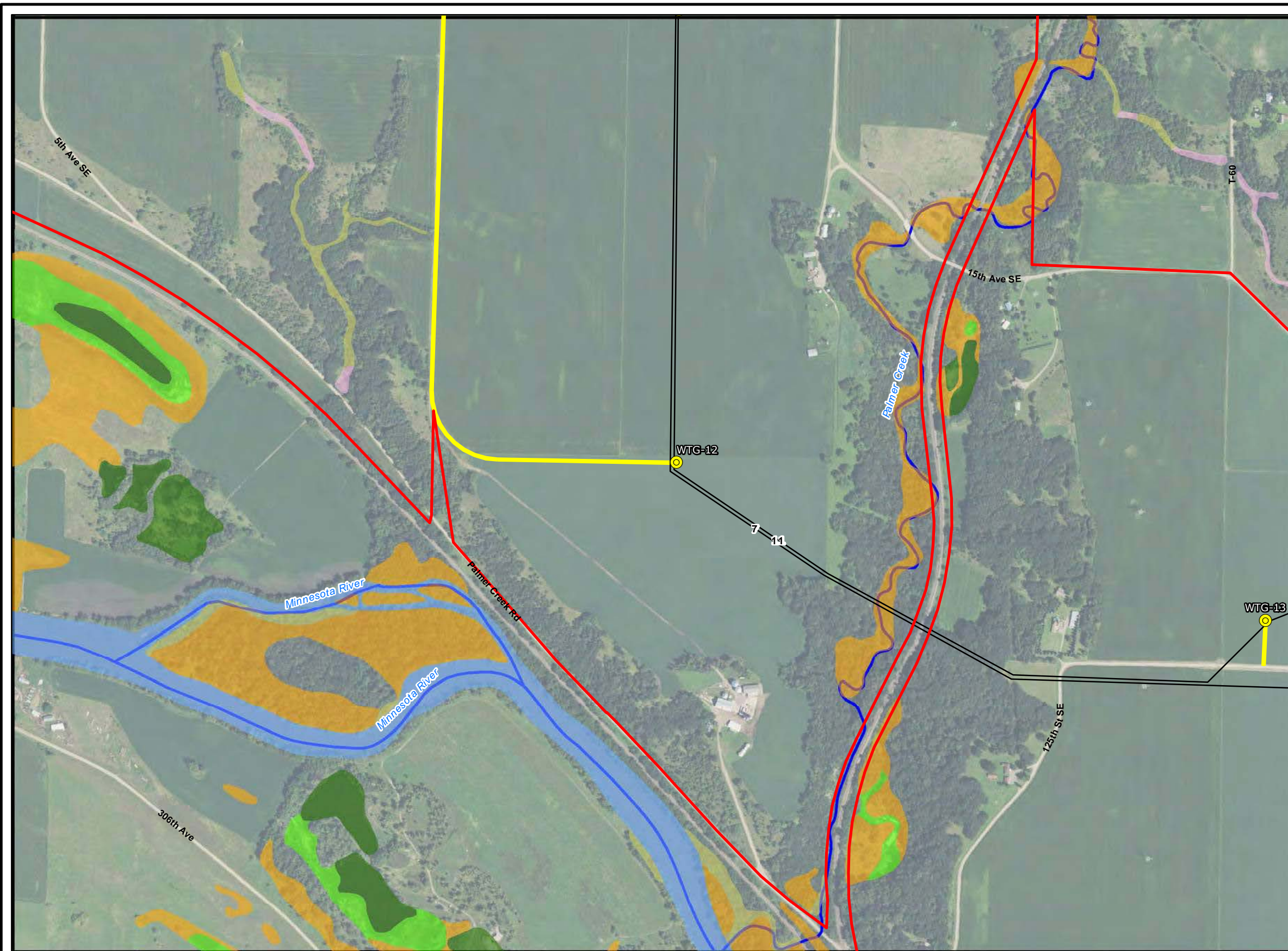
National Wetlands Inventory Map



AUG 2017

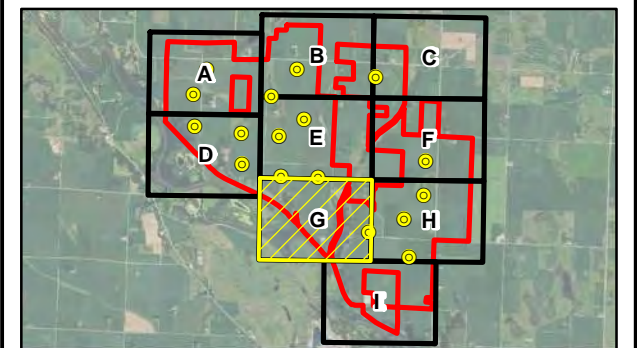
Figure 2-F



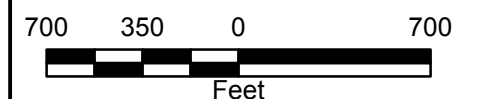


**Legend**

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
- Revised NWI**
- Seasonally Flooded (Type 1)
  - Wet Meadow (Type 2)
  - Shallow Marsh (Type 3)
  - Deep Marsh (Type 4)
  - Shallow Open Water (Type 5)
  - Shrub Swamp (Type 6)
  - Wooded Swamp (Type 7)
  - Bogs (Type 8)
  - Municipal and Industrial Activities
  - Riverine Systems
  - Public Water Watercourse
  - Public Ditch/Altered Natural Watercourse
  - Public Waters Basins



Note:  
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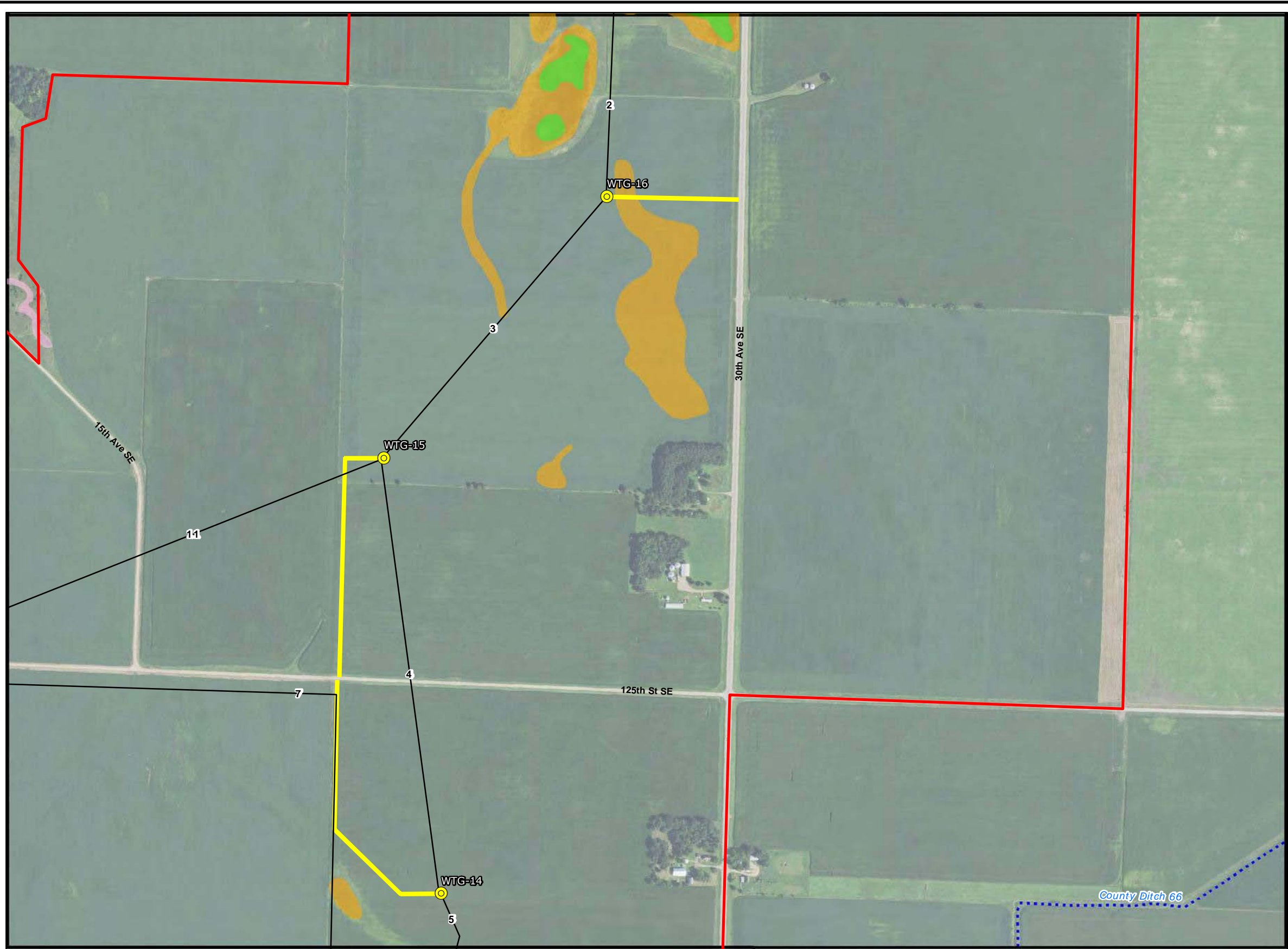
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



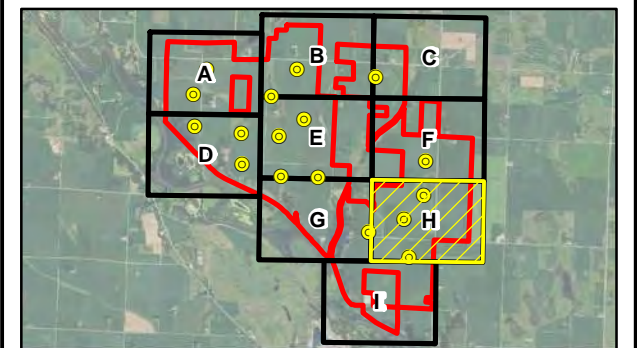
AUG 2017  
Figure 2-G



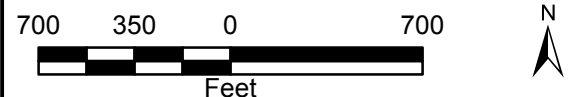


**Legend**

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
- Revised NWI**
- Seasonally Flooded (Type 1)
  - Wet Meadow (Type 2)
  - Shallow Marsh (Type 3)
  - Deep Marsh (Type 4)
  - Shallow Open Water (Type 5)
  - Shrub Swamp (Type 6)
  - Wooded Swamp (Type 7)
  - Bogs (Type 8)
  - Municipal and Industrial Activities
  - Riverine Systems
  - Public Water Watercourse
  - Public Ditch/Altered Natural Watercourse
  - Public Waters Basins



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



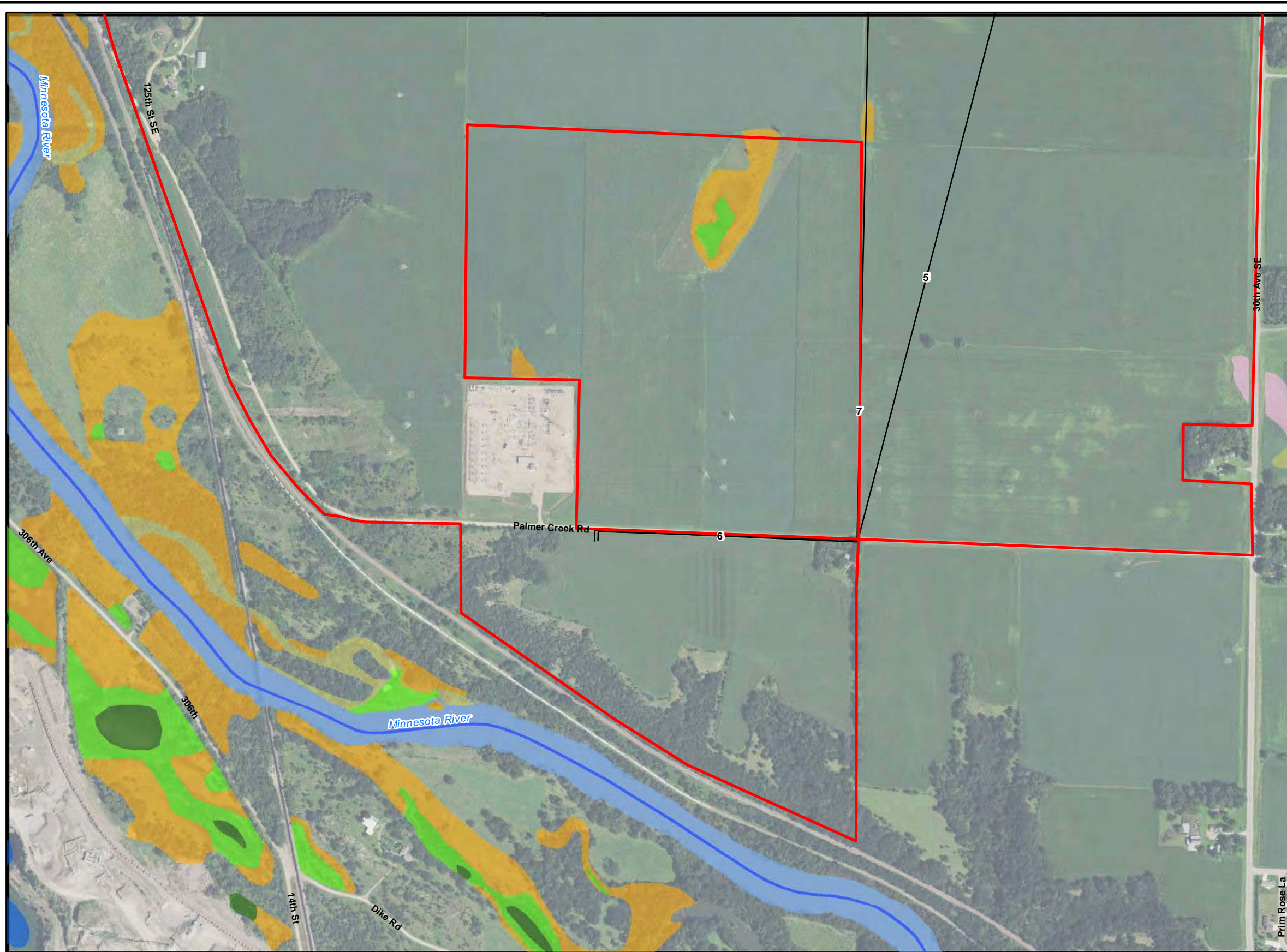
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



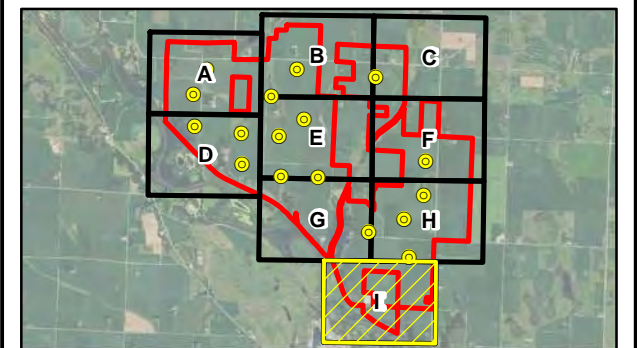
AUG 2017  
Figure 2-H



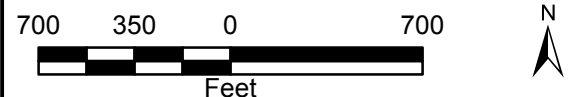


**Legend**

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
- Revised NWI**
- Seasonally Flooded (Type 1)
  - Wet Meadow (Type 2)
  - Shallow Marsh (Type 3)
  - Deep Marsh (Type 4)
  - Shallow Open Water (Type 5)
  - Shrub Swamp (Type 6)
  - Wooded Swamp (Type 7)
  - Bogs (Type 8)
  - Municipal and Industrial Activities
  - Riverine Systems
  - Public Water Watercourse
  - Public Ditch/Altered Natural Watercourse
  - Public Waters Basins



Note:  
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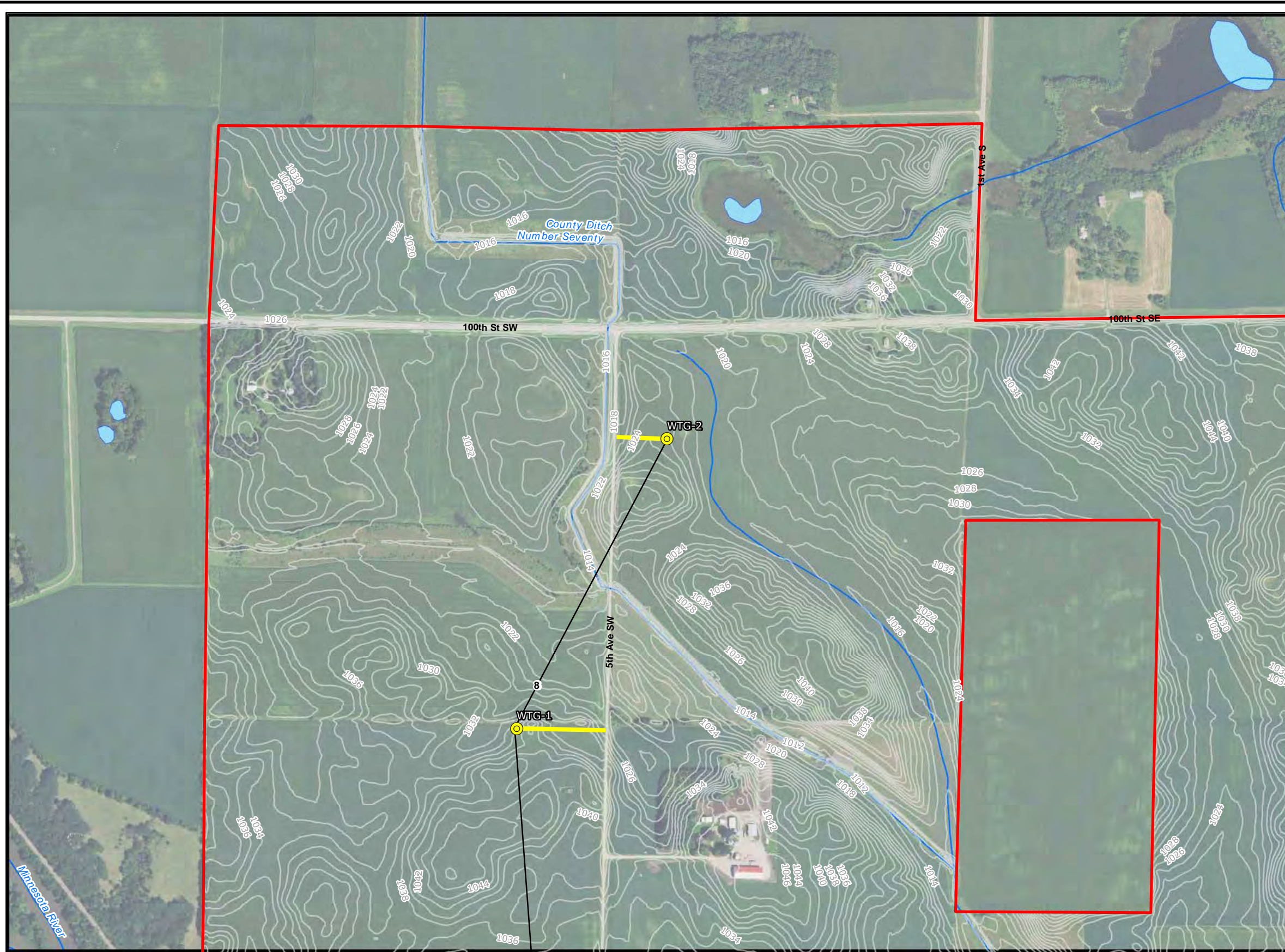
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PALMER'S CREEK WIND FARM, LLC  
National Wetlands Inventory Map



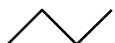






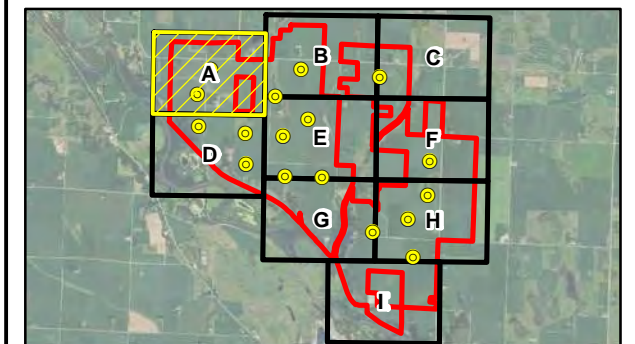
AUG 2017  
Figure 2-I



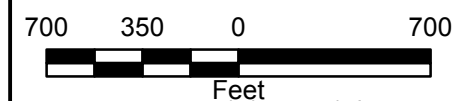


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

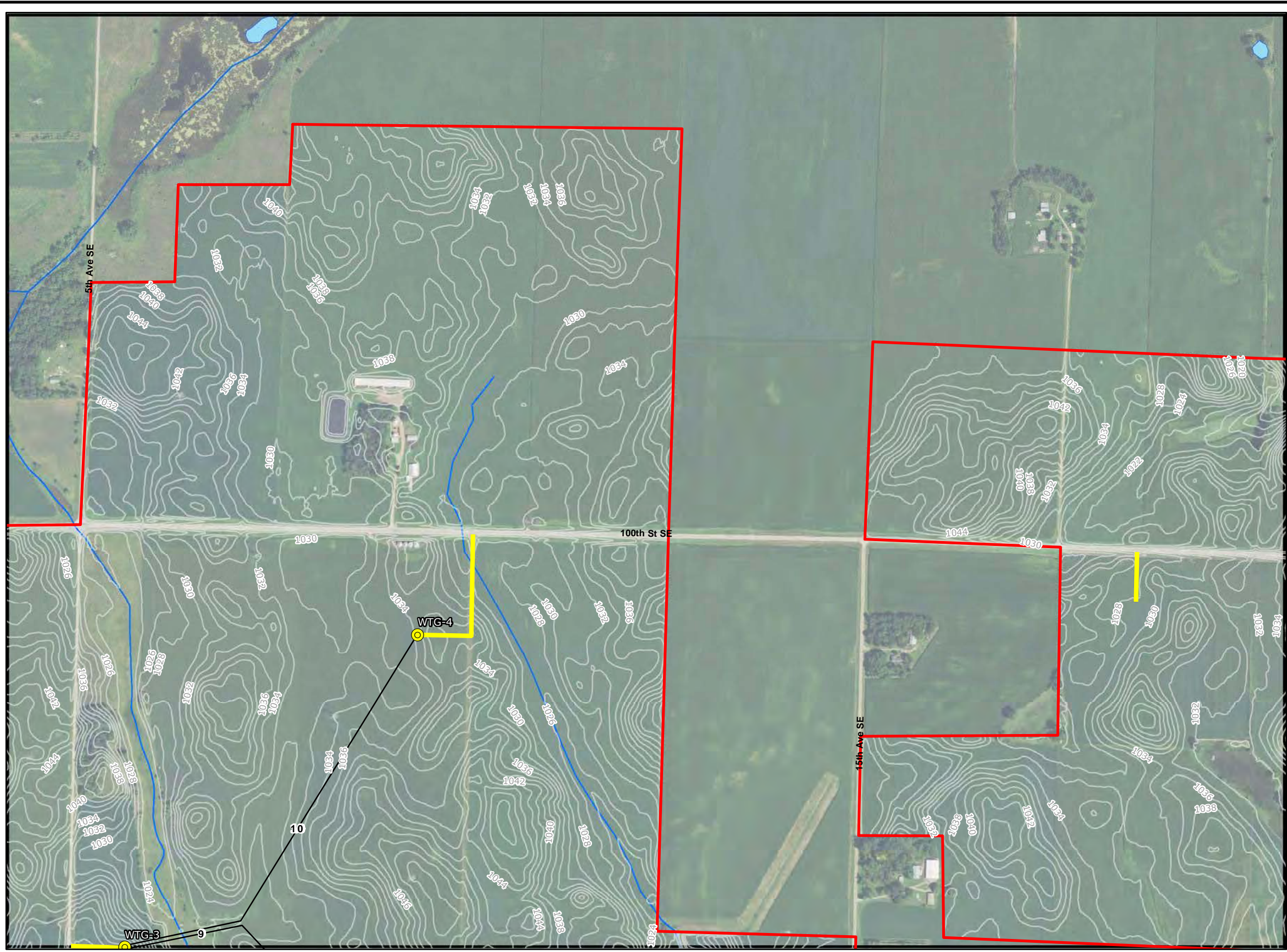
Site Topography Map (LiDAR)





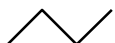



AUG 2017

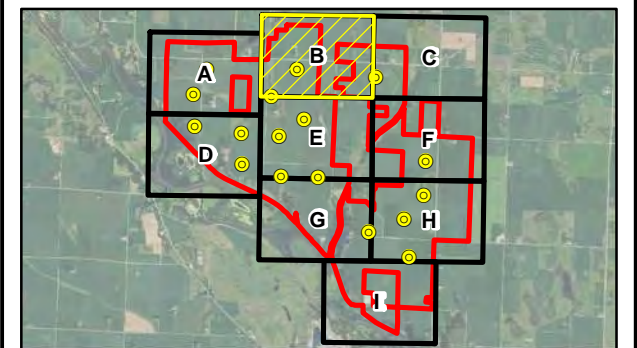
Figure 3-A



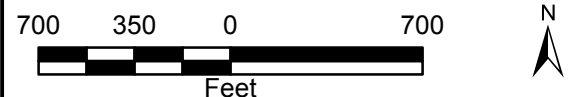


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
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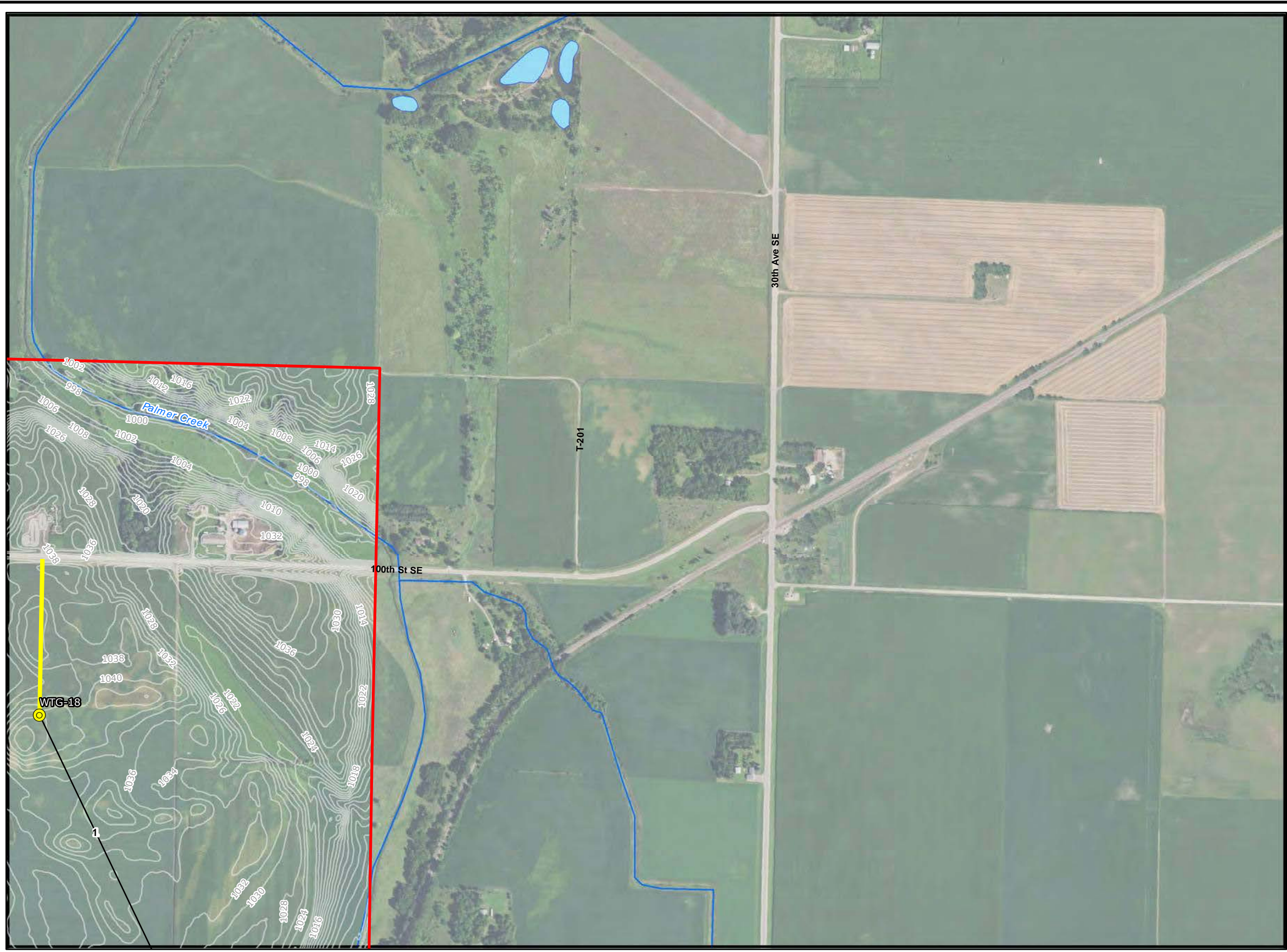
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)



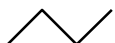





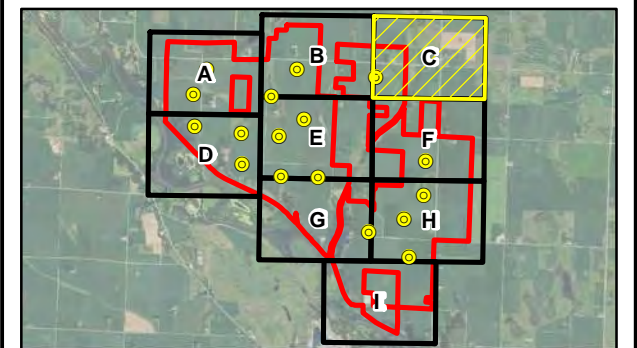
AUG 2017  
Figure 3-B



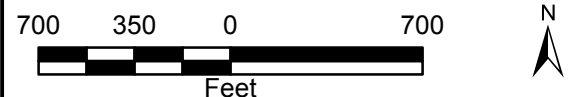


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



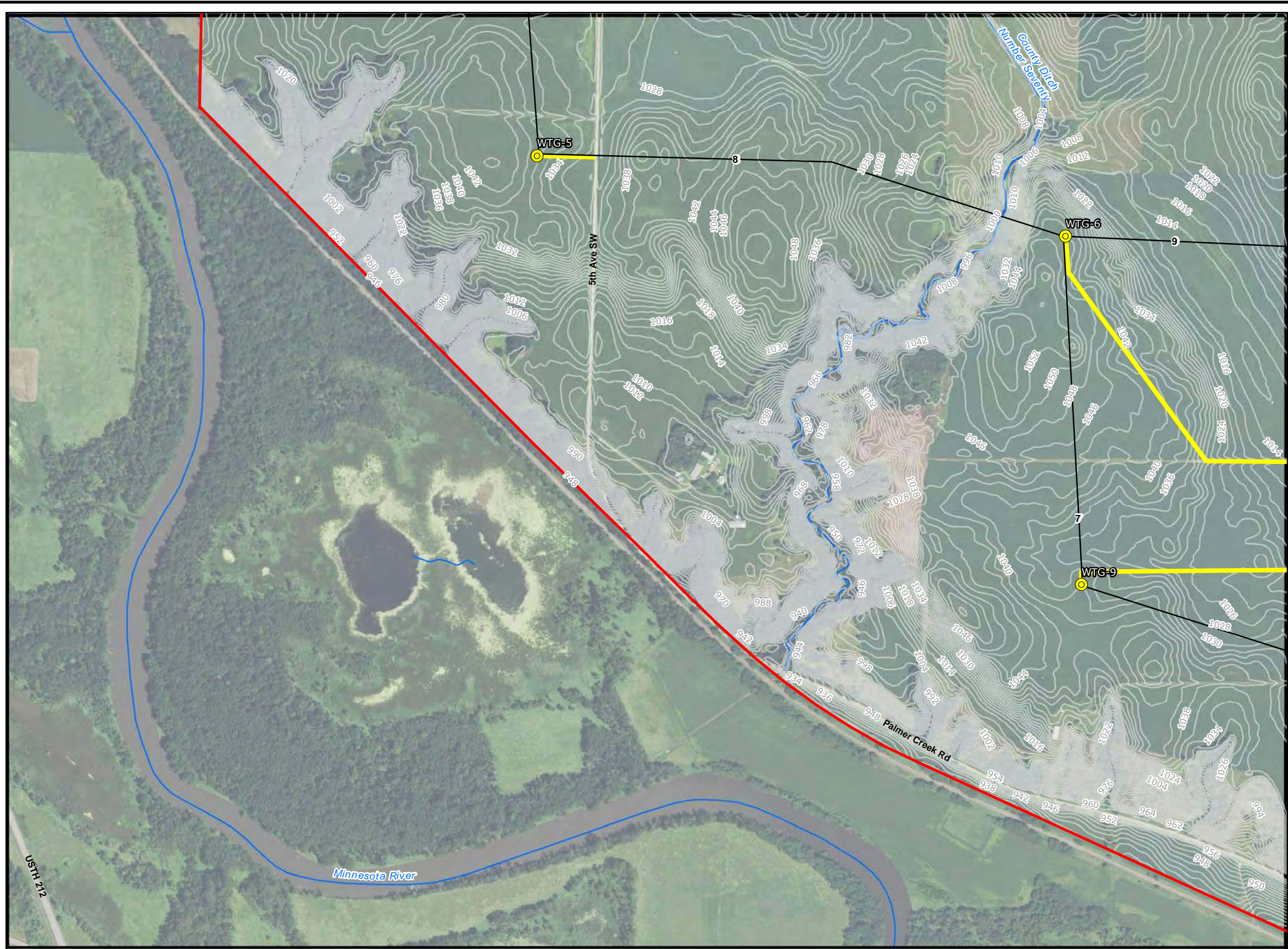
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)



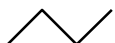





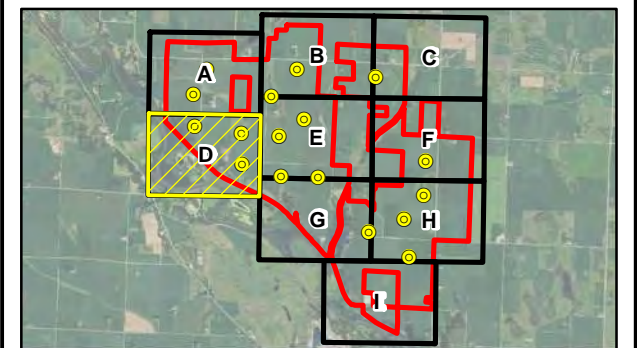
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Figure 3-C



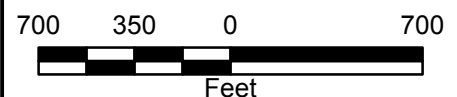


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



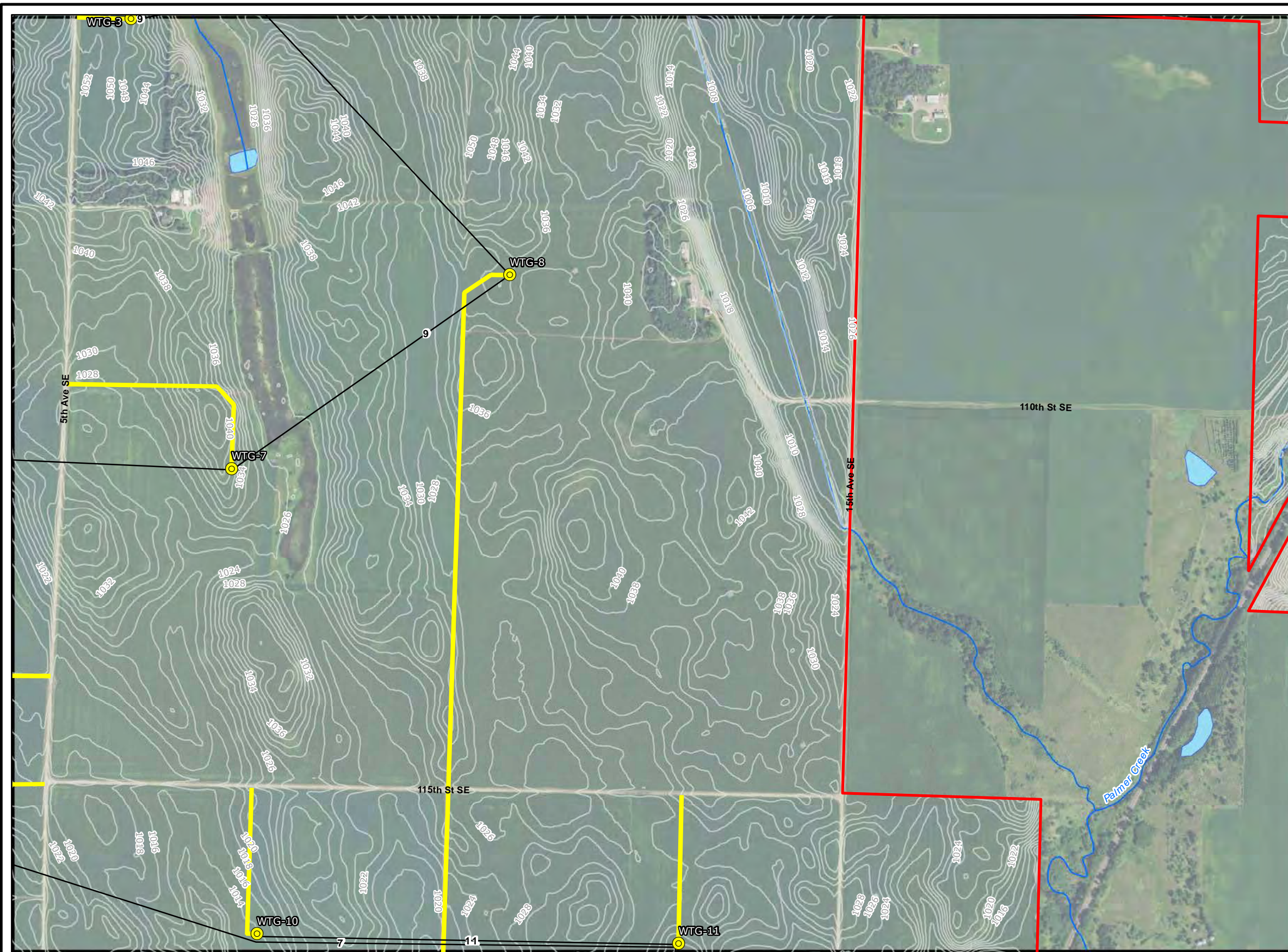
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)










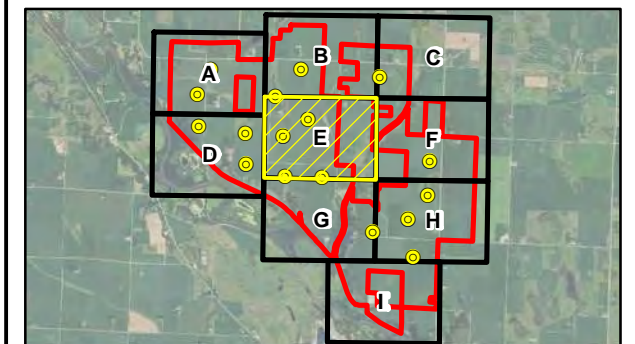
AUG 2017  
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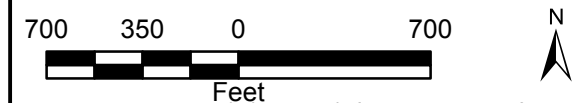


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



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PALMER'S CREEK WIND FARM, LLC

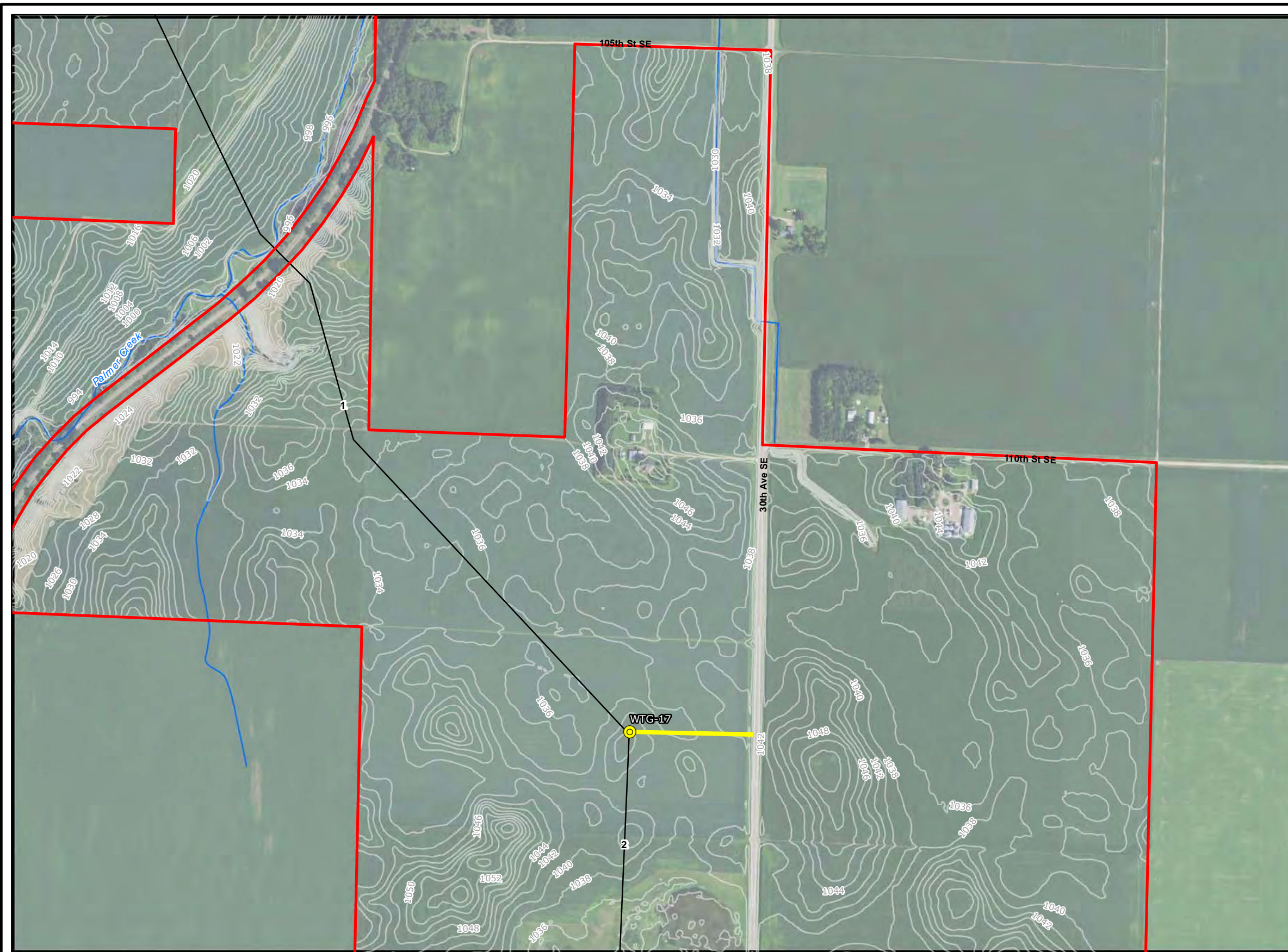
Site Topography Map (LiDAR)





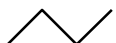




AUG 2017

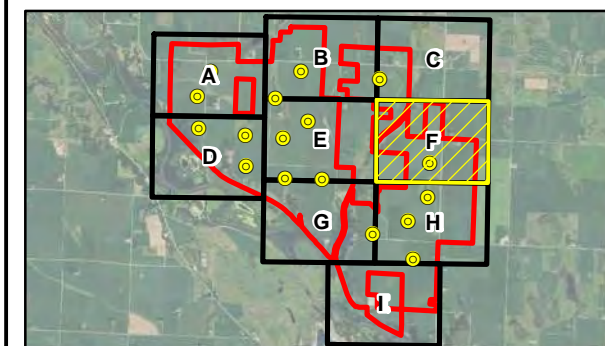
Figure 3-E





### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



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Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

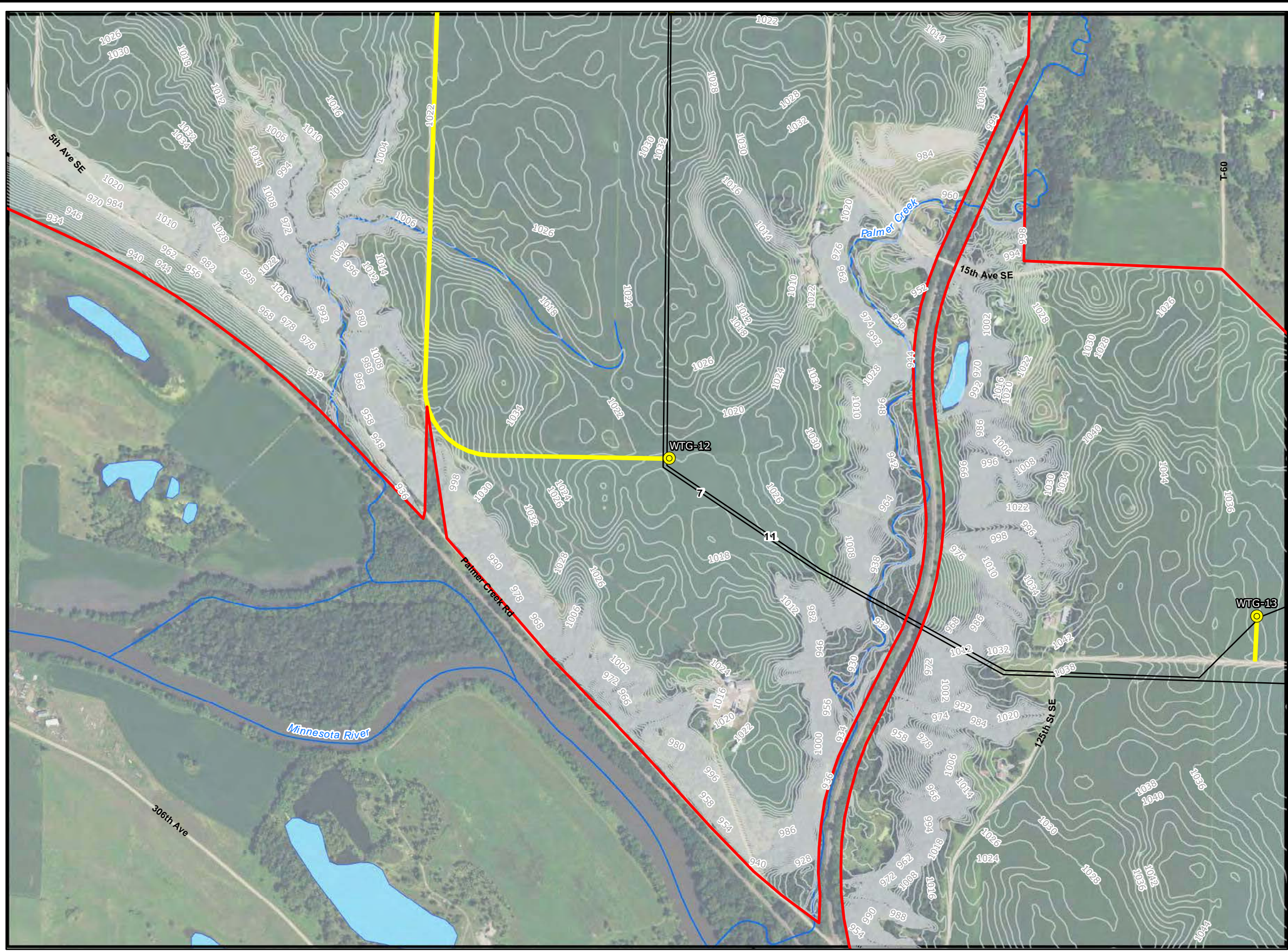
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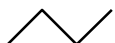



AUG 2017

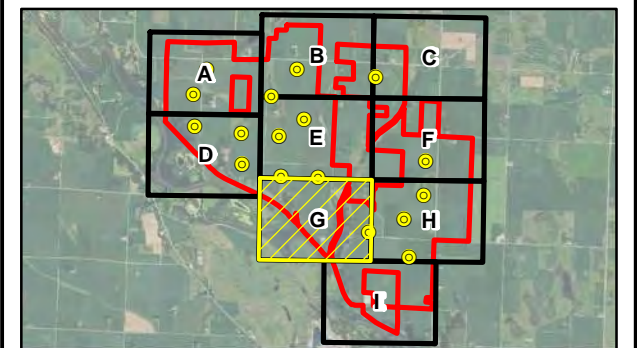
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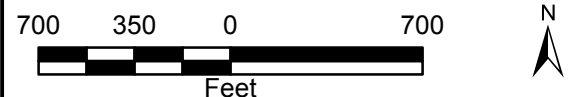


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



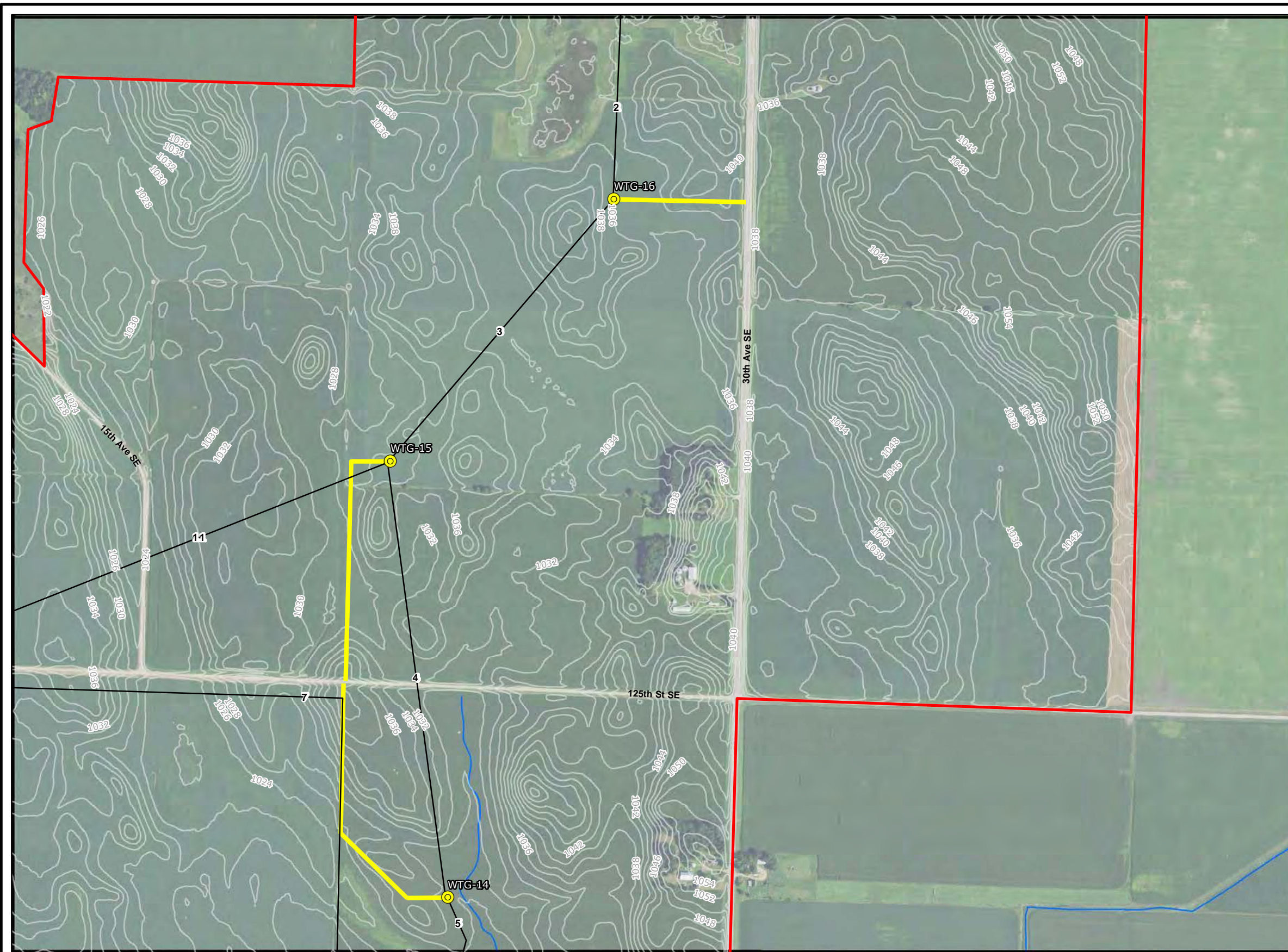
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)



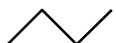






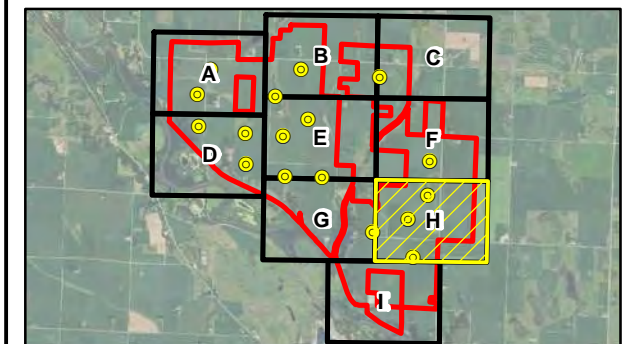
AUG 2017  
Figure 3-G



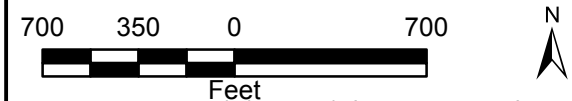


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



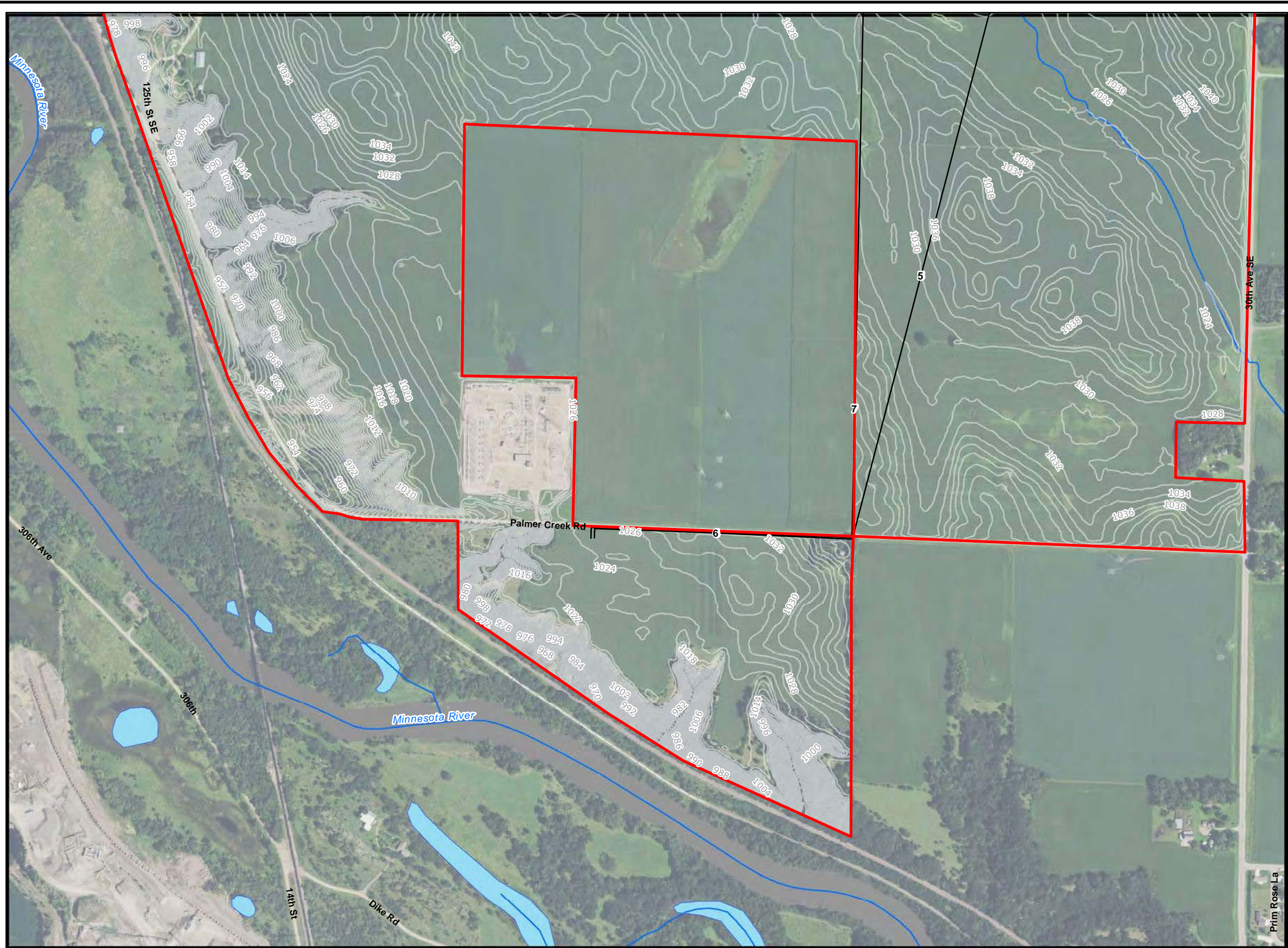
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)



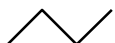





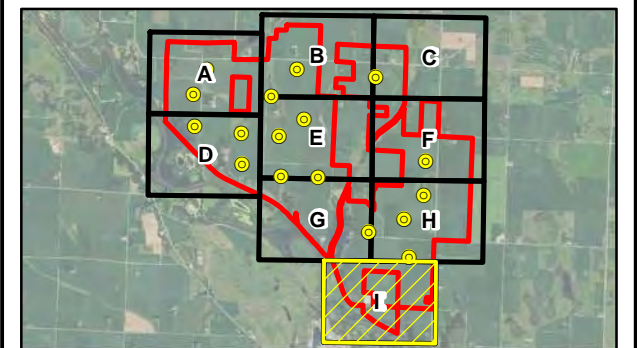
AUG 2017  
Figure 3-H



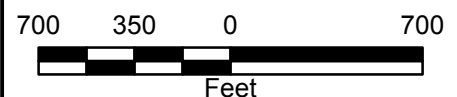


### Legend

-  Project Boundary
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  2' Contours
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



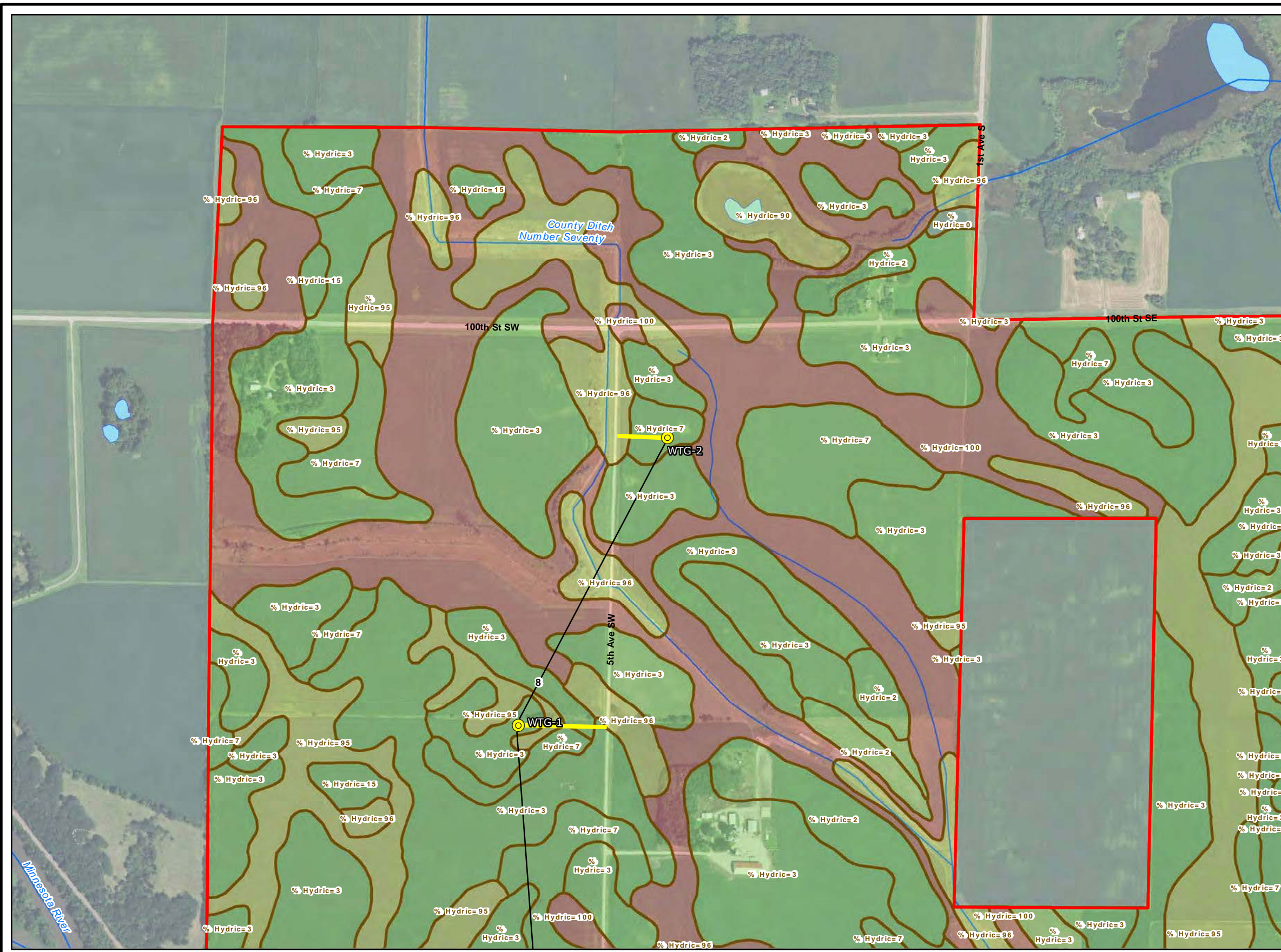
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PALMER'S CREEK WIND FARM, LLC  
Site Topography Map (LiDAR)



AUG 2017  
Figure 3-I



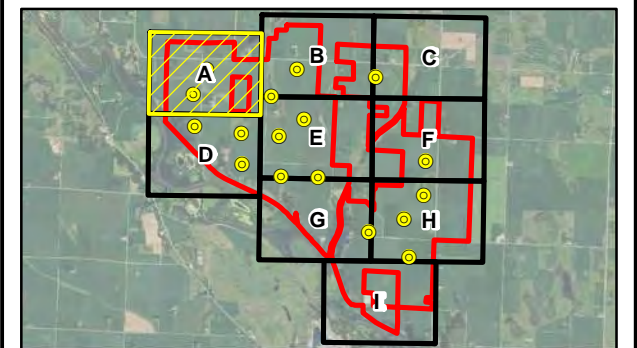


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

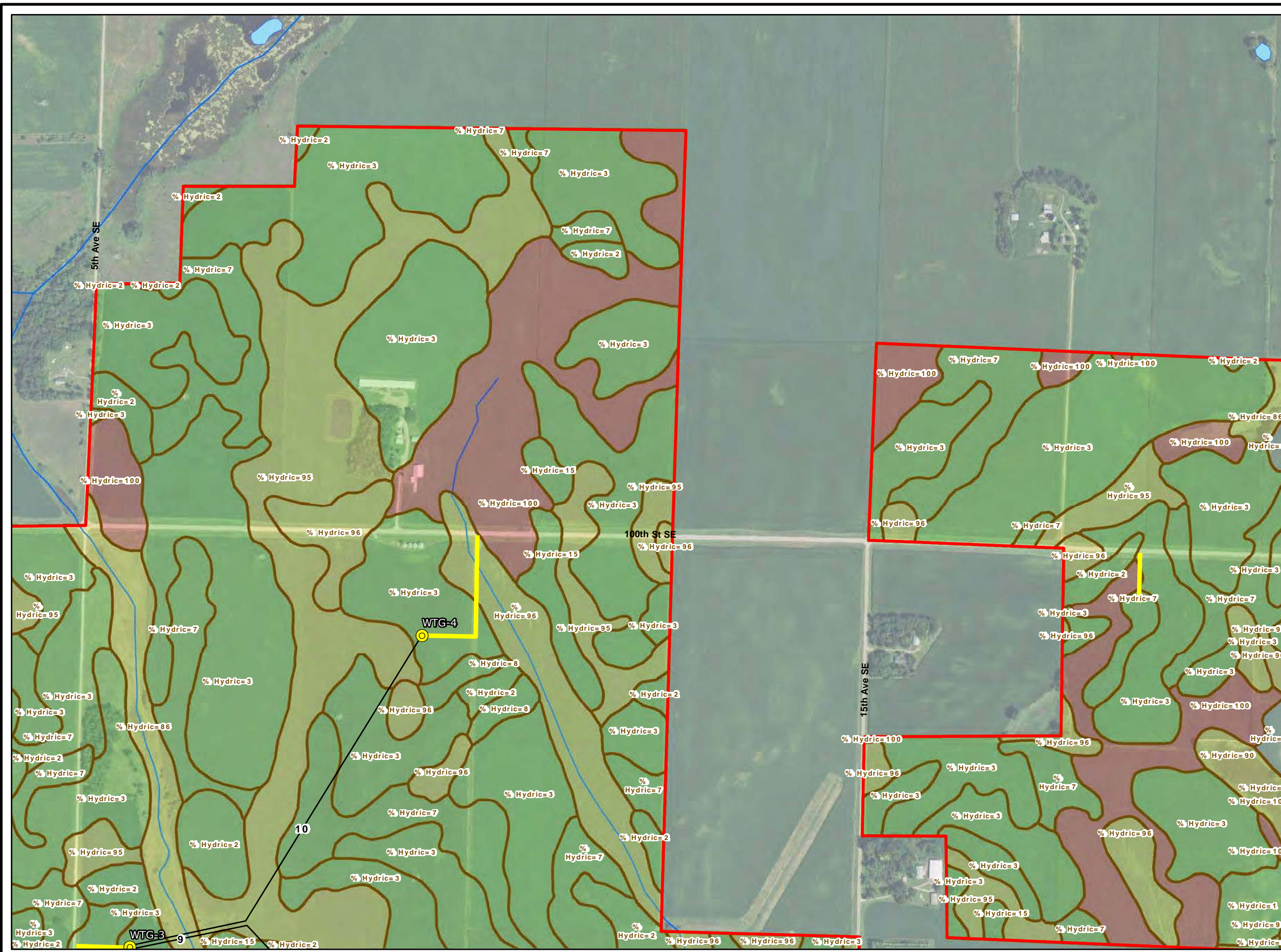
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 Feet  
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PALMER'S CREEK WIND FARM, LLC  
 Soil Survey Map



AUG 2017  
 Figure 4-A



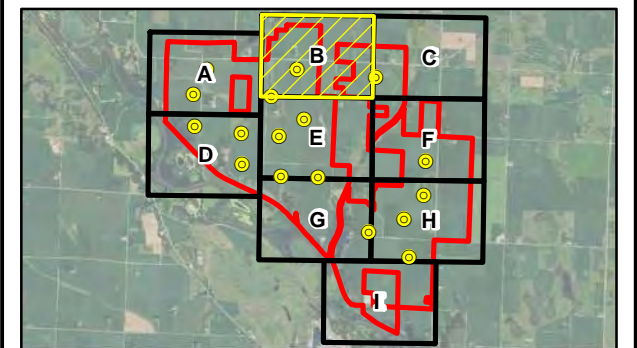


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

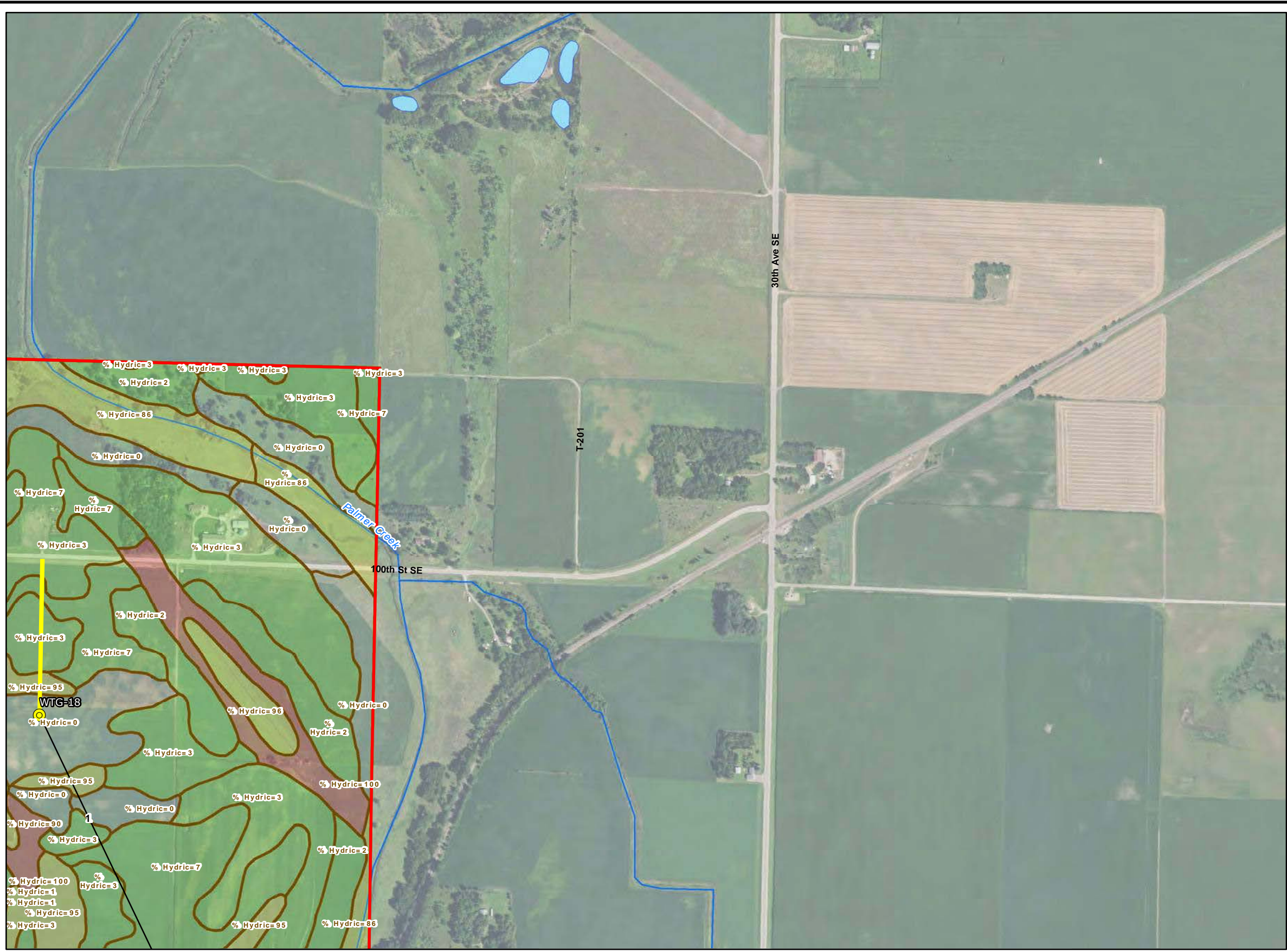
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



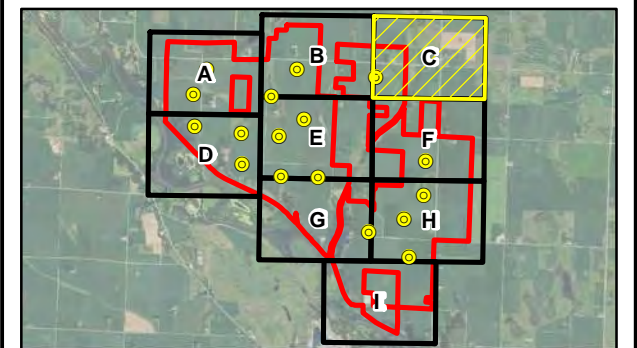
AUG 2017  
Figure 4-B



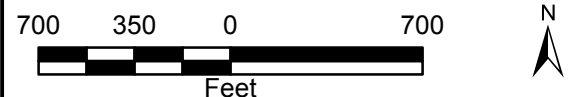


### Legend

- Project Boundary
  - Turbine Locations
  - Collector Lines
  - Access Roads
  - Soils
- ### Hydric Percent
- 0% (Non-Hydric)
  - 1-50% (Partially Hydric)
  - 51-99% (Mostly Hydric)
  - 100% (All Hydric)
  - NHD
  - NHD Waterbody



Note:  
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2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

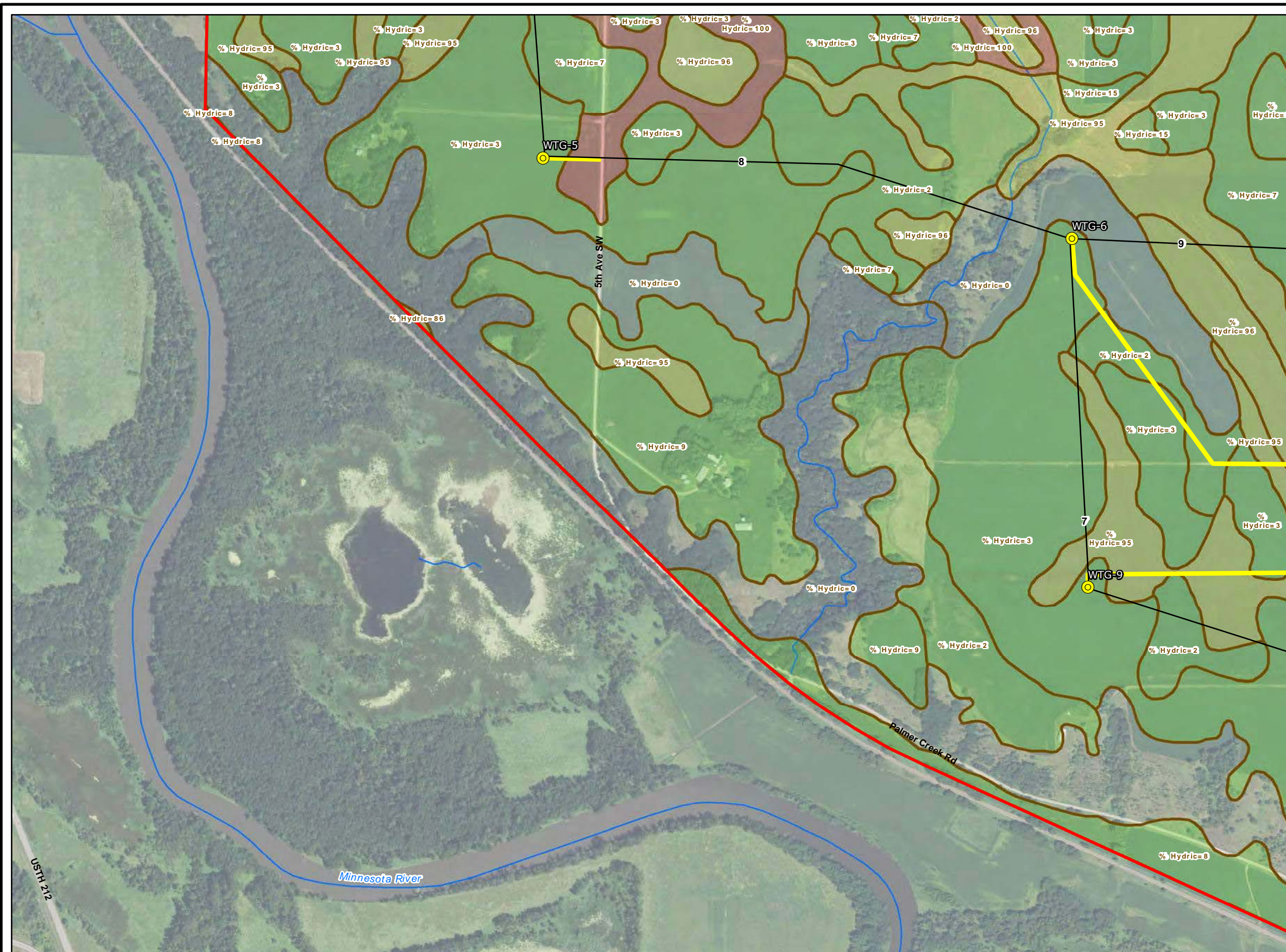
Soil Survey Map



AUG 2017

Figure 4-C



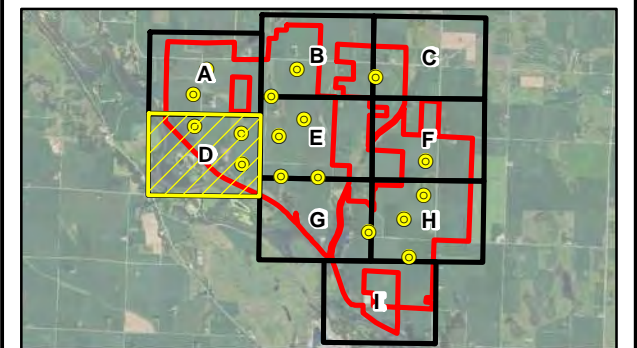


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
 Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
 Feet

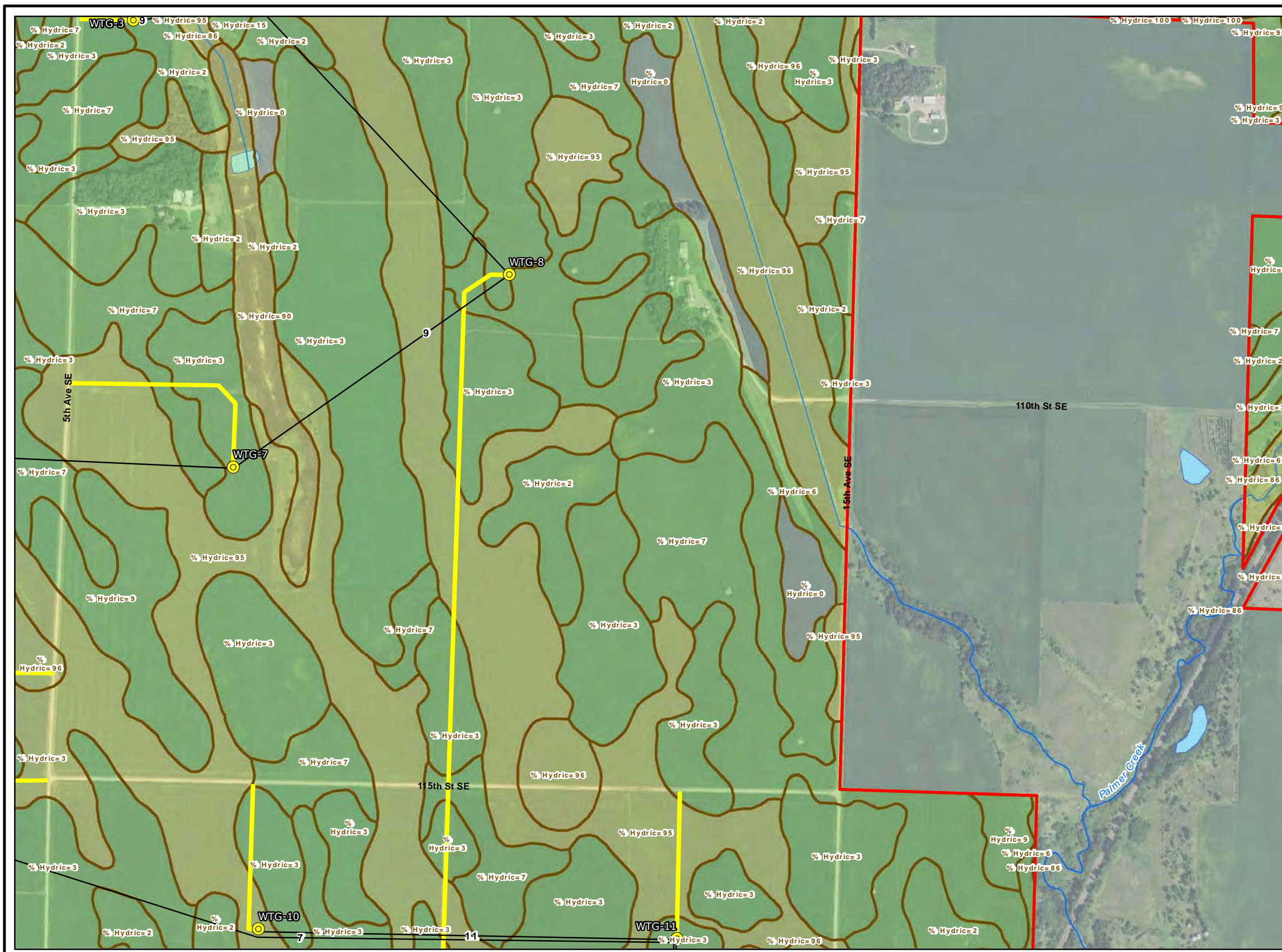
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PALMER'S CREEK WIND FARM, LLC  
 Soil Survey Map



AUG 2017  
 Figure 4-D



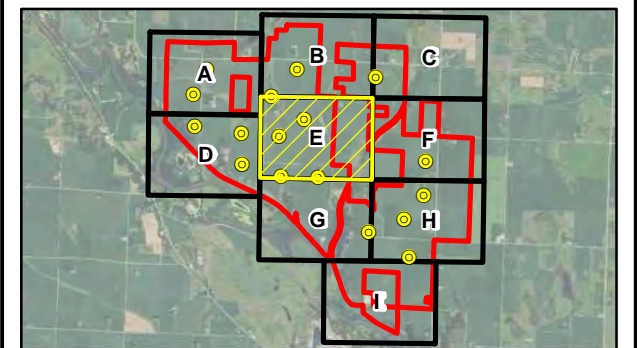


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

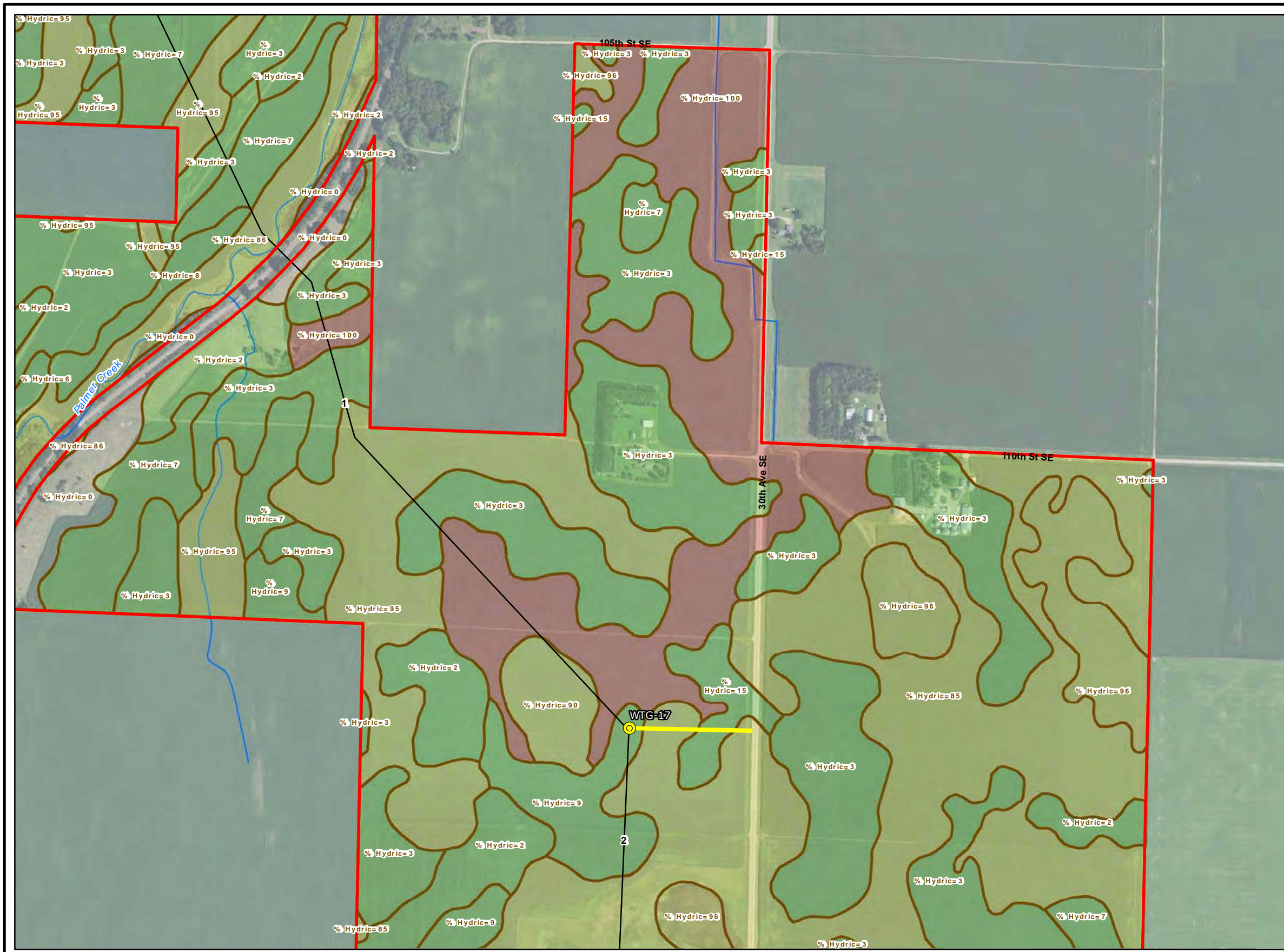
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



AUG 2017  
Figure 4-E





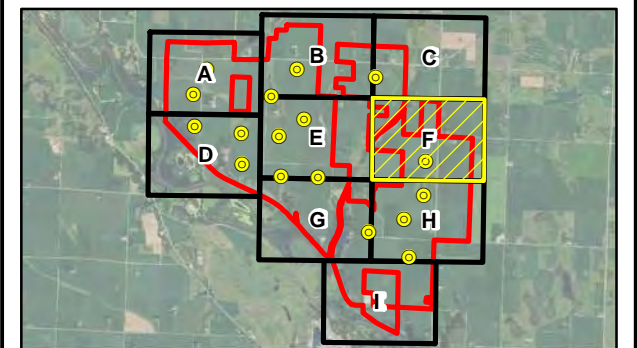
### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)

- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

2015 Aerial Photograph (Source: MN GEO)

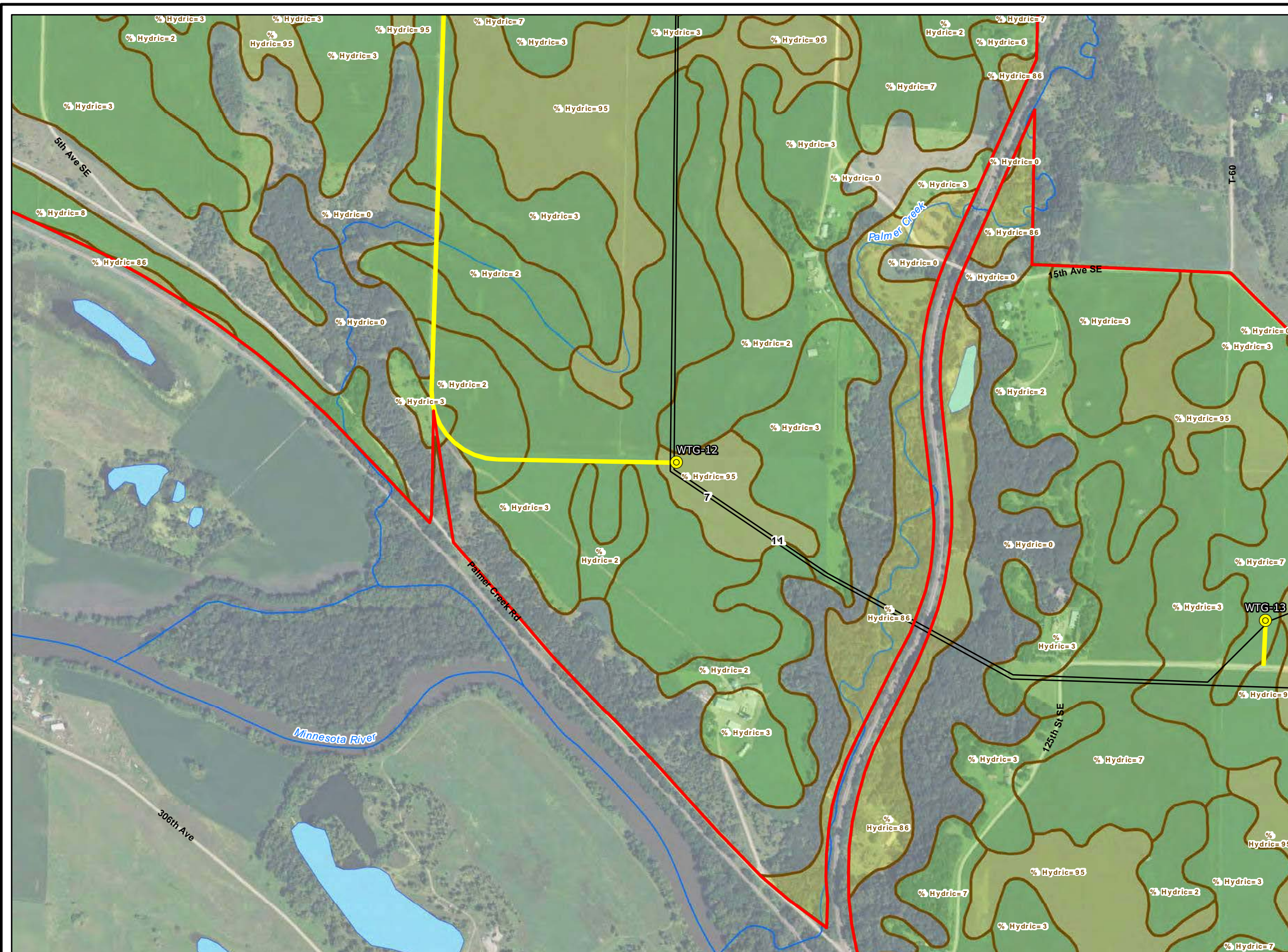
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



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Figure 4-F



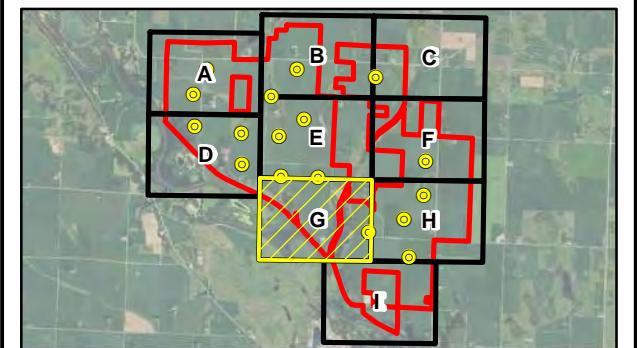


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



AUG 2017  
Figure 4-G



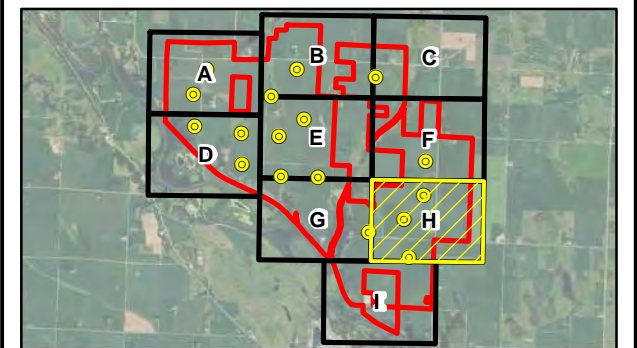


### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

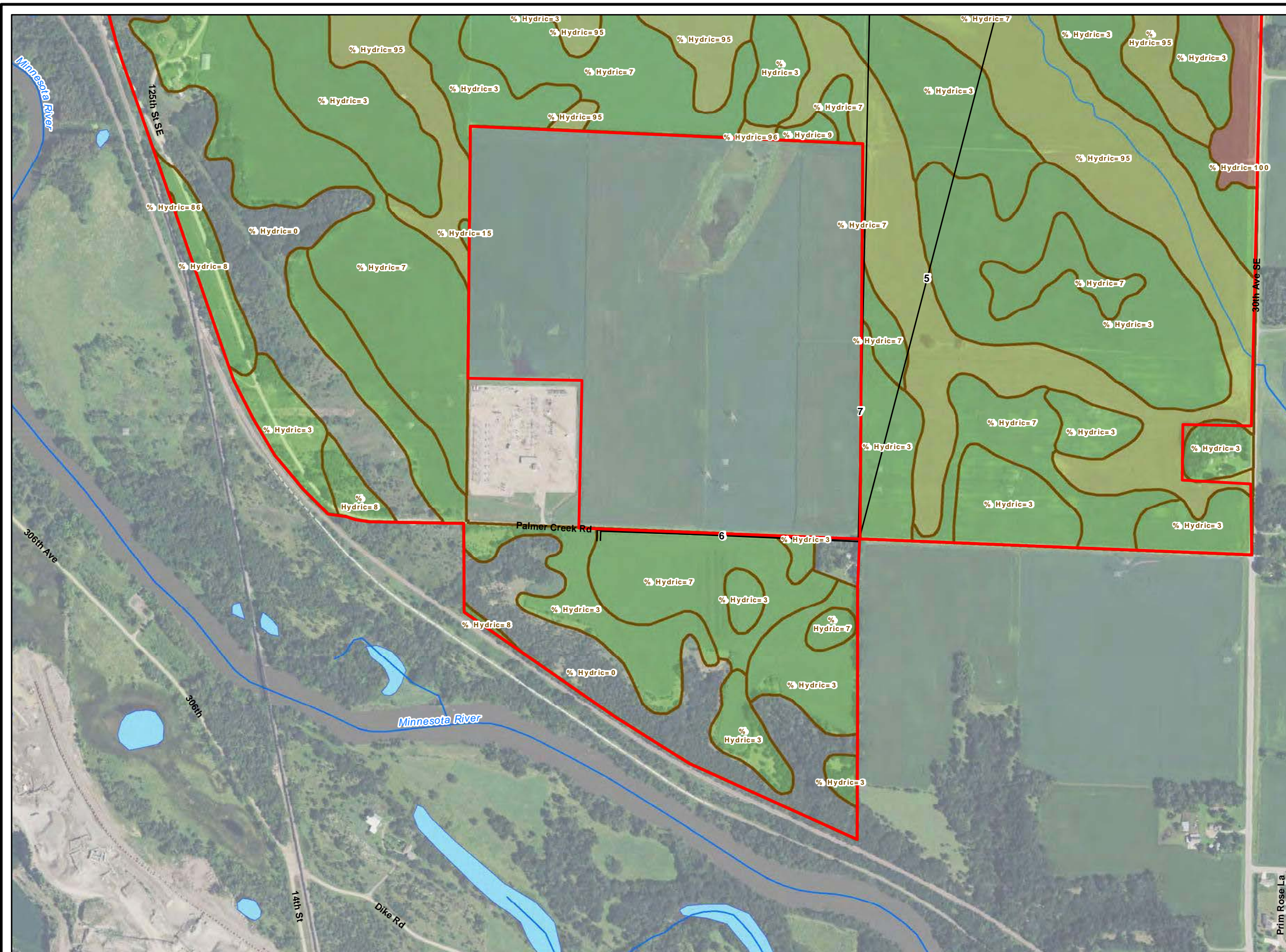
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



AUG 2017  
Figure 4-H





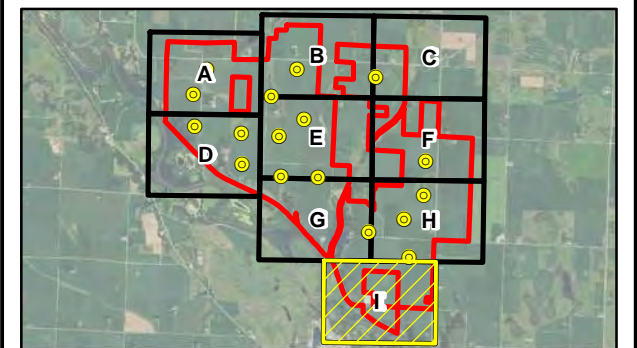
### Legend

- Project Boundary
- Turbine Locations
- Collector Lines
- Access Roads
- Soils

### Hydric Percent

- 0% (Non-Hydric)
- 1-50% (Partially Hydric)
- 51-99% (Mostly Hydric)
- 100% (All Hydric)

- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet

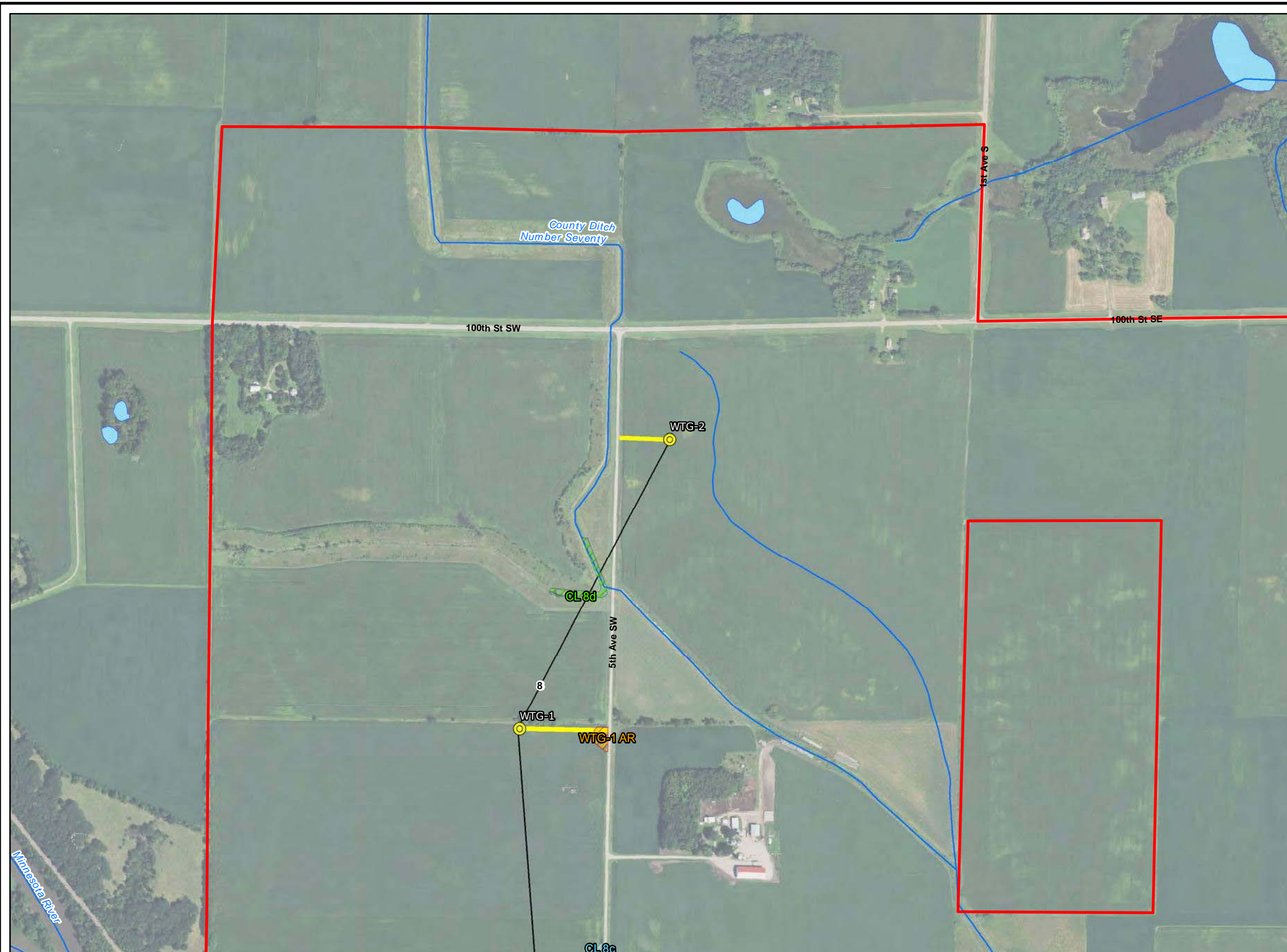
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PALMER'S CREEK WIND FARM, LLC  
Soil Survey Map



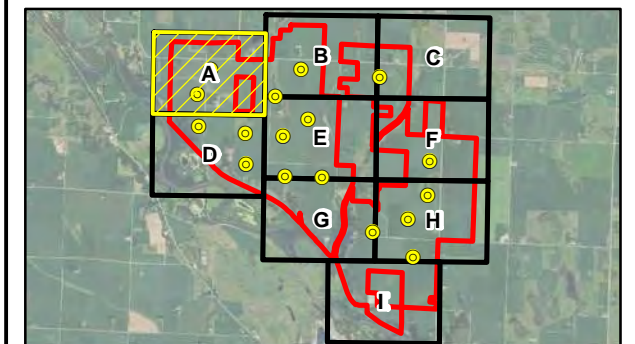
AUG 2017  
Figure 4-I



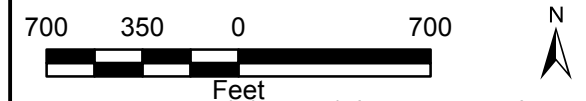


### Legend

- Project Boundary
- Non-Wetland (Field Verified)
- Waterbody/Non-Verified
- Wetland
- Turbine Locations
- Collector Lines
- Access Roads
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

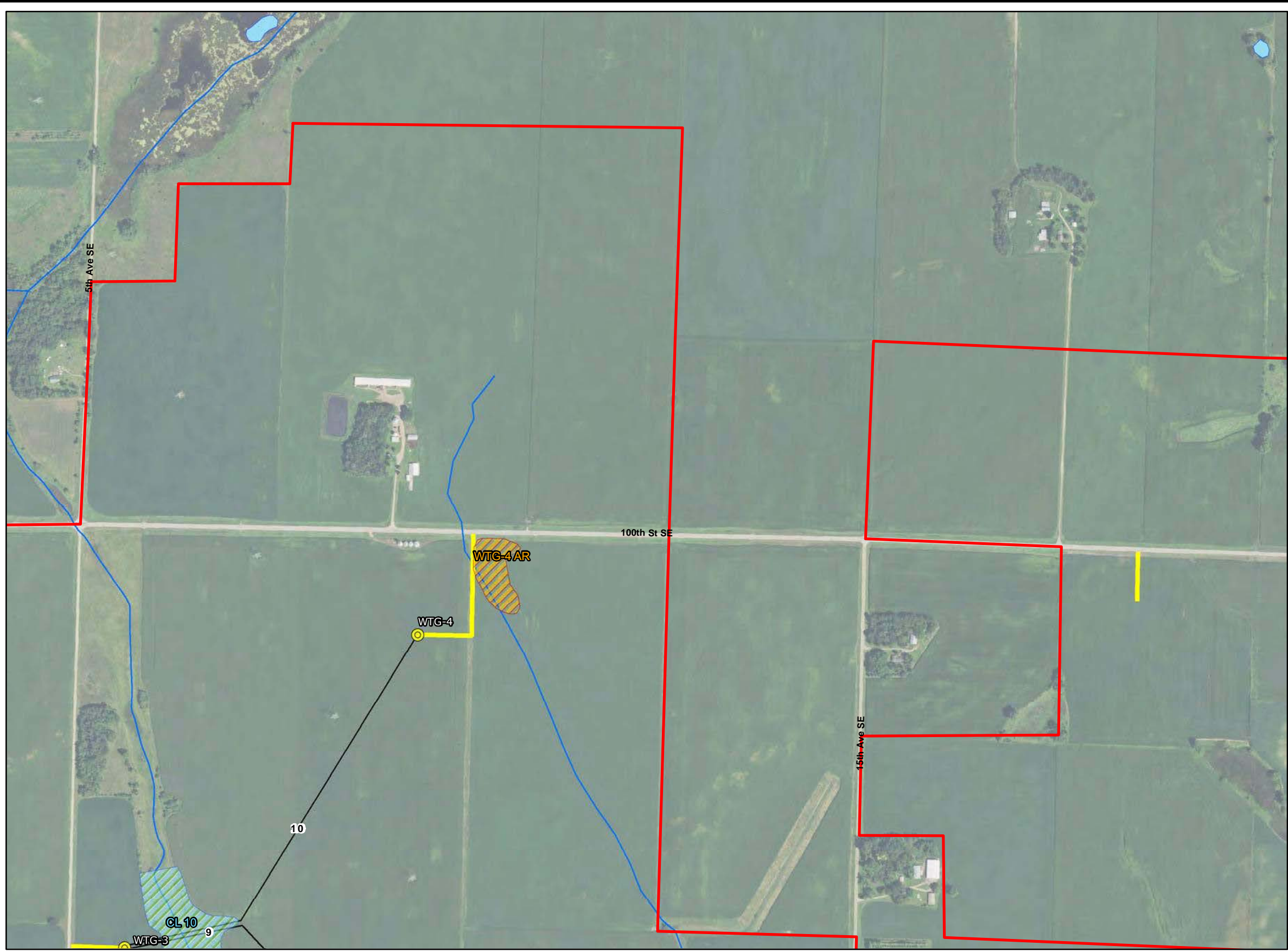
Offsite Wetlands Map





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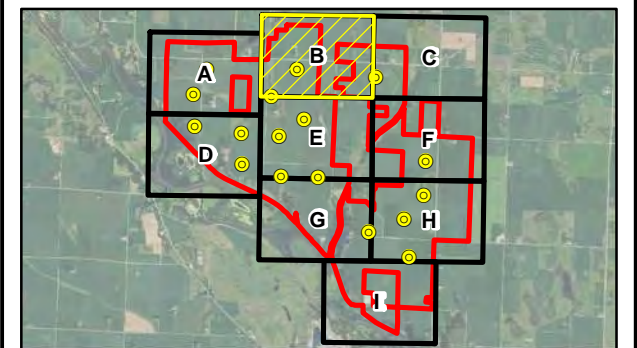
Figure 5-A



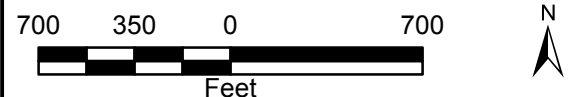


### Legend

-  Project Boundary
-  Non-Wetland (Field Verified)
-  Waterbody/Non-Verified
-  Wetland
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

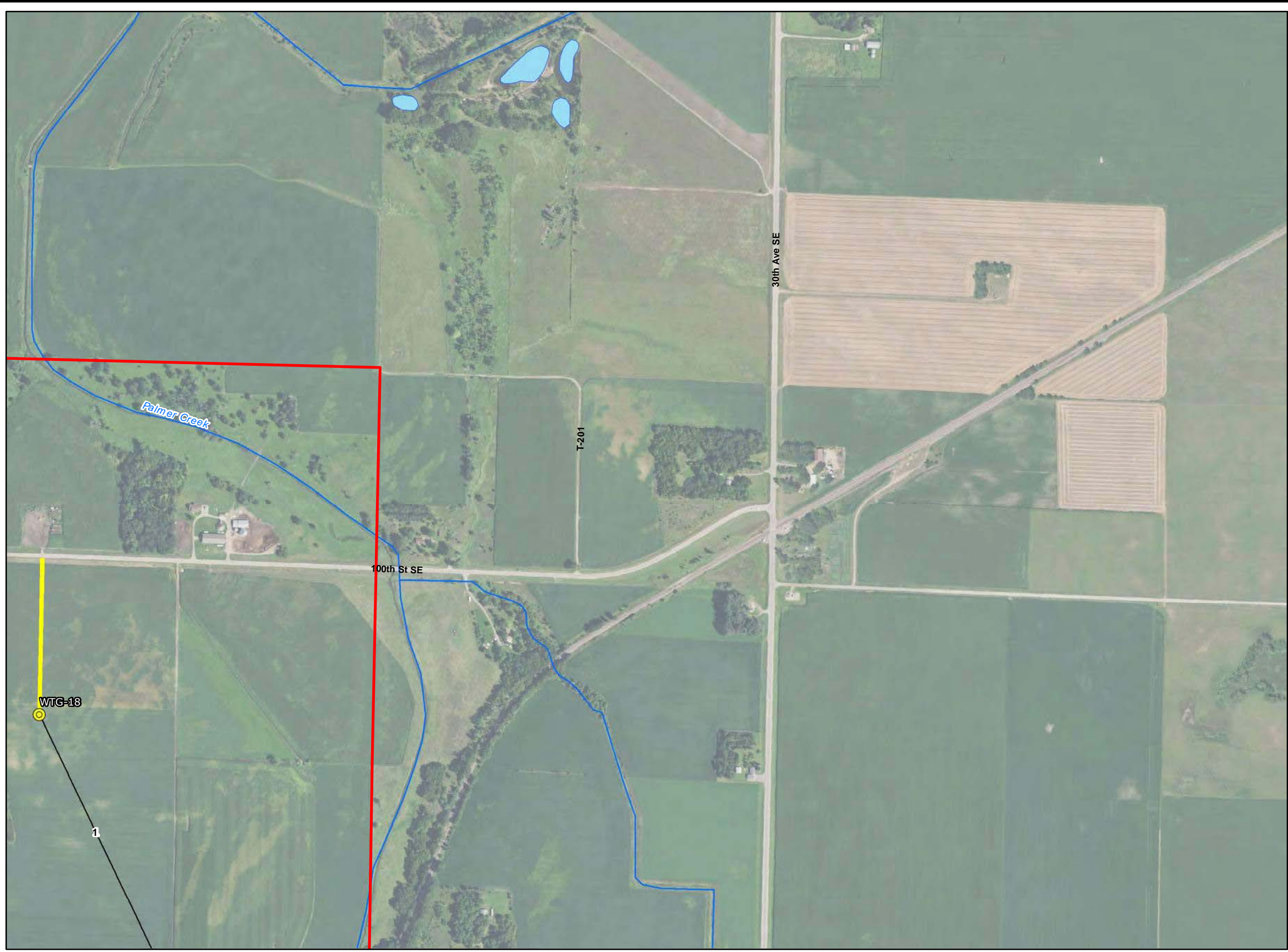
Offsite Wetlands Map












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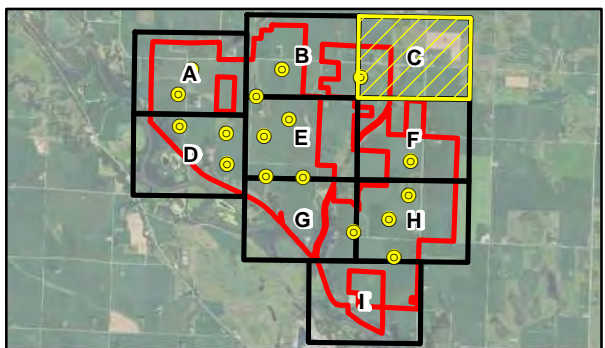
Figure 5-B





**Legend**

-  Project Boundary
-  Non-Wetland (Field Verified)
-  Waterbody/Non-Verified
-  Wetland
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

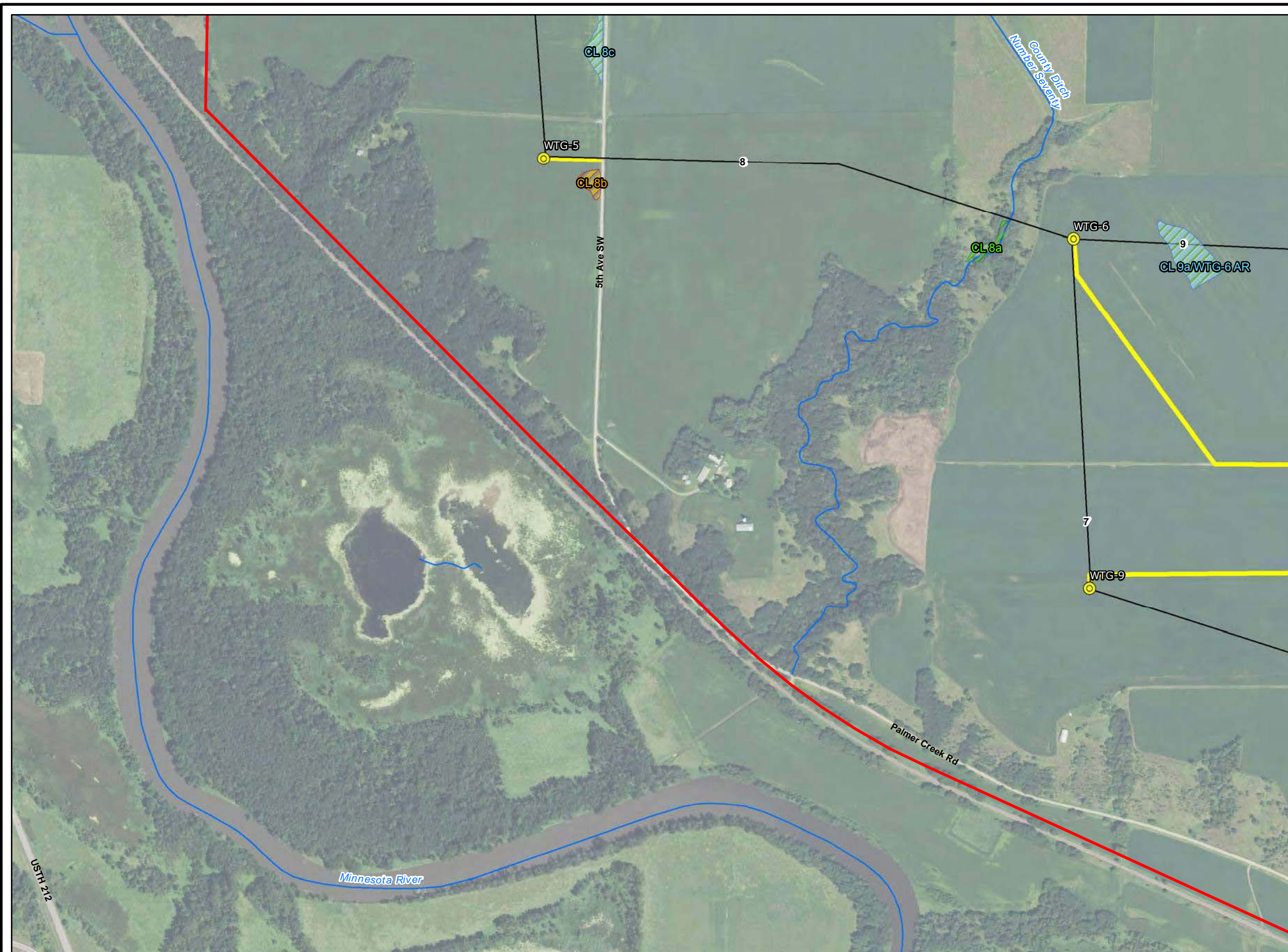
Offsite Wetlands Map



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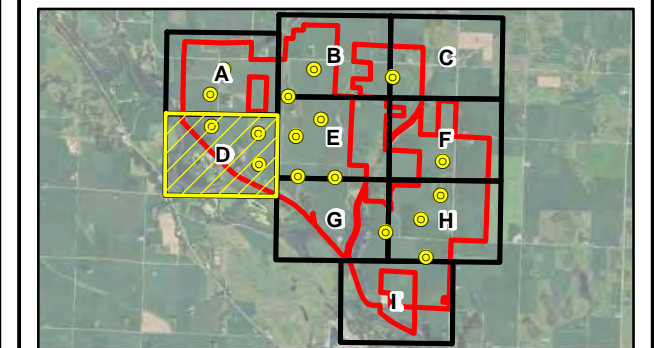
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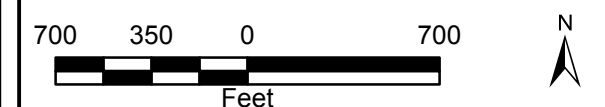


### Legend

- Project Boundary
- Non-Wetland (Field Verified)
- Waterbody/Non-Verified
- Wetland
- Turbine Locations
- Collector Lines
- Access Roads
- NHD
- NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

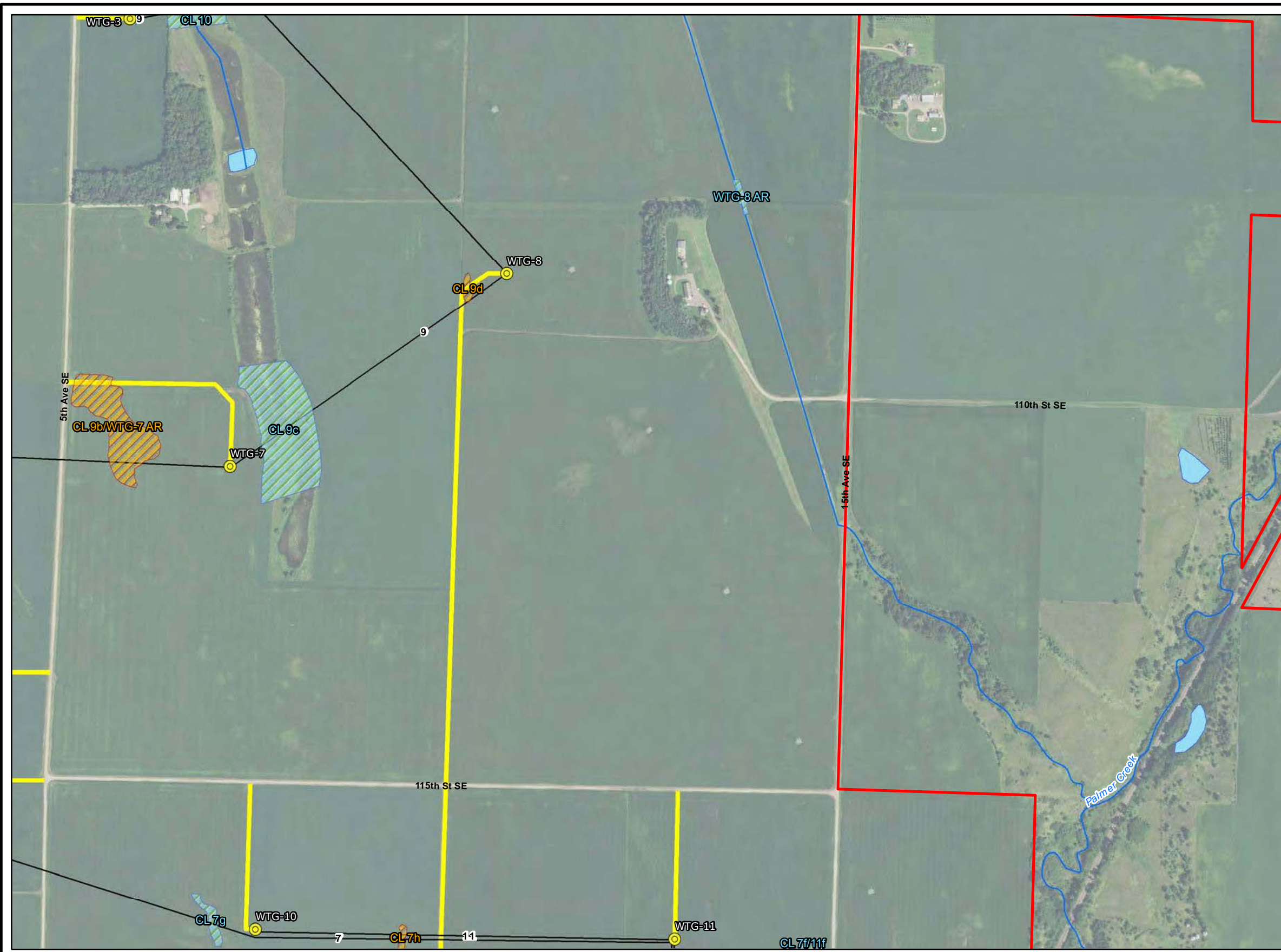
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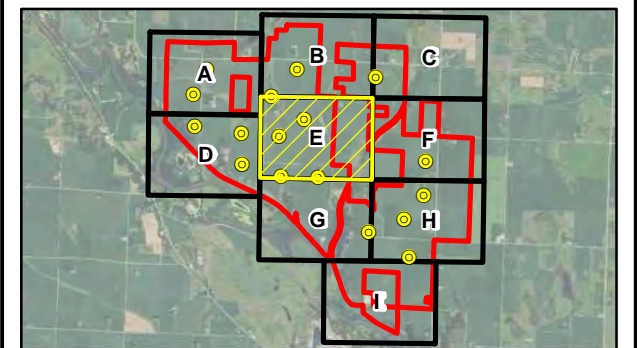
AUG 2017

Figure 5-D





- ### Legend
- Project Boundary
  - Non-Wetland (Field Verified)
  - Waterbody/Non-Verified
  - Wetland
  - Turbine Locations
  - Collector Lines
  - Access Roads
  - NHD
  - NHD Waterbody



Note:  
 Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
 Feet

2015 Aerial Photograph (Source: MN GEO)

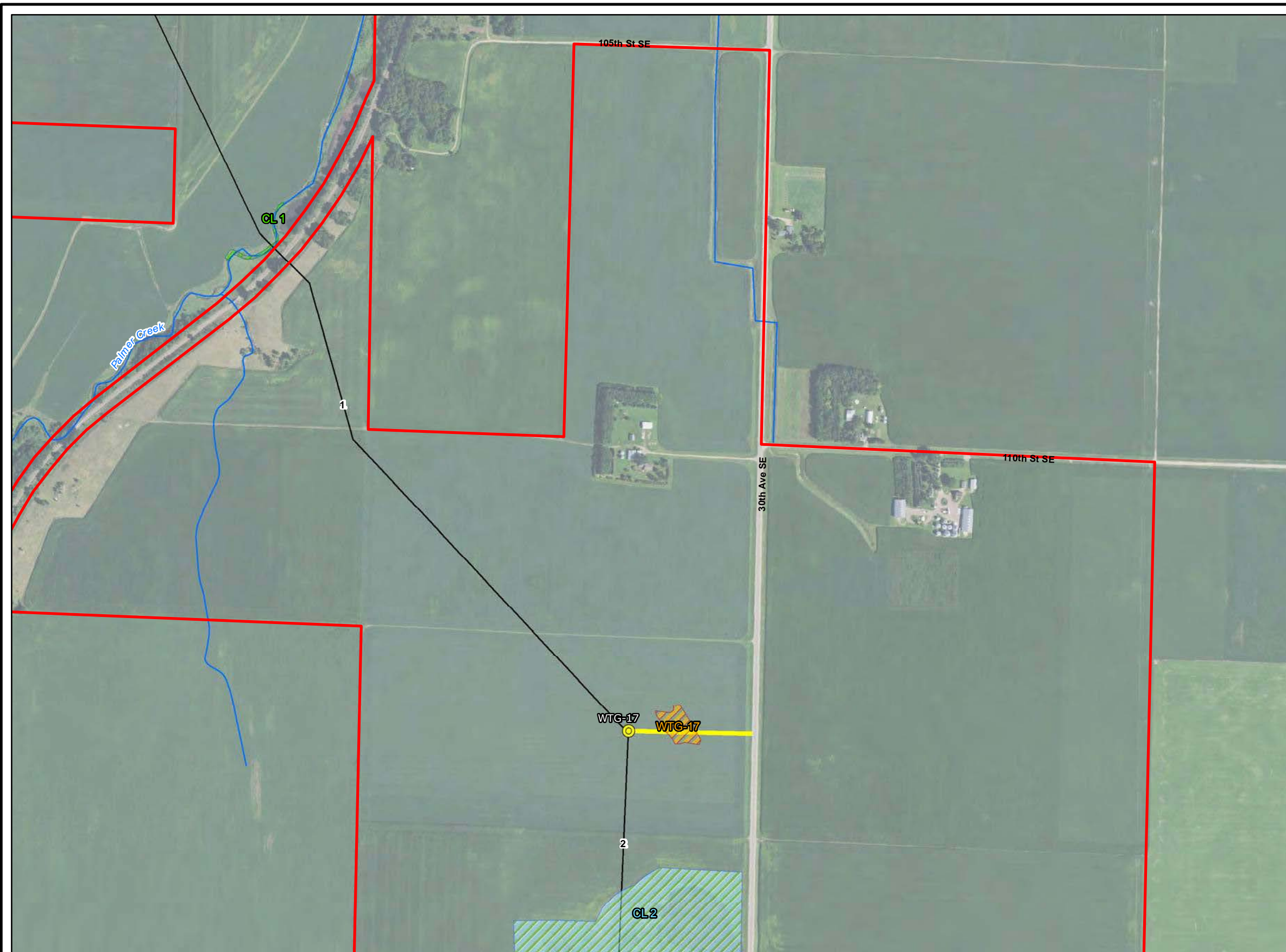
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PALMER'S CREEK WIND FARM, LLC  
 Offsite Wetlands Map





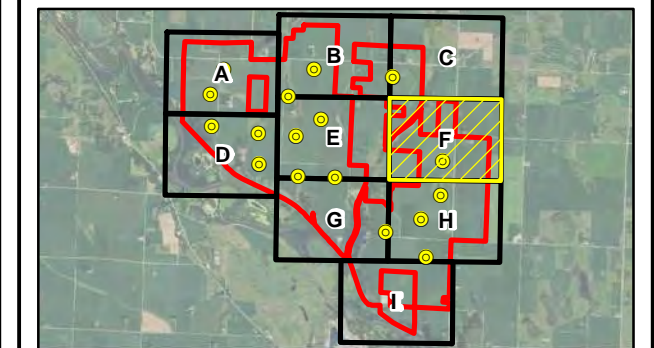
AUG 2017  
 Figure 5-E



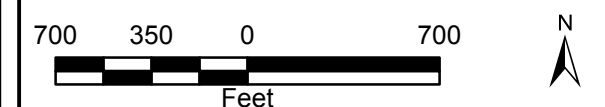


### Legend

-  Project Boundary
-  Non-Wetland (Field Verified)
-  Waterbody/Non-Verified
-  Wetland
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC

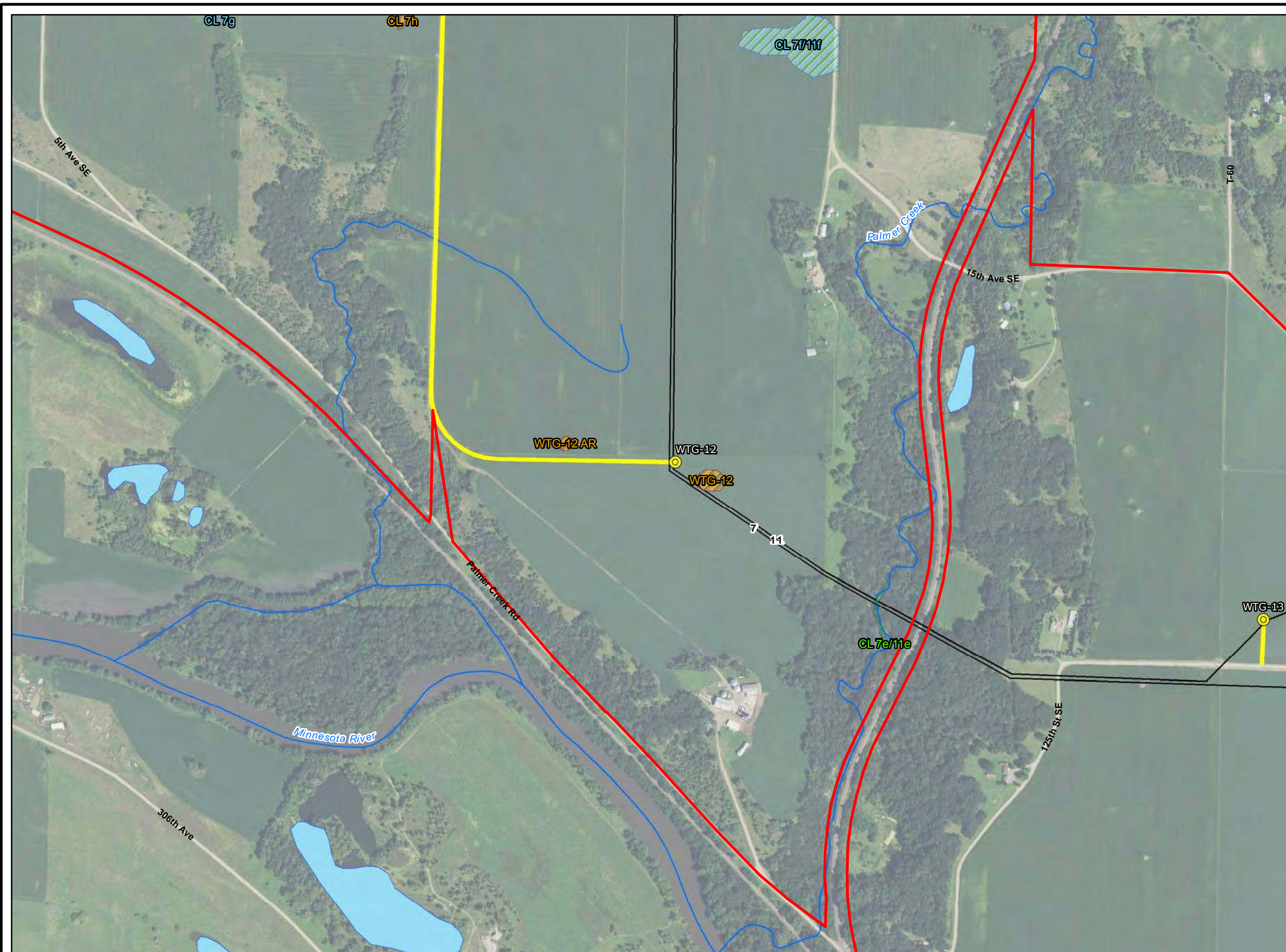
Offsite Wetlands Map





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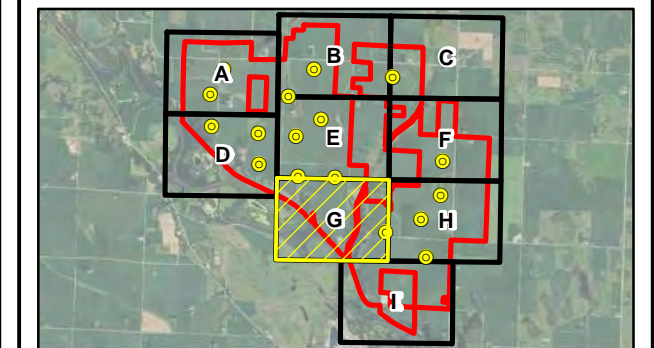
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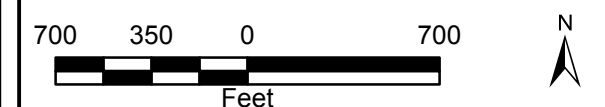


### Legend

-  Project Boundary
-  Non-Wetland (Field Verified)
-  Waterbody/Non-Verified
-  Wetland
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  NHD
-  NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.



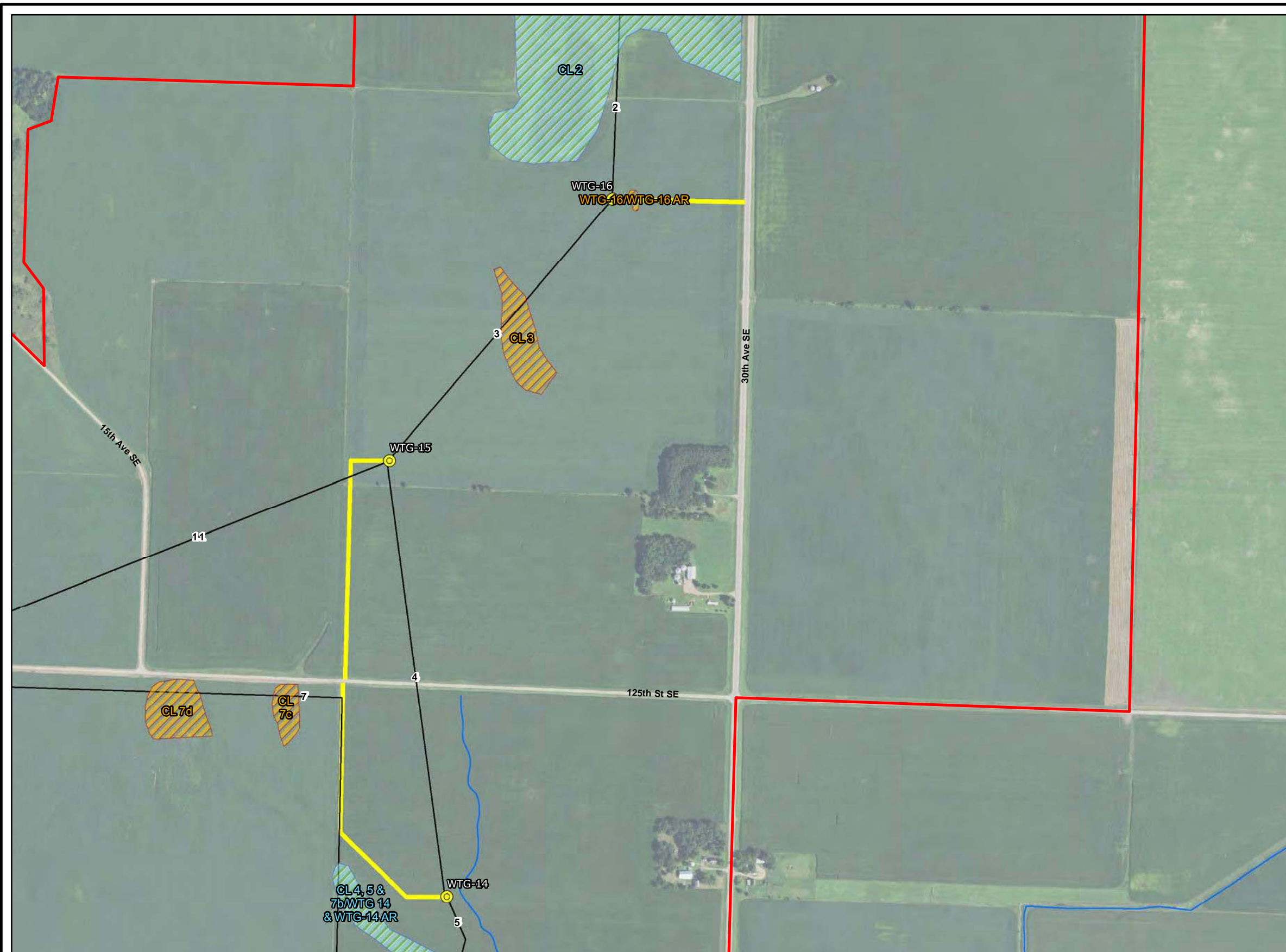
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PALMER'S CREEK WIND FARM, LLC  
Offsite Wetlands Map





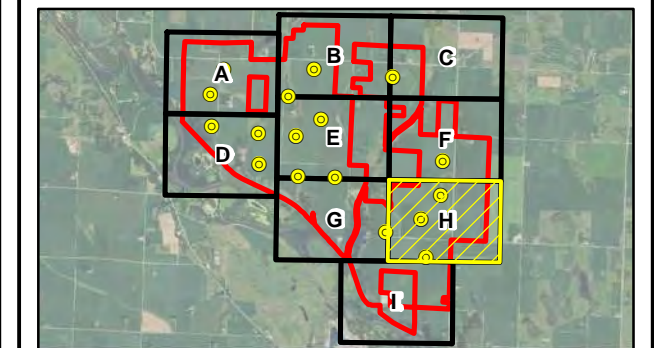
AUG 2017  
Figure 5-G





### Legend

-  Project Boundary
-  Non-Wetland (Field Verified)
-  Waterbody/Non-Verified
-  Wetland
-  Turbine Locations
-  Collector Lines
-  Access Roads
-  NHD
-  NHD Waterbody



Note:  
 Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
 Feet  
 2015 Aerial Photograph (Source: MN GEO)

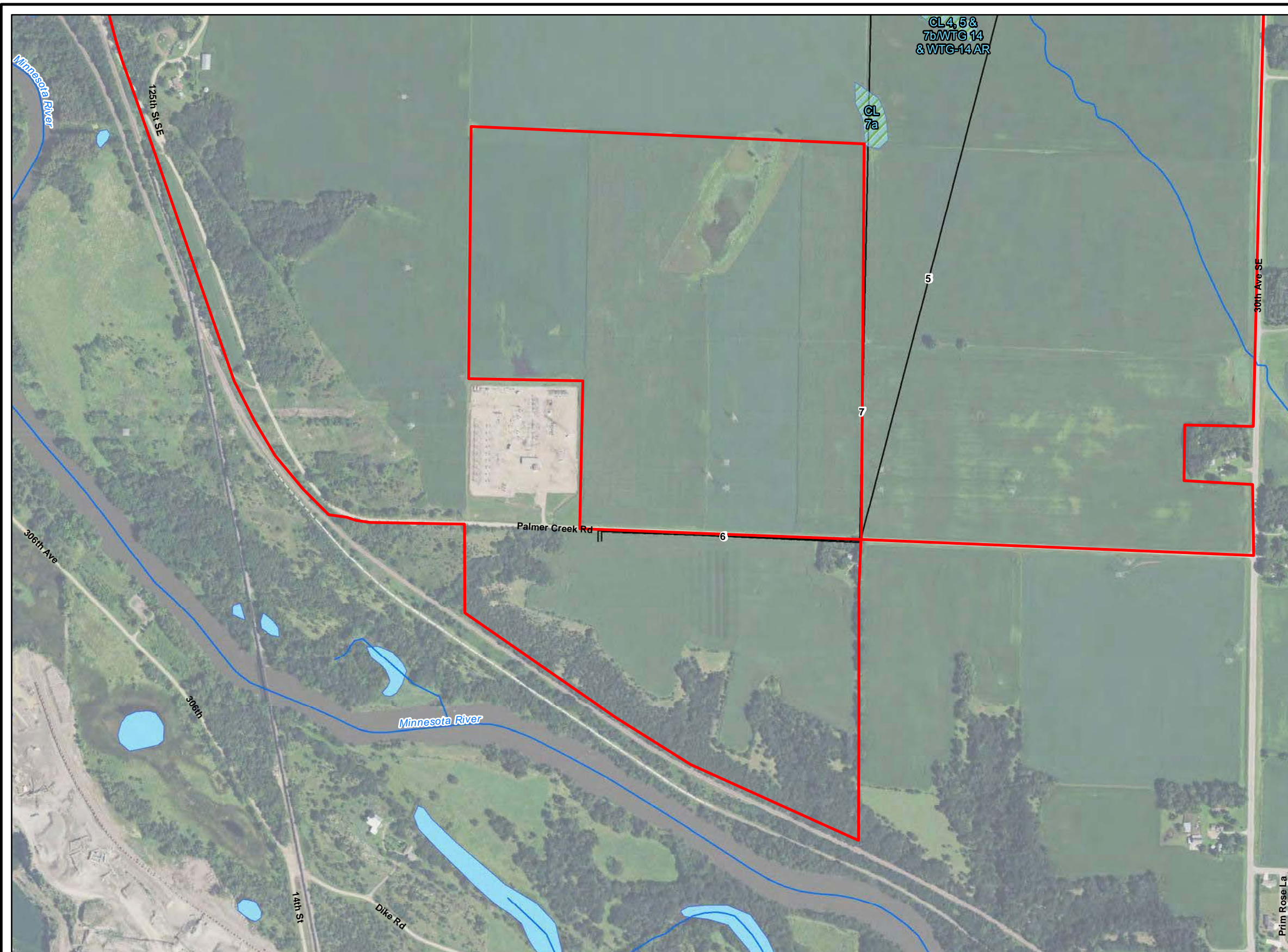
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PALMER'S CREEK WIND FARM, LLC  
 Offsite Wetlands Map

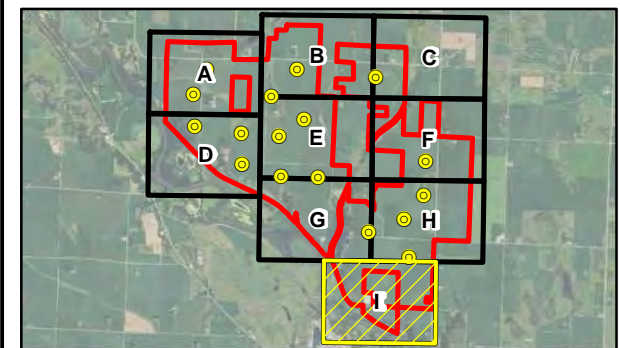


AUG 2017  
 Figure 5-H





- ### Legend
- Project Boundary
  - Non-Wetland (Field Verified)
  - Waterbody/Non-Verified
  - Wetland
  - Turbine Locations
  - Collector Lines
  - Access Roads
  - NHD
  - NHD Waterbody



Note:  
Project features are approximate. Once final design is completed, area will be surveyed prior to construction for Project feature placement.

700 350 0 700  
Feet  
2015 Aerial Photograph (Source: MN GEO)  
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PALMER'S CREEK WIND FARM, LLC  
Offsite Wetlands Map



AUG 2017  
Figure 5-I