

**Courtenay Wind Farm
Case No. PU-13-64**

EXHIBIT 17

At the public hearing on the Certificate of Site Compatibility application (“Application”) for the Courtenay Wind Farm (“Project”), held on July 12, 2013, Courtenay Wind Farm, LLC (“Courtenay”), testified that certain wetland survey field work still needed to be completed for the Project and that coordination with the United States Fish and Wildlife Service (“USFWS”) with respect to the location of the Project facilities on USFWS wetland easements was ongoing. Courtenay indicated that it would file a late-filed exhibit with updated wetland information.

Wetland field survey work has now been completed for all Project facility locations. A Wetlands and Waters Survey Report is attached as **Exhibit A**, which provides a complete discussion of all wetland and water survey work completed for the Project. As noted in the report and in prior testimony, Courtenay will obtain any wetland-related permits required for the Project from the United States Army Corps of Engineers.

Following the public hearing, Courtenay continued its coordination with the USFWS with respect to the location of Project facilities on USFWS wetland easements. As a result of those coordination efforts, the Project has avoided permanent impacts to all wetland basins subject to USFWS wetland easements. In order to do so, Courtenay had to adjust the location of certain access roads and collector lines, and the adjustments made are depicted on the map attached as **Exhibit B**. No turbine locations were affected. All new access road and collector line locations are within the Project’s wetland and cultural resource survey corridors, and are addressed in the attached Wetlands and Waters Survey Report and in the Updated Technical Memorandum – Cultural Resources Investigation provided in late-filed Exhibit 15. Courtenay will obtain a Special Use Permit from the USFWS for any temporary impacts to wetland basins subject to USFWS wetland easements.

A map showing the final Project layout, including the adjustments to access roads and collector lines required to avoid USFWS wetland easements, is attached as **Exhibit C**.

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Wetlands and Waters Survey

**Courtenay Wind Energy Center
Stutsman County, North Dakota**



Prepared for



Prepared by



October 2013

EXHIBIT

A

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ACRONYMS AND ABBREVIATIONS

CWA	Clean Water Act
EPA	Environmental Protection Agency
GIS	Geographic Information System
GPS	global positioning system
MW	megawatt
NHD	National Hydrography Dataset
NRCS	Natural Resource Conservation Service
NRPW	non-relatively permanent water
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHWM	ordinary high water mark
PCN	pre-construction notification
RPW	relatively permanent water
SSURGO	Soil Survey Geographic (database)
TNW	traditional navigable water
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOUS	waters of the United States

1.0 INTRODUCTION

Geronimo Energy (Geronimo) contracted with Tetra Tech, Inc., (Tetra Tech) to conduct a wetlands and waters survey of its proposed Courtenay Wind Energy Project (Project), located in Stutsman County, North Dakota. This Wetlands and Waters Survey Report provides a description of wetlands and other surface waterbodies identified within the survey corridor. The report includes a description of the Project Area, methods used to evaluate and delineate wetlands and waterbodies, agency consultation, survey results and conclusions, and references used to support the conclusions. Appendices include figures illustrating the Project and survey results and site photographs.

1.1 Project Location and Description

The Project Area consists of approximately 24,206 acres located within the northeastern portion of Stutsman County, North Dakota, approximately 15 miles north of Jamestown, North Dakota as shown on **Figure 1**. Construction will occur within portions of 37 sections of land within the Project Area consisting of privately owned agricultural cropland (**Table 1**). See section 2.1 for a description of the survey corridor.

Table 1: Legal Description of the Project Area

County	Township Name	Township	Range	Section(s)
Stutsman	Ashlund	142N	63W	2, 11, 14
	Courtenay	143N	62W	7, 17-20, 28-33
	Durham	143N	63W	1-3, 9-15, 22-26, 36
	Gray	142N	62W	4-8
	Nogesek	144N	63W	34-35

The Project at completion will consist of between 100 and 133 turbines (dependent upon final turbine model selected) with a designed nameplate generating capacity totaling 200 MW. Facilities planned for construction and operation include:

- Turbines
- Turbine access roads;
- Underground electrical collection lines;
- Substation; and
- Permanent meteorological towers.

1.2 Physical Setting and Hydrology

The Project is located in northeastern Stutsman County in the Level IV Drift Plains Ecoregion (Bryce et al. 1998). Wisconsin glaciers covered this region leaving a slightly undulating topography, a thick layer of glacial till and numerous wetlands upon their retreat. The relatively level topography and fertile soils make this region well suited to cultivation, including many of the wetlands which may be drained for cultivation. Historically, grasslands on the drift plains were a transitional mix of tallgrass and shortgrass prairie, which have largely been replaced by cultivated crops. Land elevations in Stutsman County range from 2,000 feet in the western part to 1,340 feet in the James River valley in the southeastern part (USDA NRCS 1995).

The Stutsman County climate is usually quite warm in the summer (the average daily maximum temperature in July is 81 degrees Fahrenheit) with frequent spells of hot weather and occasional cool days. It is cold in winter when arctic air frequently surges over the area (the average daily minimum temperature in January is 2 degrees Fahrenheit). The average annual total precipitation in the County is about 18 inches. Of this about 14 inches, or 75 percent, usually falls in April through September (USDA NRCS 1995).

The Project is located at the intersection of four watershed basins: Fox Lake, Silver Creek, Sevenmile Coulee and Jamestown Reservoir (USGS 2008). The Fox Lake, Silver Creek and Sevenmile Coulee watersheds have poorly developed drainage networks with only a few unnamed intermittent drainages and numerous isolated ponds and wetlands that collect surface water. The west-central portion of the Project Area is located within the Jamestown Reservoir watershed, which has a relatively more developed drainage network and is drained by the James River and its tributaries. There are no perennial or intermittent streams located within the Project Area.

1.3 Regulatory Framework

Tetra Tech completed a wetlands and waters survey to determine if any jurisdictional wetlands or other WOUS exist within the survey corridor that may be regulated by the USACE Omaha District or USFWS Chase Lake Wetland Management District. Potential temporary and permanent impacts to these wetlands or WOUS during the construction of the Project facilities were examined.

1.3.1 U.S. Army Corps of Engineers

Wetlands with “jurisdictional” status are WOUS as defined by Section 404 of the CWA. WOUS are regulated by the USACE and the U.S. EPA. Several classes of waterbodies are subject to federal jurisdiction under the CWA, including: TNWs; wetlands adjacent to TNWs; non-navigable tributaries of TNWs that are relatively permanent (RPWs); and wetlands that directly abut RPWs (USACE 2008)¹.

The EPA and the USACE are required to assert jurisdiction over other certain types of waters based on a fact-specific analysis as to whether they have a significant nexus with a TNW (USACE 2007). These types of waters include:

- Non-navigable tributaries that are relatively non-permanent (NRPW);
- Wetlands adjacent to NRPWs; and,
- Wetlands adjacent to, but not directly abutting, an RPW.

The regulations define adjacent as “bordering, contiguous, or neighboring,” and state that wetlands separated from other WOUS by barriers such as natural river berms, man-made dikes and beach dunes may be considered adjacent wetlands. The ruling also requires that agencies not generally assert jurisdiction over the following features:

- Swales or erosional features (e.g. gullies, small washes characterized by low volume, infrequent or short duration of flow); and,
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

¹ Draft revised guidance regarding jurisdiction of waters under the CWA was issued by the USACE and EPA on June 27, 2011 (USACE and EPA 2011). The draft guidance provides clarification on waters not regulated by the CWA.

Guidance issued jointly by the EPA and USACE states that agencies will apply the significant nexus standards as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters; and,
- Significant nexus includes consideration of hydrologic and ecological factors.

The regulations specify that tributaries to WOUS should be considered WOUS. In the absence of adjacent wetlands, lateral jurisdiction over non-tidal waters extends to the OHWM. The definition of the OHWM is “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (65 *Fed. Reg.* 12823, 2000).

Only the USACE can make a final determination on the jurisdiction of a wetland at a site. Therefore, jurisdictional determinations provided in this report are preliminary and are based on application of the above guidance following desk top review of relevant information and field inspection. If development is to occur, the USACE determines the type of permit, if any, that may be required under the CWA.

Certain developments in WOUS may be permitted by the USACE under a NWP. NWPs that may apply to the Project include NWP 51 for Land-Based Renewable Energy Generation Facilities, NWP 12 for Utility Line Activities and NWP 14 for Linear Transportation Projects². To qualify for NWP authorization, the prospective permittee must comply with the general conditions identified within the relevant NWP (USACE 2012). The following summarizes thresholds for total impacts, PCN, and mitigation requirements under NWP 51, NWP 12 and NWP 14:

- The activity cannot result in impacts of greater than 0.5 acre in non-tidal WOUS including the loss of no more than 300 linear feet of stream bed. For impacts greater than 0.5 acre, application for an Individual Permit with the USACE must be submitted;
- A PCN is required for all impacts permitted under NWP 51,
- A PCN is required for impacts between 0.1 acre and 0.5 acre under NWP 12 and NWP 14;
- A PCN may be required for impacts less than 0.1 acre under NWP 12 and NWP 14 if certain other criteria are met;
- Mitigation is required for impacts that exceed 0.1 acre;

Impacts for linear projects, such as utilities and roads, are typically assessed at each crossing and are not cumulative across a project. However, individual channels of a braided stream, individual arms of a large irregular wetland or lake, a stream and its adjacent wetlands, etc. are not separate waterbodies and such crossings cannot be considered separately.

1.3.2 U.S. Fish and Wildlife Service

The USFWS Chase Lake Wetland Management District manages wetland easements on private lands in Stutsman and Wells counties in central North Dakota. The easements afford permanent protection to wetland basins that provide important seasonal habitat to waterfowl and shorebird species during the

² The North Dakota Regulatory Office of the USACE indicated in a telephone conversation that wetlands impacted by collection line or access road construction for a wind energy facility may be permitted under NWP 12 or NWP 14 rather than NWP 51 (Patsy Crook, personal communication, November 27, 2012).

spring migration and nesting seasons. The easements do not allow the burning, leveling, filling, and/or draining of protected wetland basins without a permit from the USFWS. However, landowners are permitted to till and farm these areas when they are not wet. No permanent impacts to these basins are allowed from wind farm construction activities. Temporary impacts may be permitted, but the original elevation contours must be restored when construction is complete. Approximately 7,870 acres (33%) of the Project Area is located on USFWS wetland easement tracts, which are depicted in **Figure 1**.

2.0 AREA OF ANALYSIS AND IMPACT

2.1 Area of Analysis

The locations of proposed Project facilities (layout dated June 3, 2013 [substation], June 24, 2013 [met towers], July 24, 2013 [turbines], August 5, 2013 [collection lines] and August 30, 2013 [access roads]) were surveyed to determine the presence of potential wetlands or other WOUS following USACE definitions. GIS files of the facility layout provided by Geronimo were used to define the survey corridor.

The survey corridor is defined as the area within the Project Area specifically evaluated for wetlands and WOUS as part of this survey and includes:

- 136 wind turbine locations within a 300-foot radius survey area;
- Approximately 36.8 miles of access roads within a 250-foot wide survey corridor (125 feet on either side of the centerline);
- Approximately 58.9 miles of electrical collection lines within a 150-foot wide survey corridor (75 feet on either side of the centerline);
- Approximately 12 acre substation; and,
- 4 permanent meteorological towers within a 100-foot radius survey area.

2.2 Area of Impact

For the purposes of this investigation, permanent impacts are considered to be the Project footprint during operation. Temporary impacts are considered to be those impacts that result during construction to accommodate equipment and temporary activities outside of the areas that will remain as the Project footprint during operation. **Table 2** outlines the temporary and permanent impacts anticipated for the Project.

After construction, the temporary construction areas adjacent to the turbine pads, service roads, collection lines and construction laydown area will be restored. The site will be graded to pre-construction contours, soil will be loosened if needed, and the site will be seeded.

Table 2: Project Impact Assumptions

Facility	Permanent Impacts	Temporary Impacts	Survey Corridor
Turbine	21 foot radius	135 foot radius	300 foot radius
Access Road	16 foot corridor	100 foot corridor	250 foot corridor
Collection Line	None	100 foot corridor	150 foot corridor
Substation	6 acres	10 acres	12 acres
Meteorological Towers	4 foot radius	10 foot radius	100 foot radius

3.0 METHODS

Tetra Tech conducted a wetlands and waters survey that included identification of jurisdictional and non-jurisdictional wetlands and non-wetland features within the survey corridor based on the preliminary Project layout (turbines, access roads, collection lines, substation and permanent meteorological towers).

3.1 Desktop Data Review

Prior to and during the wetlands and waters survey, available information was reviewed to identify areas that may exhibit wetland and other surface water characteristics. These data layers were evaluated as a whole to make probable wetland and other waters determinations. This included review of aerial photographs, the USGS NHD, the NWI, the SSURGO database, and the Stutsman County Soil Survey.

3.2 Wetlands and Waters Survey

The purpose of the wetlands and waters survey was to identify the presence and location of potential wetlands and other surface waters within the survey corridor. Wetlands were not delineated in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement (USACE 2010). Approximate boundaries for potential wetlands identified within the survey corridor were estimated based on reviewed desktop data and visual indications of hydrology, hydrophytic vegetation and topography. Observations for each potential wetland identified during the survey were documented in a field notebook that is on record at the Tetra Tech office in Bloomington, Minnesota

3.2.1 Digital Capture of Data

A GIS specialist designed a geodatabase specifically for the Project that was used to capture wetland and non-wetland feature location data in the field using Trimble GPS technology, as well as to manage and display features for quality control and electronic deliverables. The geodatabase contains three types of feature classes for data capture: wetland points, wetland lines, and wetland polygons. Additional attribute data collected in the field included:

- Date feature was collected;
- Identification number;
- Wetland specialist who evaluated and collected the feature;
- Feature type: seasonally flooded wetland (Type 1), shallow marsh wetland (Type 3), RPW, NRPW, etc.;
- Notes as to whether the feature extends beyond what was collected, in what direction and approximately how far;
- Probable USACE jurisdictional status; and,
- Recommendation for Project facilities (e.g., avoidance vs. no modification required).

The geodatabase was loaded on a Trimble GeoExplorer 6000 Series hand-held GeoXH GPS with sub-meter accuracy running both ESRI's ArcPad 10 and Trimble GPS Correct Software Packages.

After the field data were post-processed, the biologists who captured the field data conducted a quality control review of the geodatabase to ensure the features collected correspond with field observations.

4.0 RESULTS

4.1 Desktop Data Review

The following sections describe the data sources reviewed prior to, and utilized during the wetlands and waters survey. These data sources include topographic maps, recent aerial photography, NHD, NWI, SSURGO, and the Stutsman County soil survey.

4.1.1 Topographic Maps

The Courtenay (1951), Courtenay NW (1990), Fried (1990) and Spiritwood Lake (1951) 7.5 Minute USGS Topographic Quadrangles were reviewed and perennial, intermittent, and ephemeral streams, ponds and wetlands that could possibly be affected by the project were identified and investigated during the wetlands and waters survey. The topographic map data are presented on **Figure 1**.

4.1.2 Aerial Photographs

Recent aerial photography for the Project Area was obtained from the USDA (2012). The reviewed 2012 aerial photography showed the Project Area to be agricultural dominated by cultivated fields and relatively few grassland areas (hay or Conservation Reserve Program lands). The region appears to have a poorly developed drainage system with no major streams or drainages, and a high density of isolated lakes, ponds and wetlands. Most potential wetland areas identified during review of the aerial photography coincided with NWI data features (see section 4.1.4 below), however most potential wetlands appear to be much larger in the aerial photographs than they are depicted in the NWI. Potential wetlands identified during review of the aerial photography within the survey corridor were investigated during the wetlands and waters survey. Reviewed aerial photography is presented on **Figure 2**.

4.1.3 National Hydrography Dataset

The NHD was downloaded from the USGS NHD website (USGS 2008). The NHD does not depict any streams within the Project Area.

4.1.4 National Wetlands Inventory

The NWI data for the Project Area was downloaded from the USFWS NWI website (2010). The NWI data indicated the presence of 235 freshwater emergent wetlands in the survey corridor. NWI wetlands identified within the survey corridor were investigated during the wetlands and waters survey. The NWI data are presented on **Figure 2**.

4.1.5 Soil Survey

Soils data for Stutsman County were obtained from the USDA NRCS Stutsman County Soil Survey (1995) and the NRCS SSURGO database. This information was used to study the distribution of hydric soils within the Project Area. According to reviewed data, there are 23 soil series represented within the survey corridor. Soil, as it relates to wetland delineations, must be classified as a hydric soil for the area to qualify as a wetland in accordance with the 1987 Manual (Environmental Laboratory 1987) and the Regional Supplement (USACE 2010). Hydric soils are defined as soils that are formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop

anaerobic conditions. In the SSURGO dataset, soils may be classified as not hydric (all series components rated as not hydric), partially hydric (at least one component rated as hydric and at least one component rated as not hydric) or all hydric (all series components rated as hydric). Nearly all of the soils in the survey corridor (99.4%) are classified as partially hydric with the remaining 0.6% classified as not hydric or water.

4.2 Wetlands and Waters Survey

The wetlands and waters survey was conducted for the entire survey corridor for the Project from June 12-18, 2013. Additional surveys were conducted on July 9, 2013, August 13-14, 2013, August 20-23, 2013, and September 18-20, 2013 to evaluate modifications to Project facility locations.

During the wetlands and waters survey, Tetra Tech identified 390 wetlands, two drainage ditches, two ponds and one drainage swale. Wetlands were classified using the USFWS Circular 39 classification system (Shaw and Fredine 1956). The following wetland types were observed:

Type 1: Seasonally Flooded Basins or Flats

These wetlands may be inundated or saturated for variable periods, but are usually well drained during much of the growing season. Vegetation is variable.

Type 2: Inland Fresh Meadows

These wetlands are typically not inundated, but soils remain saturated within a few inches of the surface during most of the growing season. Vegetation typically includes grasses, sedges, rushes and various broad-leaved plants.

Type 3: Inland Shallow Fresh Marshes

These wetlands typically have soils that remain saturated during the growing season and are commonly inundated with six inches or more of water. Vegetation typically includes grasses, bulrushes, spikerushes and various marsh plants including cattails, arrowheads and smartweeds.

Type 4: Inland Deep Fresh Marshes

These wetlands are typically inundated with six inches to three feet or more of water during the growing season. Vegetation typically includes cattails, reeds, bulrushes, spikerushes and wild rice as well as pondweeds, coontail, watermilfoils, duckweeds, and waterlilies in deeper water.

Type 5: Inland Open Fresh Water

These wetlands include shallow ponds and reservoirs less than 10 feet deep fringed with emergent wetland vegetation. Vegetation typically includes pondweeds, coontail, watermilfoils, and waterlilies.

Of the 390 wetlands identified, the majority were classified as Type 1 or Type 3 (178 and 154, respectively). The remaining wetlands included 9 classified as Type 2, 25 as Type 4, and 24 as Type 5. Wetlands were classified based on their “wettest” component and many of the Type 3 and greater classified wetlands include bands of drier classes of wetlands on their edges. Wetlands identified during the wetlands and waters survey are presented on **Figure 2** and representative photographs are presented in **Appendix B**.

4.2.1 Vegetation Observations

Wetlands observed within the survey corridor were typically vegetated with a variety of wetland plants typical of the central North Dakota ecotone. Many of the Type 1 and Type 2 wetlands were observed to be cultivated and were either barren or vegetated with crops (wheat, soybeans or corn). Vegetation observed in non-cultivated Type 1 and Type 2 wetlands included grasses (bluejoint [*Calamagrostis*

canadensis], large barnyard grass [*Echinochloa crus-galli*], fox-tail barley [*Hordeum jubatum*], reed canary grass [*Phalaris arundinacea*], and freshwater cord grass [*Spartina pectinata*]), sedges (*Carex sp.*), foxtails (*Setaria sp.*), horsetails (*Equisetum sp.*), and various forbs. Type 3 and Type 4 wetlands were often dominated by cattails (*Typha angustifolia*). Other species observed in Type 3 and Type 4 wetlands included: American water-plantain (*Alisma subcordatum*), sedges (*Carex sp.*), spike-rushes (*Eleocharis sp.*), smartweeds (*Persicaria sp.*), curly dock (*Rumex crispus*), and soft-stem club-rush (*Schoenoplectus tabernaemontani*). Deep-water portions of Type 4 and Type 5 wetlands were not observed during the survey for indications of non-emergent (submerged or floating) vegetation.

4.2.2 Hydrologic Observations

The Project is located within the prairie pothole region of North Dakota. This region is characterized by the numerous small, depressional wetlands present after the retreat of the glaciers of the Pleistocene epoch approximately 12,000 years ago (Euliss et al. 1999). No TNWs, RPWs or NRPWs were identified within the Project Area. All of the wetlands and waterbodies observed in survey corridor appeared to be isolated, closed depressions typical of the prairie pothole region.

4.2.3 Jurisdictional Determinations

Each wetland and water feature identified during the wetlands and waters survey was reviewed for potential USACE jurisdiction in accordance with USACE and EPA guidance (USACE 2007; USACE and EPA 2007) and a preliminary jurisdictional determination was recommended. In order to evaluate the significant nexus of identified wetlands and water features the following questions were considered:

Does the tributary, in combination with its adjacent wetlands (if any):³

- Have the capacity to carry pollutants or flood waters to, or reduce the amount of pollutants or flood waters reaching a TNW?
- Provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Have the capacity to transfer nutrients and organic carbon that support downstream food webs?
- Have other relationships to the physical, chemical, or biological integrity of the TNW?

No TNWs, RPWs, or NRPWs were identified within the survey corridor. Application of the significant nexus criteria to the wetlands and water features identified during the wetlands and waters survey found that none of the identified wetlands or waters have a significant nexus to a TNW. Tetra Tech recommends that none of the wetlands or water features identified during the wetlands and waters survey are subject to Section 404 jurisdiction. However, only the USACE can make the final determination on the jurisdiction of wetlands and waters.

4.2.4 Data and Area of Impact Analysis

Temporary and permanent impact areas were established for the Project as described in **Table 2**. An analysis of potential wetlands and waters impacted by the Project was conducted based on the results of the wetlands and waters survey and established Project impact areas. Impacts were not calculated for drainage swales or drainage ditches as these features are not generally considered USACE jurisdictional

³ These questions were answered using visual indications, as well as desk top sources, such as aerial photography and the NHD dataset. Limitations to the nexus determination include: (1) one-time evaluation of the area, which limits understanding of the hydrology of the potential tributary; and (2) limited areal extent of the evaluation, which limits investigation of downstream mechanics and potential for the waterbody to reach tributaries to TNWs.

and impacts to these features do not require notification to the USACE. Based on the analysis conducted, a total of 209 wetland and water features may be impacted by the Project. This includes permanent and temporary impacts to two wetlands, and temporary impacts only to 206 wetlands and one pond.

The 209 wetlands and waters potentially affected by the Project are listed in **Table 3** in descending order of potential impact area.

Table 3: Potential Wetlands and Waters Impacts

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
C068	143, 62, 19 143, 63, 24	Seasonally Flooded Basin	None	Substation	0.631	0.000	0.631
C127	143, 62, 32 143, 62, 33	Shallow Marsh	None	Access Road, Collection Line	0.155	2.707	2.862
A057	143, 63, 10	Shallow Open Water	None	Access Road, Collection Line	0.000	5.565	5.565
A094	143, 62, 32	Deep Marsh	None	Collection Line	0.000	4.771	4.771
B062	143, 63, 13 143, 63, 14	Shallow Open Water	None	Collection Line	0.000	3.422	3.422
C101	143, 62, 29 143, 62, 30	Shallow Open Water	None	Collection Line	0.000	3.362	3.362
A096	142, 62, 05 142, 62, 06 143, 62, 32	Shallow Open Water	None	Collection Line	0.000	3.335	3.335
B052a	143, 62, 07 143, 63, 12	Shallow Marsh	USFWS	Turbine, Collection Line	0.000	3.196	3.196
A105	142, 62, 06	Shallow Open Water	USFWS	Collection Line	0.000	3.153	3.153
B049	143, 63, 12	Shallow Open Water	USFWS	Collection Line	0.000	2.555	2.555
A097	142, 62, 05	Deep Marsh	None	Collection Line	0.000	2.415	2.415
C079	143, 62, 19	Shallow Open Water	None	Collection Line	0.000	2.395	2.395
A040	143, 63, 01 143, 63, 02	Shallow Marsh	USFWS	Collection Line	0.000	2.374	2.374
C062	143, 62, 18	Deep Marsh	USFWS	Collection Line	0.000	2.216	2.216
C045	143, 63, 13	Shallow Marsh	USFWS	Access Road, Collection Line	0.000	2.135	2.135
C050	143, 63, 13 143, 63, 14	Shallow Open Water	USFWS	Turbine	0.000	1.893	1.893
B065	143, 63, 13	Shallow Marsh	USFWS	Collection Line	0.000	1.749	1.749
A028	144, 63, 35	Shallow Open Water	USFWS	Access Road, Collection Line	0.000	1.542	1.542
C113b	143, 62, 29	Seasonally Flooded Basin	None	Access Road, Collection Line	0.000	1.494	1.494
A120	143, 63, 11 143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	1.438	1.438
B070	143, 63, 14	Shallow Open Water	None	Access Road, Collection Line	0.000	1.385	1.385
C087	143, 62, 30	Deep Marsh	None	Collection Line	0.000	1.233	1.233
C038	143, 63, 11	Deep Marsh	USFWS	Access Road	0.000	1.115	1.115
A093	143, 62, 32	Deep Marsh	None	Collection Line	0.000	1.097	1.097
C066	143, 62, 17	Shallow Marsh	None	Access Road, Collection Line	0.000	1.024	1.024

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
B017	143, 63, 25	Deep Marsh	USFWS	Turbine, Access Road, Collection Line	0.000	1.005	1.005
A025	143, 63, 25	Shallow Marsh	None	Collection Line	0.000	1.004	1.004
C065	143, 62, 18	Shallow Marsh	None	Turbine	0.000	0.944	0.944
C096	143, 62, 30	Shallow Marsh	None	Collection Line	0.000	0.939	0.939
A085	142, 62, 07	Shallow Open Water	None	Access Road, Collection Line	0.000	0.932	0.932
C111	143, 62, 29 143, 62, 30	Shallow Open Water	None	Collection Line	0.000	0.906	0.906
A036	143, 63, 02	Shallow Marsh	USFWS	Collection Line	0.000	0.874	0.874
C043	143, 63, 11	Shallow Marsh	USFWS	Turbine, Access Road, Collection Line	0.000	0.868	0.868
A091	143, 62, 32	Shallow Marsh	None	Turbine	0.000	0.787	0.787
A075	142, 62, 08	Shallow Marsh	None	Collection Line	0.000	0.774	0.774
B051	143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	0.773	0.773
A041	143, 63, 01	Shallow Marsh	USFWS	Collection Line	0.000	0.771	0.771
B050	143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	0.762	0.762
C004	143, 63, 15	Shallow Marsh	None	Turbine, Collection Line	0.000	0.751	0.751
C123	143, 62, 32	Shallow Marsh	None	Turbine, Access Road, Collection Line	0.000	0.710	0.710
A042	143, 63, 01	Shallow Marsh	USFWS	Collection Line	0.000	0.687	0.687
C122	143, 62, 28 143, 62, 29	Shallow Marsh	None	Turbine, Collection Line	0.000	0.680	0.680
B071	143, 63, 14	Shallow Marsh	None	Turbine, Collection Line	0.000	0.665	0.665
A104	142, 62, 05 142, 62, 06	Shallow Marsh	None	Collection Line	0.000	0.665	0.665
C073	143, 62, 19	Shallow Marsh	None	Collection Line	0.000	0.653	0.653
B009	143, 62, 20	Deep Marsh	USFWS	Collection Line	0.000	0.625	0.625
C021	142, 63, 02	Shallow Open Water	USFWS	Access Road	0.000	0.577	0.577
B082	143, 63, 15	Shallow Marsh	USFWS	Access Road	0.000	0.523	0.523
C102	143, 62, 29	Shallow Marsh	None	Collection Line	0.000	0.505	0.505
A019	143, 63, 36	Shallow Marsh	USFWS	Collection Line	0.000	0.498	0.498
C076	143, 62, 19	Deep Marsh	None	Turbine	0.000	0.487	0.487
A043	143, 62, 06 143, 63, 01	Deep Marsh	None	Collection Line	0.000	0.484	0.484
C059	143, 63, 24	Seasonally Flooded Basin	USFWS	Access Road, Collection Line	0.000	0.482	0.482
A102	142, 62, 06	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.481	0.481
A038	143, 63, 02	Wet Meadow	USFWS	Collection Line	0.000	0.476	0.476
B046	143, 63, 12	Shallow Open Water	USFWS	Access Road, Collection Line	0.000	0.457	0.457

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
C091	143, 62, 30	Shallow Marsh	None	Collection Line	0.000	0.457	0.457
A131	143, 63, 25	Shallow Marsh	USFWS	Turbine	0.000	0.454	0.454
C097	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.451	0.451
B024	143, 63, 25	Shallow Marsh	USFWS	Turbine	0.000	0.451	0.451
A089	143, 62, 32	Shallow Marsh	None	Turbine	0.000	0.448	0.448
C094	143, 62, 30	Shallow Marsh	None	Turbine, Access Road	0.000	0.434	0.434
A092	143, 62, 32	Seasonally Flooded Basin	None	Turbine, Access Road, Collection Line	0.000	0.431	0.431
341	143, 63, 24	Seasonally Flooded Basin	USFWS	Turbine, Collection Line	0.000	0.429	0.429
C052	143, 63, 13	Seasonally Flooded Basin	USFWS	Turbine, Collection Line	0.000	0.426	0.426
A106	143, 62, 32	Wet Meadow	None	Collection Line	0.000	0.422	0.422
A053	143, 63, 10	Shallow Marsh	None	Collection Line	0.000	0.413	0.413
A037	143, 63, 02	Wet Meadow	USFWS	Collection Line	0.000	0.396	0.396
C053	143, 63, 24	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.382	0.382
C058	143, 63, 23 143, 63, 24	Deep Marsh	None	Access Road	0.000	0.363	0.363
C070	143, 62, 19	Seasonally Flooded Basin	None	Collection Line	0.000	0.359	0.359
B034	143, 63, 23	Wet Meadow	USFWS	Access Road, Collection Line	0.000	0.358	0.358
B080	143, 63, 22	Shallow Open Water	None	Turbine, Access Road, Collection Line	0.000	0.339	0.339
B044	143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	0.299	0.299
C071	143, 62, 19	Seasonally Flooded Basin	None	Collection Line	0.000	0.259	0.259
A032	143, 63, 01	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.248	0.248
A027	143, 63, 25	Seasonally Flooded Basin	None	Collection Line	0.000	0.243	0.243
A055	143, 63, 10	Seasonally Flooded Basin	None	Access Road, Collection Line	0.000	0.242	0.242
C106	143, 62, 30	Shallow Marsh	None	Collection Line	0.000	0.235	0.235
A141	143, 62, 30	Seasonally Flooded Basin	None	Access Road	0.000	0.235	0.235
A098	142, 62, 05	Shallow Marsh	None	Collection Line	0.000	0.232	0.232
C092	143, 62, 30	Seasonally Flooded Basin	None	Access Road, Collection Line	0.000	0.232	0.232
A039	143, 63, 02	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.228	0.228
B064	143, 63, 13	Wet Meadow	None	Turbine, Collection Line	0.000	0.227	0.227

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
C042	143, 63, 11	Shallow Marsh	USFWS	Access Road, Collection Line	0.000	0.225	0.225
B032	143, 63, 23	Shallow Marsh	USFWS	Access Road	0.000	0.216	0.216
A045	143, 63, 01	Shallow Marsh	USFWS	Collection Line	0.000	0.210	0.210
A052	143, 63, 10	Seasonally Flooded Basin	None	Collection Line	0.000	0.210	0.210
C104	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.209	0.209
A101	142, 62, 05	Seasonally Flooded Basin	None	Collection Line	0.000	0.207	0.207
A095	143, 62, 32	Shallow Marsh	None	Collection Line	0.000	0.206	0.206
B054	143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	0.203	0.203
A132	143, 63, 24	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.201	0.201
C083	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.193	0.193
B018	143, 63, 25	Deep Marsh	USFWS	Collection Line	0.000	0.190	0.190
C029	143, 63, 36	Deep Marsh	None	Collection Line	0.000	0.190	0.190
B008	143, 62, 20	Deep Marsh	USFWS	Collection Line	0.000	0.189	0.189
A020	143, 63, 36	Seasonally Flooded Basin	USFWS	Turbine, Collection Line	0.000	0.187	0.187
B016	143, 63, 25	Shallow Marsh	USFWS	Turbine, Collection Line	0.000	0.182	0.182
C063	143, 62, 17	Shallow Marsh	None	Turbine, Access Road, Collection Line	0.000	0.168	0.168
C041	143, 63, 11	Shallow Marsh	USFWS	Turbine, Access Road, Collection Line	0.000	0.168	0.168
B048	143, 63, 12	Seasonally Flooded Basin	USFWS	Access Road, Collection Line	0.000	0.167	0.167
C072	143, 62, 19	Seasonally Flooded Basin	None	Collection Line	0.000	0.161	0.161
C077	143, 62, 19	Shallow Marsh	None	Turbine, Access Road, Collection Line	0.000	0.160	0.160
C108	143, 62, 30	Shallow Marsh	None	Collection Line	0.000	0.159	0.159
B053	143, 63, 12	Seasonally Flooded Basin	USFWS	Turbine, Collection Line	0.000	0.156	0.156
B061	143, 63, 14	Shallow Marsh	None	Collection Line	0.000	0.152	0.152
B026	143, 63, 26	Shallow Marsh	USFWS	Access Road, Collection Line	0.000	0.151	0.151
C061	143, 62, 18	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.150	0.150
A074	142, 62, 08	Seasonally Flooded Basin	None	Access Road	0.000	0.149	0.149
B072	143, 63, 14	Shallow Marsh	None	Turbine, Access Road, Collection Line	0.000	0.147	0.147
A067	143, 63, 15	Seasonally Flooded Basin	None	Turbine, Collection Line	0.000	0.146	0.146

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
C084	143, 62, 30	Shallow Marsh	None	Collection Line	0.000	0.144	0.144
A077	142, 62, 08	Deep Marsh	None	Access Road	0.000	0.138	0.138
B079	143, 63, 23	Seasonally Flooded Basin	None	Access Road	0.000	0.136	0.136
C130	143, 62, 33	Seasonally Flooded Basin	None	Turbine, Access Road, Collection Line	0.000	0.134	0.134
B058	143, 63, 14	Seasonally Flooded Basin	None	Collection Line	0.000	0.131	0.131
A118	143, 62, 32	Seasonally Flooded Basin	None	Collection Line	0.000	0.125	0.125
C074	143, 62, 19	Shallow Marsh	None	Collection Line	0.000	0.124	0.124
C088	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.124	0.124
C002	143, 63, 15	Seasonally Flooded Basin	None	Turbine	0.000	0.121	0.121
A044	143, 63, 01	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.118	0.118
C016	142, 63, 11	Shallow Open Water	None	Access Road	0.000	0.118	0.118
C095	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.116	0.116
A066	143, 63, 15	Seasonally Flooded Basin	None	Collection Line	0.000	0.113	0.113
C075	143, 62, 19	Shallow Marsh	None	Access Road, Collection Line	0.000	0.112	0.112
A148	143, 63, 23	Seasonally Flooded Basin	None	Collection Line	0.000	0.106	0.106
C034	143, 63, 26	Shallow Marsh	None	Turbine	0.000	0.103	0.103
C069	143, 62, 19	Seasonally Flooded Basin	None	Collection Line	0.000	0.095	0.095
B040	143, 63, 12	Shallow Marsh	USFWS	Collection Line	0.000	0.090	0.090
B015	143, 63, 25	Seasonally Flooded Basin	USFWS	Turbine, Access Road, Collection Line	0.000	0.090	0.090
A079	142, 62, 07	Seasonally Flooded Basin	None	Turbine, Access Road	0.000	0.089	0.089
A056	143, 63, 10	Shallow Marsh	None	Access Road	0.000	0.084	0.084
B021	143, 63, 25	Shallow Marsh	USFWS	Collection Line	0.000	0.080	0.080
A024	143, 63, 26	Seasonally Flooded Basin	None	Collection Line	0.000	0.080	0.080
C049	143, 63, 13	Deep Marsh	USFWS	Collection Line	0.000	0.078	0.078
B038	143, 63, 23	Seasonally Flooded Basin	None	Turbine, Collection Line	0.000	0.075	0.075
C007	142, 63, 14	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.074	0.074
C006	142, 63, 14	Shallow Marsh	USFWS	Collection Line	0.000	0.072	0.072

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
A143	143, 63, 14	Seasonally Flooded Basin	None	Collection Line	0.000	0.070	0.070
A062	143, 63, 10	Seasonally Flooded Basin	None	Collection Line	0.000	0.069	0.069
A100	142, 62, 05	Seasonally Flooded Basin	None	Collection Line	0.000	0.069	0.069
A068	143, 63, 15	Seasonally Flooded Basin	None	Access Road, Collection Line	0.000	0.068	0.068
A160	143, 63, 12	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.067	0.067
C125	143, 62, 32	Seasonally Flooded Basin	None	Turbine, Access Road, Collection Line	0.000	0.067	0.067
C027	143, 63, 36	Shallow Marsh	USFWS	Access Road	0.000	0.063	0.063
A054	143, 63, 10	Seasonally Flooded Basin	None	Collection Line	0.000	0.061	0.061
A011	142, 63, 11	Shallow Marsh	None	Turbine, Access Road	0.000	0.061	0.061
C110	143, 62, 30	Seasonally Flooded Basin	None	Collection Line	0.000	0.059	0.059
B083	143, 63, 15	Seasonally Flooded Basin	USFWS	Turbine, Access Road, Collection Line	0.000	0.054	0.054
A078	142, 62, 08	Shallow Marsh	None	Turbine, Collection Line	0.000	0.052	0.052
A003	142, 63, 14	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.051	0.051
339	143, 63, 24	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.049	0.049
B039	143, 63, 23	Shallow Marsh	None	Access Road, Collection Line	0.000	0.048	0.048
366	143, 63, 25	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.047	0.047
C056	143, 63, 24	Shallow Marsh	USFWS	Collection Line	0.000	0.046	0.046
A047	143, 63, 01	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.040	0.040
C032	143, 63, 25	Shallow Marsh	USFWS	Turbine, Access Road	0.000	0.040	0.040
A014	142, 63, 11	Seasonally Flooded Basin	None	Turbine	0.000	0.040	0.040
B081	143, 63, 22	Shallow Marsh	None	Turbine, Access Road, Collection Line	0.000	0.039	0.039
C033	143, 63, 26	Shallow Marsh	None	Collection Line	0.000	0.038	0.038
C093	143, 62, 30	Shallow Marsh	None	Access Road, Collection Line	0.000	0.038	0.038
A058	143, 63, 10	Seasonally Flooded Basin	None	Turbine	0.000	0.038	0.038
A099	142, 62, 05	Seasonally Flooded Basin	None	Turbine	0.000	0.037	0.037
C015	142, 63, 11	Shallow Marsh	None	Turbine, Access Road	0.000	0.037	0.037
C060	143, 62, 18	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.034	0.034

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
B030	143, 63, 23	Wet Meadow	USFWS	Collection Line	0.000	0.031	0.031
A170	143, 62, 07	Shallow Marsh	None	Access Road	0.000	0.030	0.030
A137	143, 62, 29 143, 62, 30	Seasonally Flooded Basin	None	Access Road	0.000	0.029	0.029
B085	143, 63, 22	Shallow Marsh	None	Collection Line	0.000	0.028	0.028
C020	142, 63, 02	Shallow Open Water	USFWS	Access Road	0.000	0.028	0.028
A134	143, 63, 14	Seasonally Flooded Basin	None	Access Road, Collection Line	0.000	0.028	0.028
B029	143, 63, 26	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.027	0.027
C019	142, 63, 02	Shallow Marsh	USFWS	Turbine	0.000	0.026	0.026
B020	143, 63, 26	Seasonally Flooded Basin	USFWS	Turbine, Access Road	0.000	0.025	0.025
C022	142, 63, 02	Seasonally Flooded Basin	USFWS	Turbine, Access Road	0.000	0.022	0.022
A046	143, 63, 01	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.021	0.021
A133	143, 63, 24	Seasonally Flooded Basin	USFWS	Collection Line	0.000	0.020	0.020
A013	142, 63, 11	Shallow Marsh	None	Access Road	0.000	0.020	0.020
C023	142, 63, 02	Shallow Marsh	USFWS	Access Road	0.000	0.018	0.018
B073	143, 63, 14	Shallow Marsh	None	Turbine, Access Road	0.000	0.018	0.018
A007	142, 63, 11	Shallow Marsh	USFWS	Access Road	0.000	0.016	0.016
C014	142, 63, 11	Seasonally Flooded Basin	None	Access Road	0.000	0.016	0.016
C035	143, 63, 26	Shallow Marsh	None	Turbine	0.000	0.015	0.015
A071	142, 62, 08	Seasonally Flooded Basin	None	Access Road	0.000	0.014	0.014
A065	143, 63, 15	Shallow Marsh	None	Turbine, Access Road	0.000	0.014	0.014
B068	143, 63, 14 143, 63, 15	Shallow Marsh	None	Access Road	0.000	0.013	0.013
A008	142, 63, 11	Shallow Marsh	None	Access Road	0.000	0.012	0.012
B092	142, 62, 07	Seasonally Flooded Basin	None	Collection Line	0.000	0.011	0.011
B006	143, 62, 20	Shallow Marsh	USFWS	Turbine	0.000	0.011	0.011
C103	143, 62, 29	Seasonally Flooded Basin	None	Collection Line	0.000	0.011	0.011
B074	143, 63, 14	Seasonally Flooded Basin	None	Turbine, Access Road	0.000	0.010	0.010
A122	143, 63, 26	Pond	USFWS	Collection Line	0.000	0.009	0.009
A076	142, 62, 08	Seasonally Flooded Basin	None	Collection Line	0.000	0.009	0.009
B004	143, 62, 20	Shallow Marsh	USFWS	Access Road	0.000	0.008	0.008

Feature ID	Figure 2 Map Book Page	Feature Type	Jurisdiction	Facility Type	Potential Area of Impact (acre)		
					Permanent	Temporary	Total
A162	143, 62, 20	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.007	0.007
A157	143, 63, 01	Seasonally Flooded Basin	USFWS	Access Road	0.000	0.007	0.007
A154	143, 63, 01	Shallow Marsh	USFWS	Access Road	0.000	0.006	0.006
C024	142, 63, 02 142, 63, 3	Shallow Marsh	USFWS	Access Road	0.000	0.005	0.005
A090	143, 62, 32	Seasonally Flooded Basin	None	Collection Line	0.000	0.005	0.005
A087	142, 62, 07	Shallow Marsh	None	Access Road, Collection Line	0.000	0.005	0.005
B067	143, 63, 13	Seasonally Flooded Basin	None	Turbine, Access Road, Collection Line	0.000	0.004	0.004
A010	142, 63, 11	Seasonally Flooded Basin	None	Access Road	0.000	0.003	0.003
B028	143, 63, 26	Seasonally Flooded Basin	USFWS	Turbine, Access Road, Collection Line	0.000	0.002	0.002
B090	142, 62, 06	Seasonally Flooded Basin	None	Access Road	0.000	0.001	0.001
A069	143, 63, 10	Seasonally Flooded Basin	None	Access Road	0.000	0.001	0.001
A171	143, 62, 07	Seasonally Flooded Basin	None	Access Road	0.000	<0.001	<0.001
C054	143, 63, 24	Seasonally Flooded Basin	USFWS	Collection Line	0.000	<0.001	<0.001
A070	143, 63, 09	Shallow Open Water	USFWS	Collection Line	0.000	<0.001	<0.001
Potential Total Project Impacts					0.786	98.901	99.688

5.0 USFWS CONSULTATION

Tetra Tech consulted with the USFWS Chase Lake Wetland Management District regarding wetland basins on USFWS easement tracts within the Project Area. Mr. Neil Shook, Chase Lake Refuge Manager, was the primary point of contact during the consultation.

5.1 Field Survey Activities

Mr. Shook was invited to visit the Project Area on June 17, 2013 during the initial survey of the Project conducted from June 12-18, 2013. Mr. Shook met with Tetra Tech Wetland Specialist Kathy Bellrichard to discuss the survey methodology (see Section 3.2) and confirm it would be acceptable to identify wetland basins on USFWS wetland easement tracts. After meeting with Ms. Bellrichard and observing the field methodology, Mr. Shook indicated it was an acceptable procedure to identify wetland basins on easement tracts.

Upon completion of the initial June 12-18, 2013 survey, Tetra Tech provided Mr. Shook with the GIS shapefiles of the identified wetlands and project facilities (turbines, access roads and collection lines) to review and confirm that all wetland basins within the survey corridor on easement tracts had been identified. Mr. Shook responded on June 28, 2013 and indicated that he had reviewed Tetra Tech's survey results and had identified 50 potential wetland basins within the survey corridor on easement tracts that were not included in Tetra Tech's survey results. Mr. Shook identified these potential wetland basins based on desktop review of multiple years of historical aerial photographs.

Mr. Shook and Mr. Paul Halko, USFWS Chase Lake Refuge Supervisor, accompanied Tetra Tech on June 28, 2013 and July 9, 2013 to field check the 50 identified potential wetland basins. Of the 50 potential wetland basins reviewed, 41 were determined not to be protected by the USFWS. The nine remaining basins were determined to be protected wetland basins and were added to Tetra Tech's wetland geodatabase.

Tetra Tech conducted additional surveys in August and September of 2013 to address modifications to Project facility locations. Mr. Shook accompanied Tetra Tech on August 21-22, 2013 and September 19, 2013 during the surveys of the modified Project facilities on easement tracts in order to ensure that all USFWS protected wetland basins were identified during these surveys.

5.2 Impacts and Permitting

Geronimo and Tetra Tech consulted with Mr. Shook regarding impacts to wetland basins on USFWS wetland easement tracts. Mr. Shook stated that no permanent impacts (i.e. filling) to protected basins is permitted. Temporary impacts may be permitted; however, these should be avoided if possible. The USFWS issues Special Use Permits for temporary impacts to protected wetland basins. Prior to receiving the Special Use Permit, a plan for restoring affected wetland basins to pre-construction contours must be completed. Geronimo has drafted a restoration plan for protected wetland basins temporarily impacted during construction of the Project.

6.0 CONCLUSIONS AND RECOMENDATIONS

During this investigation, Tetra Tech identified two potential wetlands that may be permanently impacted by the Project. These include a seasonally flooded wetland (C068) and a shallow marsh wetland (C127), which are described in detail below:

- Wetland C068 is located within the ten acre survey area for the proposed substation. However, permanent impacts resulting from construction of the substation are only anticipated to be six acres, and it may be possible to reduce or eliminate permanent impacts to wetland C068 during construction.
- Wetland C127 is a large shallow marsh wetland with adjacent seasonally flooded wetland along the edge. The proposed access road from 17th Street SE to turbine 41 transects a seasonally flooded lobe of the wetland. Geronimo attempted to identify a route to access turbine 41 that would not result in wetland impacts; however, this was determined to be impossible. The proposed route was selected to minimize permanent impacts.

A total of approximately 0.786 acres of wetland may be permanently impacted (i.e. filled) as a result of the Project. The actual area affected will likely be less than this based on the assumed reduction in impacts to wetland C068 resulting from construction of the substation.

Additionally, up to 208 wetlands and one pond may be temporarily impacted by the Project. A total of 98.901 acres of wetlands may be temporarily affected. However, many of the projected temporary impacts may be avoided during construction. Temporary impacts to wetlands located on the fringe of access road or turbine pad construction areas may be able to be reduced or avoided completely during construction, and collections lines transecting wetlands may be able to be installed using horizontal directional drilling methods to eliminate impacts.

An assessment of potential USACE jurisdiction in accordance with USACE and EPA guidance (USACE 2007; USACE and EPA 2007) was conducted for each potentially impacted wetland and water feature. Tetra Tech recommends that none of the potentially impacted wetlands or water features are subject to Section 404 jurisdiction. However, only the USACE can make the final determination on the jurisdiction of wetlands and waters. Tetra Tech recommends that a Jurisdictional Determination should be requested from the USACE for each wetland and water feature that will be impacted by the Project prior to construction.

Up to 87 wetlands located on USFWS easement tracts may be temporarily impacted by the Project. A total of 40.877 acres of wetlands on USFWS easement tracts may be temporarily affected. A Special Use Permit from the USFWS will be required for any temporary impacts to wetlands on USFWS easement tracts. Tetra Tech recommends reducing temporary impacts to wetlands on USFWS easement tracts to the extent practicable.

7.0 REFERENCES

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APPENDIX A – FIGURES

APPENDIX B – PHOTOGRAPHS

Courtenay Wind Energy Center



Photograph 1

Feature ID: 355

Description: View of a Type 1 seasonally flooded basin in a CRP field.

7/9/2013

Southeast



Photograph 2

Feature ID: C048

Description: View of a typical Type 1 seasonally flooded wetland in a cultivated field.

6/15/2013

South



Photograph 3
Feature ID: A034
Description: View of a Type 2 wet meadow in a hay field.

6/15/2013
Northwest



Photograph 4
Feature ID: B055
Description: View of a Type 2 wet meadow in a cultivated field.

6/16/2013
Northeast

Courtenay Wind Energy Center



Photograph 5

Feature ID: B050

Description: View of a Type 3 shallow marsh in a CRP field.

6/15/2013

North



Photograph 6

Feature ID: B054

Description: View of a Type 3 shallow marsh in a cultivated field.

6/16/2013

South/Southeast



Photograph 7
Feature ID: A094
Description: View of a Type 4 deep marsh in a CRP field.

6/18/2013
East



Photograph 8
Feature ID: B022
Description: View of a Type 4 deep marsh in a cultivated field.

6/14/2013
Northeast



Photograph 9
Feature ID: A049
Description: View of a Type 5 shallow open water wetland.

6/15/2013
Southwest



Photograph 10
Feature ID: A033
Description: View of a pond lacking wetland vegetation at its edge.

6/15/2013
South



Photograph 11
Feature ID: C068

6/16/2013
North

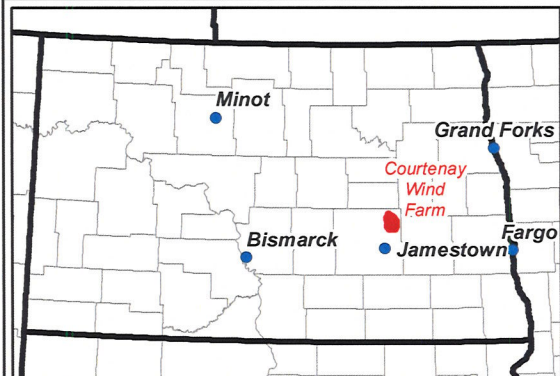
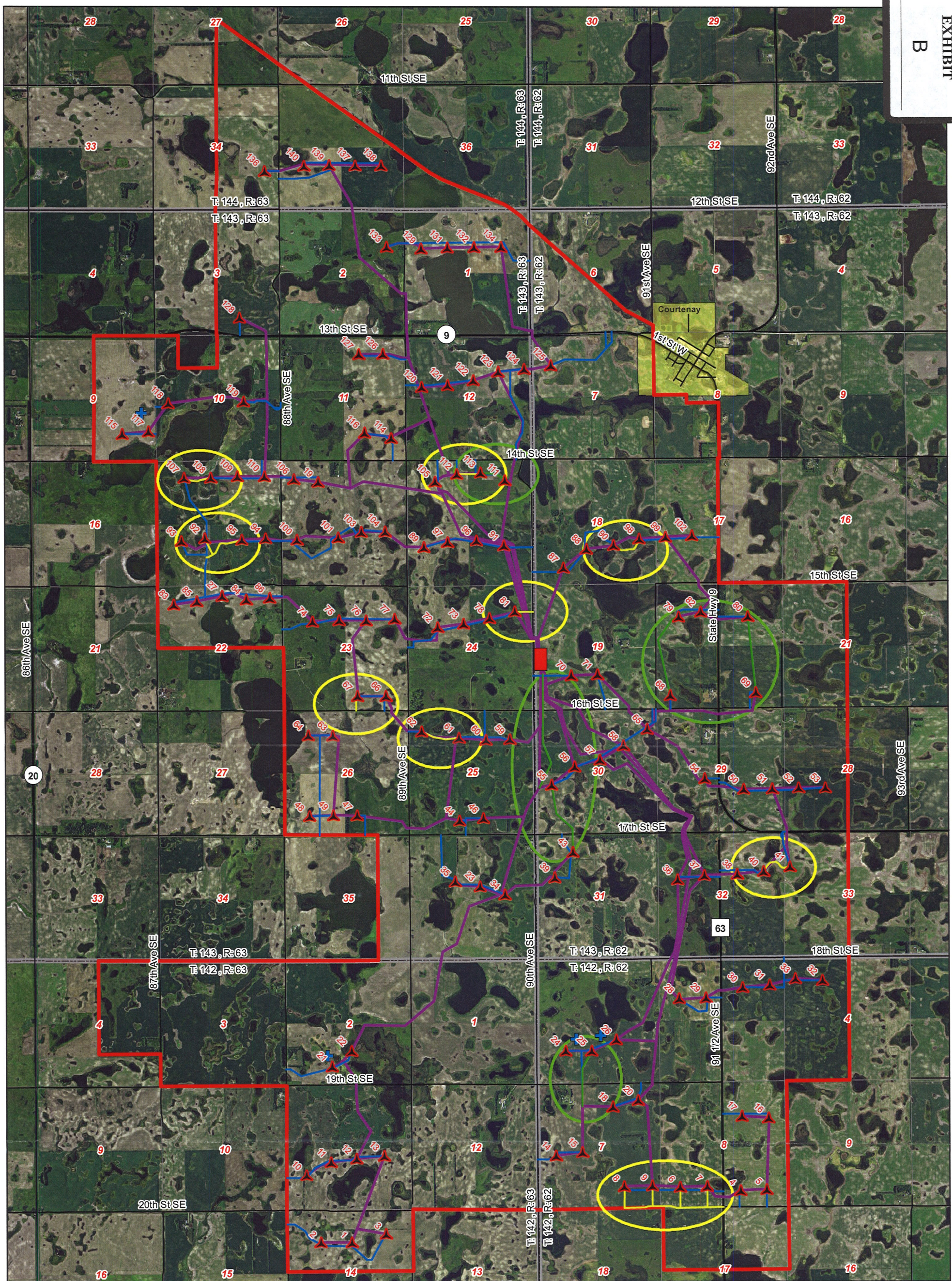
Description: View of seasonally flooded wetland C068, which may be permanently impacted by the Project.



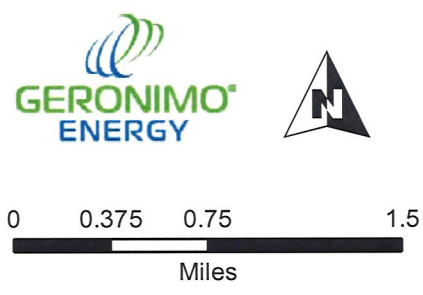
Photograph 12
Feature ID: C127

9/18/2013
Southwest

Description: View of shallow marsh wetland C127, which would be permanently impacted by the Project, from the approximate point of the proposed access road crossing.



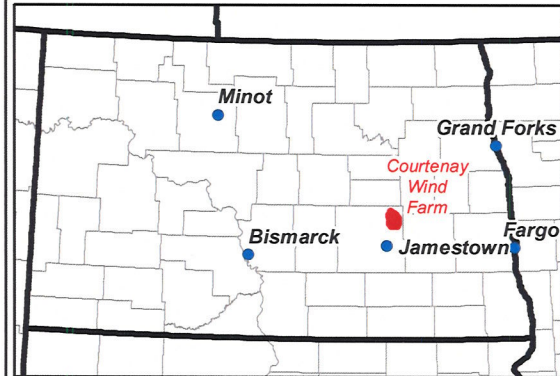
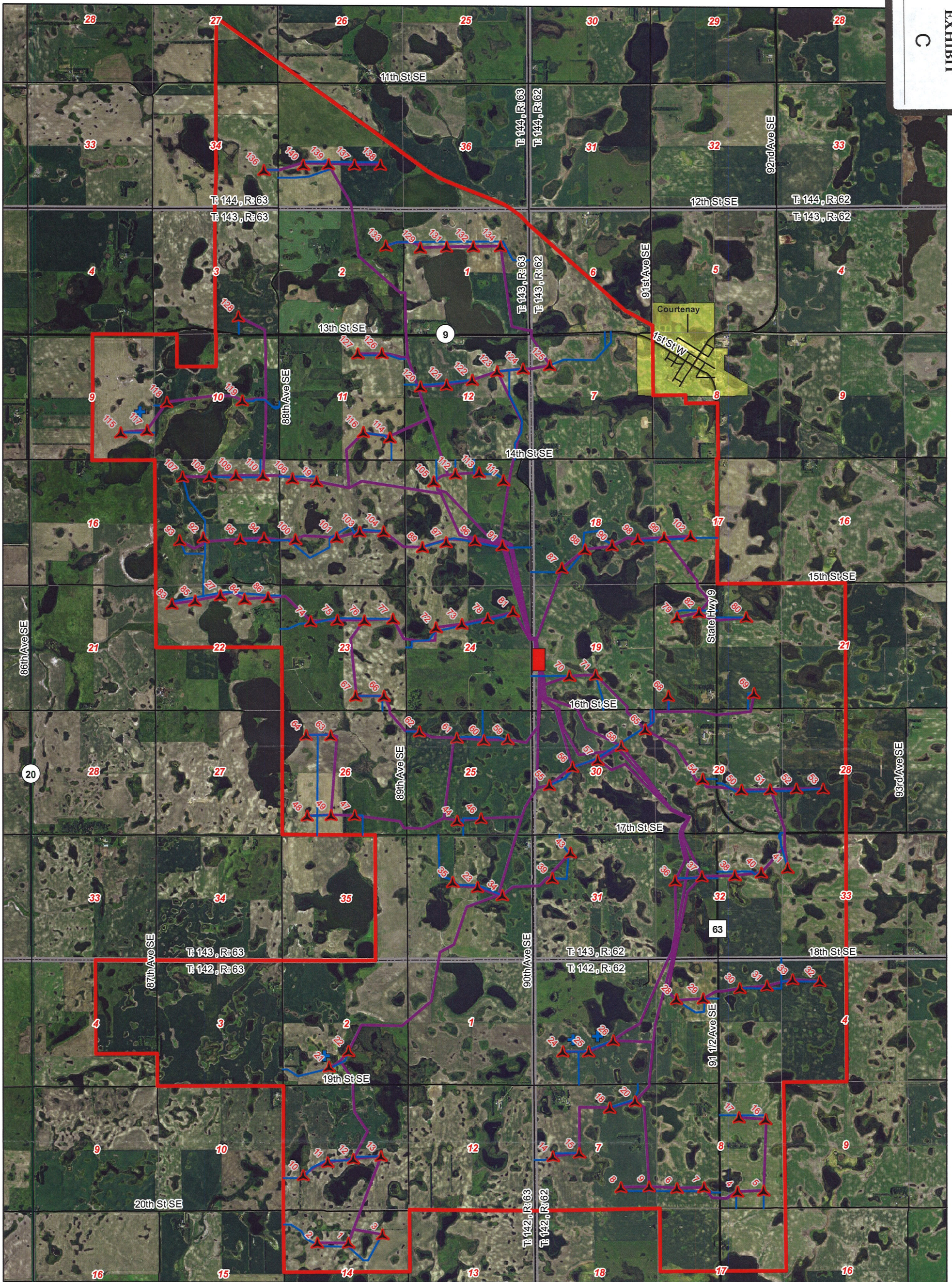
- Initial Access Road
- Current Access Roads
- Access Road Change Area
- Initial Collector Line
- Current Collector Lines
- Collector Line Change Area
- ▲ Turbine Layout
- + Permanent Met Towers
- Substation
- Project Area



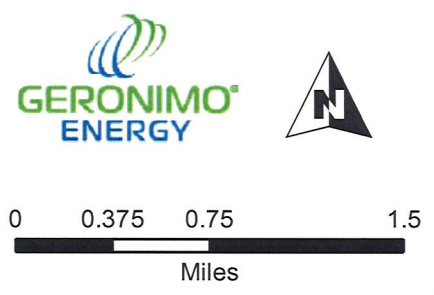
Collector Line and Access Road Location Changes to Avoid USFWS Easements



Source: Geronimo Energy, NAIP/NRCS, Ventyx,



- Current Access Roads
- Current Collector Lines
- ▲ Turbine Layout
- + Permanent Met Towers
- Substation
- Project Area



**Final Turbine,
Access Road and
Collector Line
Locations**

**COURTENAY
WIND FARM**

Stutsman County, ND