Natural Resources and Wetland Determination Report for the COLT Connector Pipeline, Williams County, North Dakota

Prepared for

Barr Engineering Company

Prepared by

SWCA Environmental Consultants

August 29, 2011

Natural Resources and Wetland Determination Report for the COLT Connector Pipeline, Williams County, North Dakota

Prepared for

Barr Engineering Company
4700 West 77th Street, Suite 200
Minneapolis, MN 55435

Prepared by

Jason Bivens, Environmental Specialist

Reviewed by

Michael Cook, Natural Resources Lead

SWCA Environmental Consultants
116 N. 4th Street, Suite 200
Bismarck, ND 58501
(701) 258-6622, Fax (701) 258-5957

SWCA Project No. 17121

August 29, 2011

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF CONTENTS (continued)

LIST OF APPENDICES

Appendix

1.0 INTRODUCTION

1.1 BACKGROUND

Rangeland Energy, LLC is proposing to construct an approximately 20.5-mile-long crude oil pipeline named the COLT Connector in Williams County, North Dakota (survey area). The proposed pipeline will be constructed within a 100-foot-wide temporary construction right-of-way (ROW) and a permanent 30-foot-wide ROW will be maintained after construction is complete.

The North Dakota Public Service Commission (ND PSC) has claimed jurisdiction over the survey area and is requiring a certificate of corridor compatibility and route permit be obtained prior to the commencement of construction activities. SWCA Environmental Consultants (SWCA) was contracted by Barr Engineering Company (Barr) to complete natural and cultural resource field surveys in order to identify exclusion and avoidance areas as specified in North Dakota Administrative Code (NDAC) 69-06-08-02.

SWCA conducted an initial field survey of a 200-foot-wide corridor between November 8 and 17, 2010, and additional reroute surveys on May 6, June 21–22, June28–29 and July 22, 2011, to determine the potential presence and extent of waters of the U.S., commonly referred to as a wetland determination, within the proposed survey area. Concurrently with the wetland determination, SWCA also conducted a cursory threatened and endangered species survey and habitat assessment; a tree, sapling, and shrub enumeration survey; and a noxious weed survey.

This report outlines the methodology used by SWCA's ecologists to complete each of the aforementioned surveys. Additionally, this report presents the results of the completed field surveys and regulatory recommendations to ensure compliance with the ND PSC and the U.S. Army Corps of Engineers (USACE) Nationwide Permit 12.

1.2 REGULATORY BACKGROUND

1.2.1 Clean Water Act, Section 404

Section 404 of the Clean Water Act prohibits the discharge of fill material into waters of the U.S., also known as jurisdictional waters, without a permit from the USACE.

1.2.2 USACE Nationwide Permit 12

The USACE Nationwide Permit 12 authorizes the construction of utility lines and associated facilities in waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5 acre of waters of the U.S., including wetlands.

Nationwide Permit 12 also authorizes the construction of access roads for utility lines, provided that the access road:

- does not result in the permanent loss of greater than 0.5 acre of waters of the U.S.;
- is constructed to the minimum width necessary;

- is constructed so that the length of the road minimizes any adverse effects to waters of the U.S.;
- is as near as possible to pre-construction contours and elevations; and
- is properly bridged or culverted when constructed above pre-construction contours.

If the access roads are used exclusively for construction purposes, they must be temporary and removed upon project completion.

Nationwide Permit 12 requires that the permittee submit a pre-construction notification prior to commencing construction if any of the following criteria are met.

- The activity involves mechanized land clearing in a forested wetland.
- A Section 10 permit is required to cross a navigable waterbody (Rivers and Harbors Act).
- The utility line exceeds 500 feet in length through any single crossing of a water of the U.S.
- The utility line is placed within a jurisdictional area (i.e., water of the U.S.) and it runs parallel to a stream bed that is within that jurisdictional area.
- Discharges result in the permanent loss of greater than 0.1 acre of waters of the U.S.
- Permanent access roads are constructed above grade in waters of the U.S. for a distance of more than 500 feet.
- Permanent access roads are constructed in waters of the U.S. with impervious materials.

1.2.3 USACE Regional Conditions

The USACE has published several regional conditions for projects operating under Nationwide Permits in North Dakota. The regional conditions apply to wetlands classified as "fens," waters adjacent to natural springs, the Missouri River, historic properties, and fish spawning areas.

2.0 SURVEY AREA

The proposed survey area trends east to west entirely within Williams County, North Dakota, beginning at a point south of Tioga, North Dakota, in Section 5, Township (T) 155 North (N), Range (R) 95 West (W), of the 5th Prime Meridian. Moving east to west, the survey area first traverses Section 6, T155N, R95W, then moves north into Section 31, T156N, R95W, and back west through Sections 31–36, T156N, R96–98W, turning south in Section 33, T156N, R98W then continuing west through Sections 4–6 T155N, R98W and ending at a point in Section 1, T155N, R99W. The study area is located in the Great Plains (Level I), West-Central Semi-Arid Prairies (Level II), Northwestern Glaciated Plains (Level III), and the Missouri Coteau Slope (Level IV) ecoregions. The Missouri Coteau Slope is characterized by

an average precipitation amount of 15 to 18 inches and mean July temperatures ranging from 59 degrees Fahrenheit (°F) to 86°F (U.S. Geological Survey [USGS] 2006).

3.0 METHODS

3.1 WETLANDS

SWCA ecologists conducted wetland determinations, within the survey area, based on the principles and guidelines provided in the 1987 Corps of Engineers Wetlands Delineation Manual (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetlands Determination Manual: Great Plains Region version 2.0* (Supplement) (USACE 2010). According to the Manual, an area is a wetland if three mandatory wetland indicators are present in a given area, with special exceptions. These criteria include the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. All wetlands and waterbodies geographically referenced within the survey area during field survey are depicted on the Site Layout Maps in Appendix A.

3.1.1 Vegetation

SWCA taxonomically identified all plant species within each recorded wetland area. All species were recorded according to their respective vegetative stratum. A tree is defined by the Supplement to be a woody-stemmed plant with a trunk diameter at breast height (DBH) of equal to or greater than 3 inches, regardless of height. The sapling and shrub stratum is defined by the Supplement to be composed of woody-stemmed plants with a trunk DBH of less than 3 inches, regardless of height. The herbaceous stratum includes all non-woody-stemmed plants regardless of height. Finally, the woody vine stratum includes all woody-stemmed vines, regardless of diameter.

SWCA ecologists noted each plant species' respective U.S. Fish and Wildlife Service (USFWS) indicator status (i.e., upland [UPL], facultative upland [FACU], facultative [FAC], facultative wetland [FACW], and obligate [OBL]).

SWCA also noted all populations of North Dakota state or county listed noxious weeds identified within the survey area.

3.1.2 Hydrology

A wetland was determined to contain wetland hydrology if at least one primary indicator or at least two secondary indicators of wetland hydrology were present, as defined by the Manual and Supplement. Common hydrologic indicators include the presence of surface water, high water table, soil saturation, water marks on trees or other objects, sediment deposits, water-stained leaves, and oxidized rhizospheres on living roots.

3.1.3 Soil

No soil profiles were excavated by SWCA during the wetland determination. Hydric soils were assumed to be present within each area that exhibited greater than 50% hydrophytic

vegetation, and a positive indication of wetland hydrology. Additionally, the assumption of the presence of hydric soil was predicated on the geomorphic position of each wetland area.

3.2 WATERBODIES

Waterbodies (i.e., creeks, streams, rivers) were identified by the presence of an ordinary high water mark (OHWM). Common identifiable indicators of an OHWM include a clear, natural line visible on the bank; shelving; changes in soil characteristics; the destruction of terrestrial vegetation; the presence of litter and debris; and watermarks on structures that are inundated during normal high water conditions. The OHWM typically represents the potential limits of the USACE jurisdiction. Please note that the USACE has full discretion in determining the jurisdictional status of referenced wetlands and waterbodies.

SWCA classified streams as perennial, intermittent, or ephemeral based on field observations. During a typical year, a perennial stream contains flowing water year-round and the water table is located above the stream bed. Groundwater is the primary water source for stream flow while precipitation runoff is supplemental. Ecologists classified streams that showed significant flow during the field survey or were named or designated as solid blue lines on the USGS topographic maps as perennial.

An intermittent stream has flowing water for only portions of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

3.3 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

Information regarding the presence of threatened or endangered species, which may occur within the survey area, was obtained from the USFWS list of threatened and endangered species by North Dakota county (USFWS 2010a). This document does not represent a comprehensive survey, but rather acknowledges the past and/or current presence of listed species. The lack of discovery of threatened or endangered species does not signify their non-existence within the area, but only that no primary or secondary indications of these species were recorded.

SWCA conducted a cursory pedestrian survey concurrently with the wetland determination for all listed species that could be potentially impacted by construction activities. Additionally, SWCA characterized suitable threatened and endangered species habitat encountered during the field survey.

SWCA ecologists noted all wildlife observed during the field survey. Wildlife sightings can involve primary observations (i.e., actual sighting of an animal) or secondary observations (i.e., observation of scat, tracks, or fur deposits).

3.4 TREE, SAPLING, AND SHRUB COUNT

SWCA ecologists determined the total number of trees, saplings, and shrubs present within the surveyed 200-foot-wide ROW by employing several different techniques depending on the type of woody vegetation habitat (i.e., forested upland, shrubland, or shelterbelt) encountered and the overall extent of each habitat within the ROW. The boundary of all forested upland, shrubland, and shelterbelt habitat was geographically referenced using a Trimble GeoXT series handheld global positioning system (GPS) unit. In forested upland and shrubland habitat, SWCA counted or estimated the number of all woody stemmed vegetation regardless of DBH. In shelterbelt areas, all woody stemmed vegetation with a DBH of ≥ 1 inch were inventoried, regardless of height. Ecologists taxonomically identified all recorded individuals to the species level within each habitat type.

Linear Spacing Estimates: SWCA ecologists estimated the total number of individual trees or shrubs within each observed shelterbelt by calculating the total number of individuals, regardless of DBH of each species within a set linear distance. This method assumes that spacing and species pattern between individuals is equal along the entire length of the shelterbelt. When a satisfactory number of replications was averaged (usually up to 50% of the total shelterbelt length), ecologists determined the total shelterbelt length and estimated the total number of individuals potentially present based on the average number of individuals per linear foot. Once the number of individuals per foot was estimated for each shelterbelt, SWCA used a shapefile depicting the width of the proposed disturbance area (i.e., 100 feet) to determine the linear length of each shelterbelt segment potentially impacted by construction activities. This linear length was then used to estimate the number of individual trees or shrubs potentially impacted through construction activities.

Sub-Plot Estimates: Some shrub species, such as silver buffaloberry (*Shepherdia argentea*), are difficult to individually count due to the nature of their assemblages. Therefore, SWCA used a sub-plot estimation technique to estimate the total number of silver buffaloberry individuals within the ROW. SWCA completed an actual count of all silver buffaloberry individuals within a given geographically referenced sub-plot area. The area contained within the geographically referenced sub-plot was calculated using ArcGIS v9.3 and ArcGIS v10.0 (ESRI Redlands, California). This process was repeated until a satisfactory number of replications were completed. Once the total number of individuals was determined per the total geographically referenced area, an average number of individuals per acre was calculated. SWCA then calculated the total area of assemblages within the ROW and determined the total number of individuals based on the average individuals per acre value.

3.5 MAPPING

The boundaries of each wetland, waterbody, and woody vegetation habitat were geographically recorded using a Trimble GeoXT GPS unit. The aforementioned GPS unit is capable of recording geographic data with sub-meter accuracy. SWCA used Universal Transverse Mercator Zone 13N as the projected coordinate system and North American Datum 1983 as the datum. ArcGIS v9.3 and ArcGIS v10.0 were used to analyze collected features, calculate areas, and generate the maps provided in Appendix A. Please note that all

data collected using the GPS unit, and displayed on the attached maps, are for review purposes only and do not represent a professional civil survey.

4.0 RESULTS

4.1 VEGETATION

SWCA ecologists identified four general types of vegetative communities within the survey area. These vegetative communities were classified as herbaceous upland, shrubland, cropland, and palustrine emergent (PEM) wetland. PEM wetlands are characterized by the presence of herbaceous hydrophytic or submergent aquatic macrophytes.

Vegetation communities met the hydrophytic vegetation criterion for wetlands if greater than 50% of dominant species had an indicator status of FAC, FACW, or OBL. The upland communities failed to meet at least one of the two assessed wetland criteria. Refer to Appendix B for photographs that depict representative vegetation at wetlands surveyed. Examples of common dominant species identified within each vegetative community are listed below.

SWCA ecologists did not observe any occurrences of North Dakota state or county listed noxious weeds within the surveyed area.

4.1.1 Herbaceous Upland

Herbaceous upland communities occurring throughout the survey area consisted of non-wetland areas dominated by non-woody vegetation such as grasses and forbs. Common species found within these communities include crested wheatgrass (*Agropyron cristatum*), big bluestem (*Andropogon gerardii*), green sagewort (*Artemisia campestris*), fringed sagewort (*Artemisia frigida*), cudweed sagewort (*Artemisia ludoviciana*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), smooth bromegrass (*Bromus inermis*), purple coneflower (*Echinacea angustifolia*), squirreltail (*Elymus elymoides*), American licorice (*Glycyrrhiza lepidota*), curlycup gumweed (*Grindelia squarrosa*), needle and thread (*Hesperostipa comata*), gayfeather (*Liatris puncata*), yellow sweetclover (*Melilotus officinalis*), green needlegrass (*Nassella viridula*), western wheatgrass (*Pascopyrum smithii*), Kentucky bluegrass (*Poa pratensis*), prairie coneflower (*Ratibida columnifera*), prairie rose (*Rosa arkansana*), and little bluestem (*Schizachyrium scoparium*).

4.1.2 Shrubland

Shrubland communities occurring throughout the survey area consisted of upland areas dominated by woody-stemmed vegetation including downy hawthorn (*Crataegus mollis*), Russian olive (*Elaeagnus angustifolia*), silverberry (*Elaeagnus commutata*), chokecherry (*Prunus virginiana*), silver buffaloberry, and western snowberry (*Symphoricarpos occidentalis*).

4.1.3 Cropland

Cropland vegetation included canola (*Brassica napus*) and hard red spring wheat (*Triticum aestivum*).

4.1.4 PEM Wetland

PEM wetlands found within the survey area mainly consisted of herbaceous, non-woody vegetation such as sedges, spike-rushes, grasses, and forbs, although some woody vegetation was present but not dominant. Common species found within these communities include quackgrass (*Agropyron repens*), big bluestem, smooth bromegrass, upland sedges (*Carex* spp.), redosier dogwood (*Cornus sericea*), creeping spikerush (*Eleocharis palustris*), Canada wildrye (*Elymus canadensis*), American licorice, foxtail barley (*Hordeum jubatum*), witchgrass (*Panicum capillaire*), reed canarygrass (*Phalaris arundinacea*), fowl bluegrass (*Poa palustris*), Kentucky bluegrass, smartweed (*Polygonum* sp.), *Rumex* sp., bulrush (*Schoenoplectus* sp.), prairie cordgrass (*Spartina pectinata*), cattail (*Typha angustifolia*), and stinging nettle (*Urtica dioica*).

4.2 HYDROLOGY

Wetland communities observed during the determination effort displayed at least one primary or two secondary indicators of wetland hydrology, as defined by the Manual and Supplement. Upland communities either failed to display hydrologic indicators or failed to meet the hydrophytic vegetation requirement, as defined by the Manual and Supplement.

According to National Weather Service (NWS) preliminary climatological data for Williston, North Dakota, 3.21 inches of precipitation was recorded from September 1 through November 17, 2010 (Table 1). This amount is 0.6 inch above normal for this time period. Approximately 4.81 inches of precipitation were recorded at NWS Williston between May 1 and June 30, 2011. This value is approximately 0.67 inch below average recorded amounts. Though May 2011 precipitation amounts were approximately 0.23 inch below average, SWCA ecologists noted abnormal hydrologic conditions near the western edge of the proposed pipelines as a result of record breaking snow fall during the 2010–2011 winter and subsequent spring snow melt.

Table 1. Monthly Recorded Rainfall at NWS Williston, North Dakota.

Month	Recorded Precipitation (inches)	Average Precipitation (inches)	Difference (inches)
September 2010	1.41	1.35	0.06
October 2010	1.26	0.87	0.39
November 2010	0.54	0.39	0.15
2010 Total	**3.21**	**2.61**	**0.60**
May 2011	0.61	0.84	-0.23
June 2011	1.86	2.36	-0.50
July 2011	2.34	2.28	0.06
2011 Total	**4.81**	**5.48**	**-0.67**

Source: National Oceanic and Atmospheric Administration 2011

4.3 SOILS

SWCA assumed all wetland areas that exhibited the hydrophytic vegetation and wetland hydrology criteria also exhibited hydric soil characteristics. Table 2 summarizes the soil types present within the survey area. Please refer to Appendix C for Natural Resources Conservation Service (NRCS) soil series descriptions.

Table 2. NRCS Derived Soil Series Present within the ROW.

Soil Types	Acres within 100-foot ROW	Hydric Component Present	Component Name and % Within Map Unit
Arnegard loam, 0 to 2 percent slopes	1.65	No	N/A
Bowdle loam, 0 to 2 percent slopes	1.69	No	N/A
Farnuf loam, 0 to 2 percent slopes	22.00	No	N/A
Lehr loam, 2 to 6 percent slopes	0.40	No	N/A
Williams-Bowbells loams, 0 to 3 percent slopes	42.50	Yes	Tonka – 2% Heil – 1%
Williams-Bowbells loams, 3 to 6 percent slopes	76.10	Yes	Tonka – 1%
Williams-Zahl loams, 3 to 6 percent slopes	14.10	Yes	Tonka – 1%
Williams-Zahl loams, 6 to 9 percent slopes	49.20	No	N/A
Zahl-Williams loams, 9 to 15 percent slopes	11.60	No	N/A
Zahl-Williams loams, 15 to 60 percent slopes	9.73	No	N/A
Amor-Zahl-Cabba loams, 9 to 25 percent slopes	1.19	No	N/A
Cabba-Amor-Zahl loams, 25 to 60 percent slopes	1.11	No	N/A
Korchea-Divide loams, channeled 0 to 2 percent slopes	4.78	No	N/A

Soil Types	Acres within 100-foot ROW	Hydric Component Present	Component Name and % Within Map Unit
Lehr-Williams loams, 0 to 6 percent slopes	6.60	No	N/A
Wabek sandy loam, 6 to 25 percent slopes	2.76	No	N/A

Source: NRCS 2009

4.4 WETLANDS

SWCA recorded 11 PEM wetlands and one presumed PEM wetland within the survey area, totaling approximately 4.684 acres (Table 3). However, only approximately 2.529 acres of PEM wetland are anticipated to be temporarily impacted by construction activities.

Table 3. PEM Wetland Acreage within the Survey Area.

Wetland ID	Total Wetland Area (acres)	Temporarily Impacted Wetland Area within 100-foot ROW (acres)	Crossing Distance (feet)	USACE Jurisdictional Status[1]
WET 2	0.01	0	0	Jurisdictional
WET 3	0.02	0.020	22.7	Non-Jurisdictional
WET 4	0.07	0.010	0	Non-Jurisdictional
WET 6	1.84	1.020	454.3	Jurisdictional
WET 8	0.25	0.140	66.4	Jurisdictional
WET 9	0.24	0.050	0	Non-Jurisdictional
WET 10	0.30	0.170	74.4	Jurisdictional
WET 11	0.11	0.060	0	Non-Jurisdictional
WET 12	0.01	0	0	Non-Jurisdictional
WET 13	0.01	0	0	Non-Jurisdictional
WET 14	0.60	0.300	77.8	Jurisdictional
Presumed WET1	1.224	0.759	364.5	Jurisdictional
Total	**4.684**	**2.529**		

[1] The USACE has the final authority on the jurisdictional status of a wetland.

4.5 WATERBODIES

SWCA identified one perennial stream and one intermittent stream encompassing approximately 0.19 acre (Table 4). The single perennial waterbody (Beaver Creek) will be crossed approximately three times by the currently proposed centerline. Additionally, this drainage did not meet the criteria to be considered a wetland.

Table 4. Waterbody ID, Names, Classification, Acreages, Crossing Lengths, and Jurisdictional Status.

Waterbdody ID	Waterbody Name	Classification	Determined Area (acres)	Crossing Length (feet)	USACE Jurisdictional Status[1]
WB1	Unnamed	Intermittent Stream	N/A	5.9	Jurisdictional
WB2	Beaver Creek	Perennial Stream	N/A	4.3	Jurisdictional
WB3	Beaver Creek	Perennial Stream	N/A	5–15	Jurisdictional
WB4	Beaver Creek	Perennial Stream	N/A	5–15	Jurisdictional
WB5	Beaver Creek	Perennial Stream	N/A	5–15	Jurisdictional

[1] The USACE has the final authority on the jurisdictional status of a waterbody.

4.6 WILDLIFE

SWCA conducted a cursory threatened and endangered species survey concurrently with the wetland determination. Ecologists did not observe any primary (i.e., actual sighting) or secondary (tracks, scat, fur) indication of the presence of threatened or endangered species. However, the survey area does contain suitable foraging and stopover habitat for the whooping crane (*Grus americana*) and foraging habitat for the gray wolf (*Canis lupus*).

4.6.1 Endangered Species Act

4.6.1.1 Black-footed Ferret (*Mustela nigripes*)

Federal Status: Endangered
Affects Determination: No Effect

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the USFWS as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2010b). Ferrets inhabit extensive prairie dog complexes of the Great Plains, typically composed of several smaller colonies in proximity to one another that provide a sustainable prey base. The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size were not observed during the field survey. In addition, this species has not been observed in the wild for more than 20 years. Therefore, the proposed COLT Connector Pipeline project would have **no effect** on this species.

4.6.1.2 Gray Wolf (*Canis lupus*)

Federal Status: Endangered
Affects Determination: No Effect

The gray wolf, listed as endangered in the United States in 1978, was believed extirpated from North Dakota in the 1920s and 1930s with only sporadic reports from the 1930s to present (Licht and Huffman 1996). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings that have occurred within western North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountain region of north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 28 kilometers (km) from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including mountain and low-elevation forests, grasslands, and desert scrub (USFWS 2010c). Due to a lack of forested habitat and distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation may further act as a barrier against wolf recolonization in western North Dakota. Therefore, the proposed COLT Connector Pipeline project would have **no effect** on the gray wolf.

4.6.1.3 Whooping Crane (*Grus americana*)

Federal Status: Endangered
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The whooping crane was listed as endangered in 1970 in the United States by the USFWS and in 1978 in Canada. Historically, population declines were caused by shooting and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species include habitat destruction, especially suitable wetland habitats that support breeding and nesting, as well as feeding and roosting during their fall and spring migration (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007).

The July 2010 total wild population was estimated at 383 (USFWS 2010d). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007; USFWS 2010d). Williams County, including the survey area, is within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs,

rodents, small birds, minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 1 km of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and U.S. Fish and Wildlife Service 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed within the survey area. Therefore, the proposed COLT Connector Pipeline project **may affect, but is not likely to adversely affect** the endangered whooping crane.

4.6.1.4 Piping Plover (*Charadrius melodus*)

Federal Status: Threatened
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The piping plover is a small shorebird which breeds only in three geographic regions of North America: the Atlantic Coast, the Northern Great Plains, and the Great Lakes. Piping plover populations were federally listed as threatened and endangered in 1985, with the Northern Great Plains and Atlantic Coast populations listed as threatened, and the Great Lakes population listed as endangered (USFWS 1985a).

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2010e). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2010e). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2010e).

A suitable shoreline habitat for breeding and nesting plovers does not occur within the survey area, and Lake Sakakawea is a minimum of 13 river miles away from the proposed survey area. It is unlikely that migrating plovers would visit the survey area during their migration. Therefore, the proposed COLT Connector Pipeline project **may affect, but is not likely to adversely affect** piping plovers.

4.6.1.5 Designated Critical Habitat of Piping Plover

Affect Determination: No Effect

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (USFWS 2002).

Since the proposed project will not modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams in any way, **no effect** to designated critical habitat of the piping plover would occur.

4.6.1.6 Interior Least Tern (*Sterna antillarum*)

Federal Status: Endangered
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The interior population of the least tern is listed as endangered by the USFWS (1985b). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2010f).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota will often be found sharing sandbars with the piping plover, a threatened species (USFWS 2010f).

Census data indicate over 8,000 least terns in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone rivers upstream of Lake Sakakawea (USFWS 1990a, 2010f). Approximately 100 pairs breed in North Dakota (USFWS 2010f). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2010f).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande River systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2010f).

Current conservation strategies include identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2010f).

A suitable shoreline habitat for breeding and nesting terns does not occur in the survey area, and Lake Sakakawea is a minimum of 13 river miles away from the survey area. It is unlikely

that terns would visit the upland or wetland habitats present in the survey area. Therefore, the proposed COLT Connector Pipeline project **may affect, but is not likely to adversely affect** endangered least terns.

4.6.1.7 Pallid Sturgeon (*Scaphirhynchus albus*)

Federal Status: Endangered
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The pallid sturgeon was listed as Endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat through river channelization, creation of impoundments, and alteration of flow regimes (USFWS 1990b). These alterations within the Missouri River have blocked movements to spawning, feeding, and rearing areas; destroyed spawning habitat; altered flow conditions which can delay spawning cues; and reduced food sources by lowering productivity (USFWS 2007a). The fundamental elements of pallid sturgeon habitat are defined as the bottom of swift waters of large, turbid, free-flowing rivers with braided channels, dynamic flow patterns, flooding of terrestrial habitats, and extensive microhabitat diversity (USFWS 1990b).

The pallid sturgeon population which may be found approximately 13 river miles from the survey area occurs from the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007a). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007a). Hatchery reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to utilize the 25 km of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS 2007a). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, North Dakota Game and Fish have caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook area. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, U.S. Fish and Wildlife Service, to Mike Cook, Aquatic Ecologist, SWCA Environmental Consultants, September 3, 2010).

A suitable habitat for pallid sturgeon does not occur in the survey area, and Lake Sakakawea is a minimum of 13 river miles away from the proposed survey area. However, Beaver Creek, which drains a portion of the survey area, is a perennial tributary to the Missouri River and Lake Sakakawea. Potential pollution occurring as a result of construction activities and pipeline operations are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the construction, reclamation, and operation of the proposed COLT Connector Pipeline project are not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the proposed project **may effect, but is not likely to adversely affect** pallid sturgeon.

4.6.1.8 Dakota Skipper (*Hesperia dacotae*)

Federal Status: Candidate
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The Dakota skipper is a small butterfly with a 1-inch wingspan and is found primarily in undisturbed native tall grass and upland dry mixed grass prairie areas with a high diversity of wildflowers and grasses (Committee on the Status of Endangered Wildlife in Canada 2003). The Dakota skipper appears to require a range of precipitation-evaporation ratios between 60 and 105 and a soil pH between 7.2 and 7.9 (McCabe 1981). Larvae feed on grasses, favoring little bluestem. Adults commonly feed on nectar of flowering native forbs such as harebell (*Campanula rotundifolia*), wood lily (*Lilium philadelphicum*), and purple coneflower. The species is threatened by conversion of native prairie to cultivated agriculture or shrublands, over-grazing, invasive species, gravel mining, and inbreeding (USFWS 2005). Dakota skippers are not known to occur within the survey area; however, suitable habitat does occur. The proposed COLT Connector Pipeline project **may affect, but is not likely to adversely affect** this species. The use of best management practices and conservation guidelines (USFWS 2007b) during construction and operation and immediate reclamation of short-term disturbance should decrease direct, indirect, and cumulative impacts to this species.

4.6.1.9 Sprague's Pipit (*Anthus spragueii*)

Federal Status: Candidate
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine bird that is native to the North American grasslands. It is a ground nester that breeds and winters on open grasslands and feeds mostly on insects and spiders and some seeds. The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota, and South Dakota as well as south-central Canada (USFWS 2010g). Wintering occurs in the southern states of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico. Within the survey area, suitable habitat does occur. Therefore, the proposed COLT Connector Pipeline project **may affect, but is not likely to adversely affect** this species.

4.6.2 Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act

4.6.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Federal Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act
Effects of Project: No adverse effects anticipated

Suitable nesting or foraging habitat for bald eagles includes old growth trees relatively close (usually less than 1.24 miles [Hagen et al. 2005]) to perennial waterbodies. The survey area does not contain old growth trees and is at least 6.4 actual miles from Lake Sakakawea. Therefore, no adverse effects are anticipated. However, the possibility of transient, flying bald eagle individuals traversing the survey area does exist.

4.6.2.2 Golden Eagle (*Aquila chrysaetos*)

Federal Status: Unlisted; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

No golden eagles were observed during the field surveys, however, golden eagles may occur within or near the survey area. The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the survey area during the field survey. Therefore, the proposed project is unlikely to cause any adverse effects to golden eagles.

4.6.3 Wildlife Observed

During the field survey, SWCA ecologists observed different species of wildlife which utilize wetlands and other habitat within the survey area. Species observed included a leopard frog (*Rana pipiens*), white-tailed deer (*Odocoileus virginianus*), brewer's blackbird (*Euphagus cyanocephalus*), horned lark (*Eremophila alpestris*), killdeer (*Charadrius vociferous*), mourning dove (*Zenaida macroura*), ring-necked pheasant (*Phasianus colchicus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and western meadowlark (*Sturnella neglecta*).

Additionally, secondary observations of a northern raccoon (*Procyon lotor*), bivalve shells, and various waterfowl were observed.

4.7 TREE, SAPLING, AND SHRUB COUNT

During SWCA's field survey, approximately 15 windbreaks and 10 naturally occurring forested upland and shrubland areas were geographically referenced within the survey area. SWCA calculated an average density of 182 individual silver buffaloberry individuals per acre. Table 5 indicates the number of trees estimated to be impacted by the COLT Connector Pipeline project as currently proposed. The ND PSC requires a 2:1 post- to pre-construction mitigation for all trees impacted during the construction of the proposed pipeline. Therefore, SWCA estimates approximately 886 two-year-old sapling individuals will need to be replanted in order to fulfill the 2:1 mitigation requirement.

Table 5. Tree, Sapling, and Shrub Count.

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			200-foot Survey ROW	100-foot Construction ROW	
WV1	Russian olive (*Elaeagnus angustifolia*), Siberian peashrub (*Caragana arborescens*)	Farmstead windbreak	117	0	0
WV2	Silver buffaloberry (*Shepherdia argentea*)	Natural	60	42	84
WV4	Silver buffaloberry	Natural	5	2	4
WV5	Silver buffaloberry	Natural	20	9	18
WV6	Chokecherry (*Prunus virginiana*)	Natural	50	7	14

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			200-foot Survey ROW	100-foot Construction ROW	
WV7	Chokecherry	Natural	75	4	8
WV8	Downy hawthorn (*Crataegus mollis*)	Natural	75	20	40
WV9	Ponderosa pine (*Pinus ponderosa*)	Field windbreak	16	8	16
WV10	Chokecherry	Field windbreak	40	20	40
WV11	Ponderosa pine	Field windbreak	40	20	40
WV12	Ponderosa pine	Field windbreak	40	20	40
WV13	Siberian elm (*Ulmus pumila*), Ponderosa pine, Siberian peashrub	Farmstead windbreak	120	60	120
WV14	Silver buffaloberry	Natural	5	5	10
WV15	Siberian elm, green ash	Field windbreak	22	11	22
WV16	Siberian elm, green ash	Field windbreak	10	5	10
WV17	Siberian elm, green ash	Field windbreak	25	12	24
WV18	Siberian elm, green ash	Field windbreak	30	15	30
WV19	Siberian elm, green ash	Field windbreak	50	25	50
WV20	Siberian elm, green ash	Field windbreak	46	23	46
WV21	Siberian elm, green ash	Field windbreak	45	22	44
WV22	Siberian elm, green ash	Field windbreak	40	20	40
WV23	Siberian elm, green ash	Field windbreak	10	5	10
WV24	Siberian elm, silver buffaloberry, chokecherry	Natural	3	3	6
RR_WV1	Eastern cottonwood (*Populus deltoides*); silver buffaloberry	Natural	15; 377	8; 158	166
RR_WV2	Silver buffaloberry, green ash (*Fraxinus pennsylvanica*)	Natural	1	1	2
RR_WV3	Silver buffaloberry, green ash (*Fraxinus pennsylvanica*)	Natural	0	1	2

5.0 CONCLUSIONS AND RECCOMENDATIONS

1. SWCA ecologists recorded approximately 4.684 acres of wetlands within the survey area.
2. In total, 2.529 acres of PEM wetland *may* be temporarily impacted by construction activities.
3. SWCA estimates 443 trees, saplings, and shrubs may be impacted. Therefore, approximately 886 two-year-old saplings may need to be replanted to fulfill the 2:1 mitigation requirement.
4. According to the recommendations of the North Dakota Forest Service, tree species selection for replacement should be accomplished through collaboration with a reputable area nursery. This will allow for species to be selected based on various factors including species hardiness and area soil type (personal communication, telephone conversation between Tom Claeys, Forestry and Fire Management Team Leader, North Dakota Forest Service, and Michael Cook, Ecologist, SWCA, December 7, 2009).
5. According to the recommendations of the North Dakota Forest Service, non-native species are permitted and to an extent recommended for planting as they may be more resistant to known tree pathogens in the area (personal communication, telephone conversation between Tom Claeys, Forestry and Fire Management Team Leader, North Dakota Forest Service, and Michael Cook, Ecologist, SWCA, December 7, 2009).
6. No threatened or endangered species were observed during the field survey. The known species which occur in Williams County are not likely to be detrimentally impacted by construction activities.

6.0 LITERATURE CITED

Armbruster, M.J. 1990. Characterization of habitat used by whooping cranes during migration. *Biological Report* 90(4):1–16.

Bramblett, R.G. 1996. Habitats and Movements of Pallid and Shovelnose Sturgeon in the Yellowstone and Missouri Rivers, Montana and North Dakota. Doctoral dissertation. Montana State University, Bozeman.

Canadian Wildlife Service and U.S. Fish and Wildlife Service. 2007. International recovery plan for the whooping crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Committee on the Status of Endangered Wildlife in Canada. 2003. COSEWIC Assessment and Status Report on the Dakota Skipper *Hesperia dacotae* in Canada. Ottawa: Committee on the Status of Endangered Wildlife in Canada.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Determination Manual.* Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Hagen, S.K., P.T. Isakson, and S.R. Dyke. 2005. *North Dakota Comprehensive Wildlife Conservation Strategy*. North Dakota Game and Fish Department. Bismarck, ND.

Howe, M.A. 1987. Habitat use by migrating whooping cranes in the Aransas-Wood Buffalo corridor. In *Proceedings of the 1985 Crane Workshop*, edited by C. Lewis and J.W. Ziewitz, pp. 303–311. Platte River Whooping Crane Habitat Maintenance Trust and USFWS, Grand Island, Nebraska.

———. 1989. *Migration of Radio-Marked Whooping Cranes from the Aransas-Wood Buffalo Population: Patterns of Habitat Use, Behavior, and Survival*. USFWS Technical Report.

Kotliar, N.B., B.W. Baker, A.D. Whicker, and G. Plumb. 1999. A critical review of assumptions about the prairie dog as a keystone species. *Environmental Management* 24(2):177–192.

Licht, D.S., and S.H. Fritts. 1994. Gray wolf *(Canis lupus)* occurrences in the Dakotas. *American Midland Naturalist* 132:74–81.

Licht, D.S., and L.E. Huffman. 1996. Gray wolf status in North Dakota. *The Prairie Naturalist* 28(4):169–174.

McCabe, T.L. 1981. The Dakota skipper (*Hesperia dacotae* [Skinner]): Range and biology, with special reference to North Dakota. *Journal of the Lepidopterists' Society* 35(3):179–193.

National Oceanic and Atmospheric Administration. 2009. National Weather Service Office; Williston, ND. Archived Monthly Data. Last updated September 2009.

———. 2011. National Weather Service Office; Williston, ND. Archived Monthly Data. Last updated August 2011.

Natural Resources Conservation Service (NRCS). 2009. Web Soil Survey. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Available online at http://websoilsurvey.ncrs.usda.gov and http://soildatamart.ncrs.usda. Accessed October 7, 2009.

Root, B.G., M.R. Ryan, and P.M. Mayer. 1992. Piping plover survival in the Great Plains. *Journal of Field Ornithology*, Vol. 63, No. 1, pp. 10–15.

U.S. Army Corps of Engineers (USACE). 2010. *Regional Supplement to the Corps of Engineers Wetland Determination Manual: Great Plains Region version 2.0.* Edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-12. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Fish and Wildlife Service (USFWS). 1978. Reclassification of the gray wolf in the United States and Mexico, with determination of critical habitat in Michigan and Minnesota. *Federal Register* 43(47):9607–9615.

———. 1985a. Endangered and Threatened Wildlife and Plants: Determination of Endangered and Threatened Status for the Piping Plover. *Federal Register* 50 (238):50726–50734.

———. 1985b. Interior population of the least tern. *Federal Register* 50 FR 21784–21792. May 28, 1985.

———. 1988a. Black-footed Ferret Recovery Plan. U.S. Fish and Wildlife Service. Denver, Colorado. 154 pp.

———. 1988b. Great Lakes and Northern Great Plains Piping Plover Recovery Plan. U.S. Fish and Wildlife Service, Twin Cities, MN. 160 pp.

———. 1989. Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act. Denver and Albuquerque: U.S. Fish and Wildlife Service.

———. 1990a. Interior Population of the Least Tern Recovery Plan. U.S. Fish and Wildlife Service, Twin Cities, MN. 160 pp.

———. 1990b. Endangered and threatened wildlife and plants; Determination of endangered status for the pallid sturgeon. *Federal Register* 55(173):36641–36647.

———. 2002. Designation of Critical Habitat for the Northern Great Plains Breeding Population of the Piping Plover; Final Rule. *Federal Register*. September 11, 2002 (Volume 67, Number 176), Rules and Regulations, pp. 57637–57717.

———. 2005. Endangered and Threatened Wildlife and Plants; Review of Native Species that are Candidates or Proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Proposed Rule. *Federal Register* 70(90):24870–24934.

———. 2007a. Pallid sturgeon (*Scaphirhynchus albus)* 5-year review summary and evaluation. U.S. Fish and Wildlife Service, Pallid Sturgeon Recovery Coordinator. Billings, Montana.

———. 2007b. Dakota skipper conservation guidelines *Hesperia dacotae* (Skinner) (Lepidoptera: Hesperiidae). U.S. Fish and Wildlife Service, Twin Cities Field Office. Available online at http://www.fws.gov/midwest/endangered/insects/dask-cons-guid2007.pdf. Accessed September 3, 2010.

———. 2010a. County Occurrence of Endangered, Threatened, and Candidate Species and Designated Critical Habitat in North Dakota. Available online at http://www.fws.gov/northdakotafieldoffice/county_list.htm. Accessed May 14, 2010.

———. 2010b. Black-footed ferret. Available online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A004. Accessed September 7, 2010.

———. 2010c. Gray wolf. Available online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A00D. Accessed September 7, 2010.

———. 2010d. Whooping crane. Available online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B003. Accessed September 2, 2010.

———. 2010e. Piping plover. Available online at http://www.fws.gov/mountain-prairie/species/birds/pipingplover. Accessed September 7, 2010.

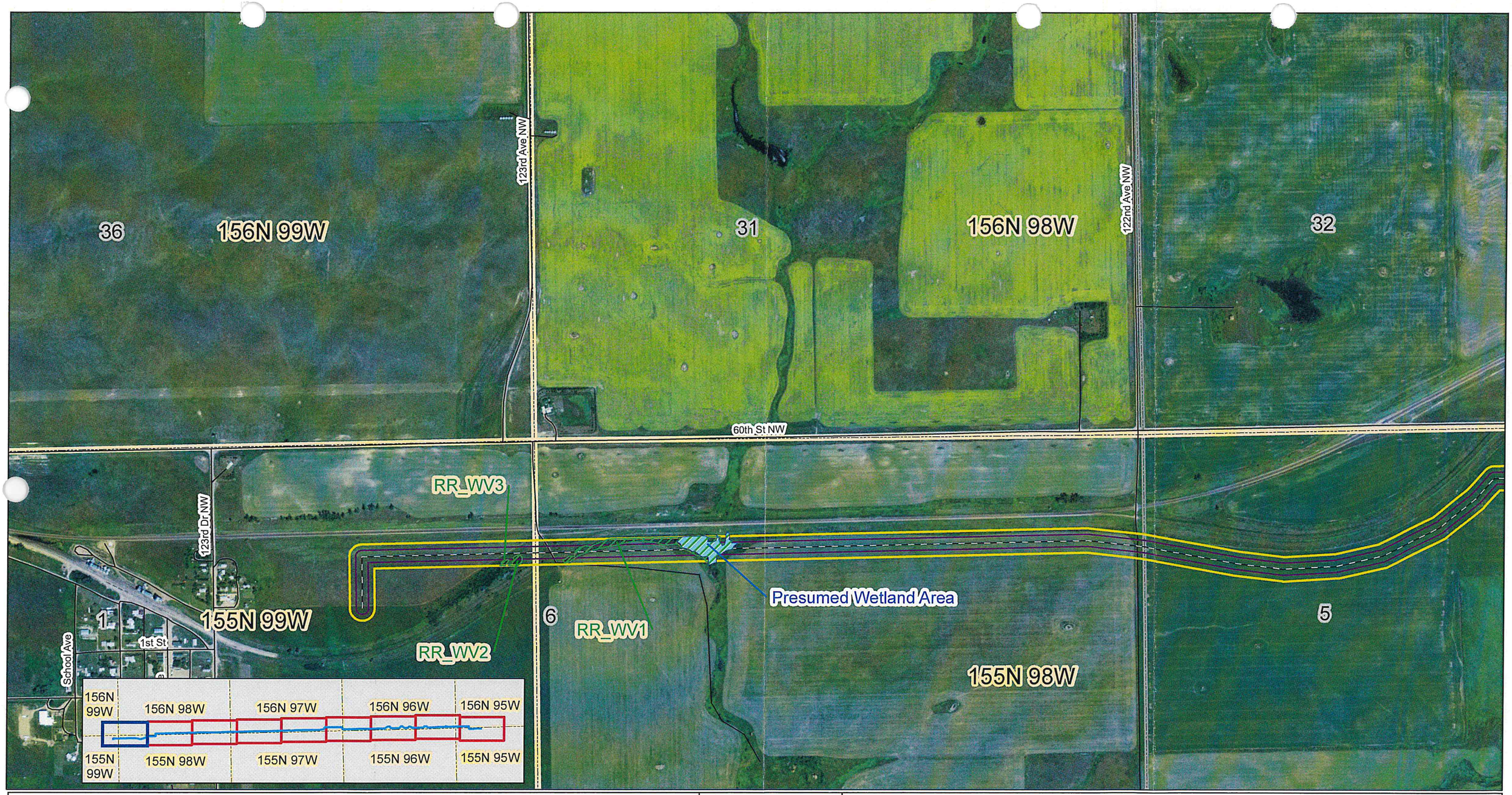
———. 2010f. Least tern (interior population). Available online at http://www.fws.gov/southwest/es/oklahoma/lestern.htm. Accessed September 7, 2010.

———. 2010g. Endangered and threatened wildlife and plants; 12-month finding on a petition to list Sprague's pipit as endangered or threatened throughout its range. Federal Register 75(178): 56028-56050.

U.S. Geological Survey (USGS). 2006. Ecoregions of North Dakota and South Dakota. Available at http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/42c.htm. Last updated August 2006.

APPENDIX A

Vicinity Maps and Site Layout Maps



Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

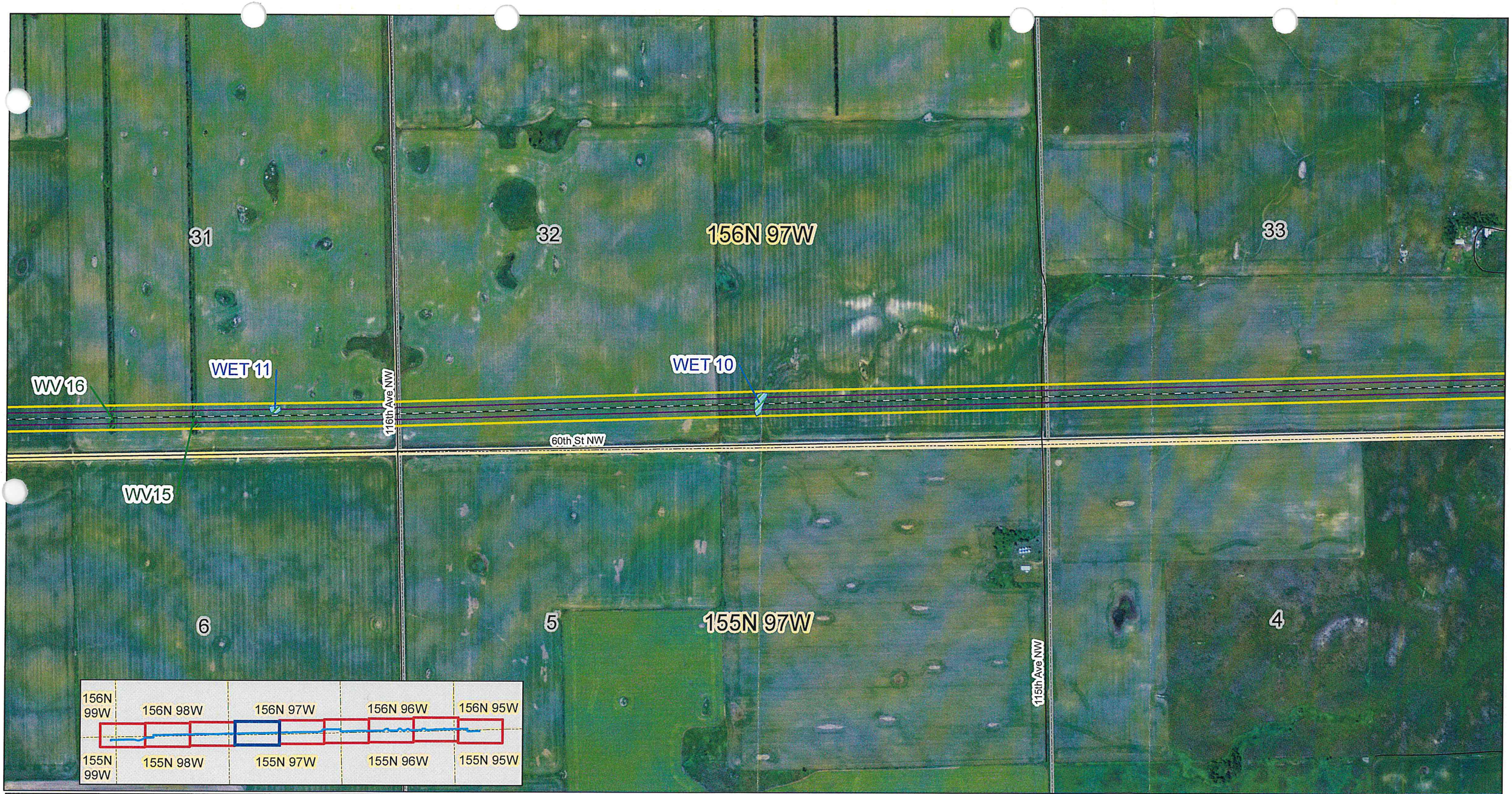
www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S



Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

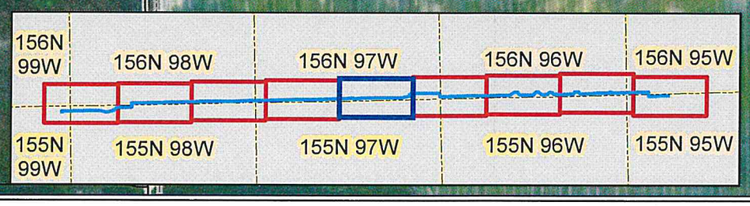
0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

33
34
156N 97W
35
36
113th Ave NW
112th Ave NW
WET 9
WET 8
114th Ave NW
60th St NW
WV 14
60th St NW
4
3
155N 97W
2
1
112th Ave NW



Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA® ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

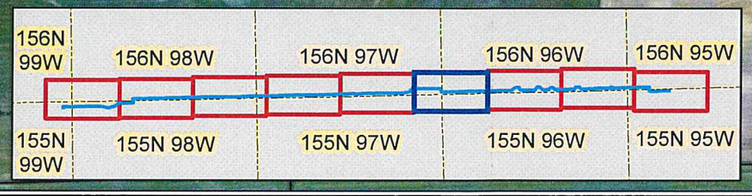
0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

36
156N 97W
31
156N 96W
32
111th Ave NW
110th Ave NW
WET 6
WB 5
WB 3
WB 4
60th St NW
1
155N 97W
6
155N 96W
5



Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA® ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

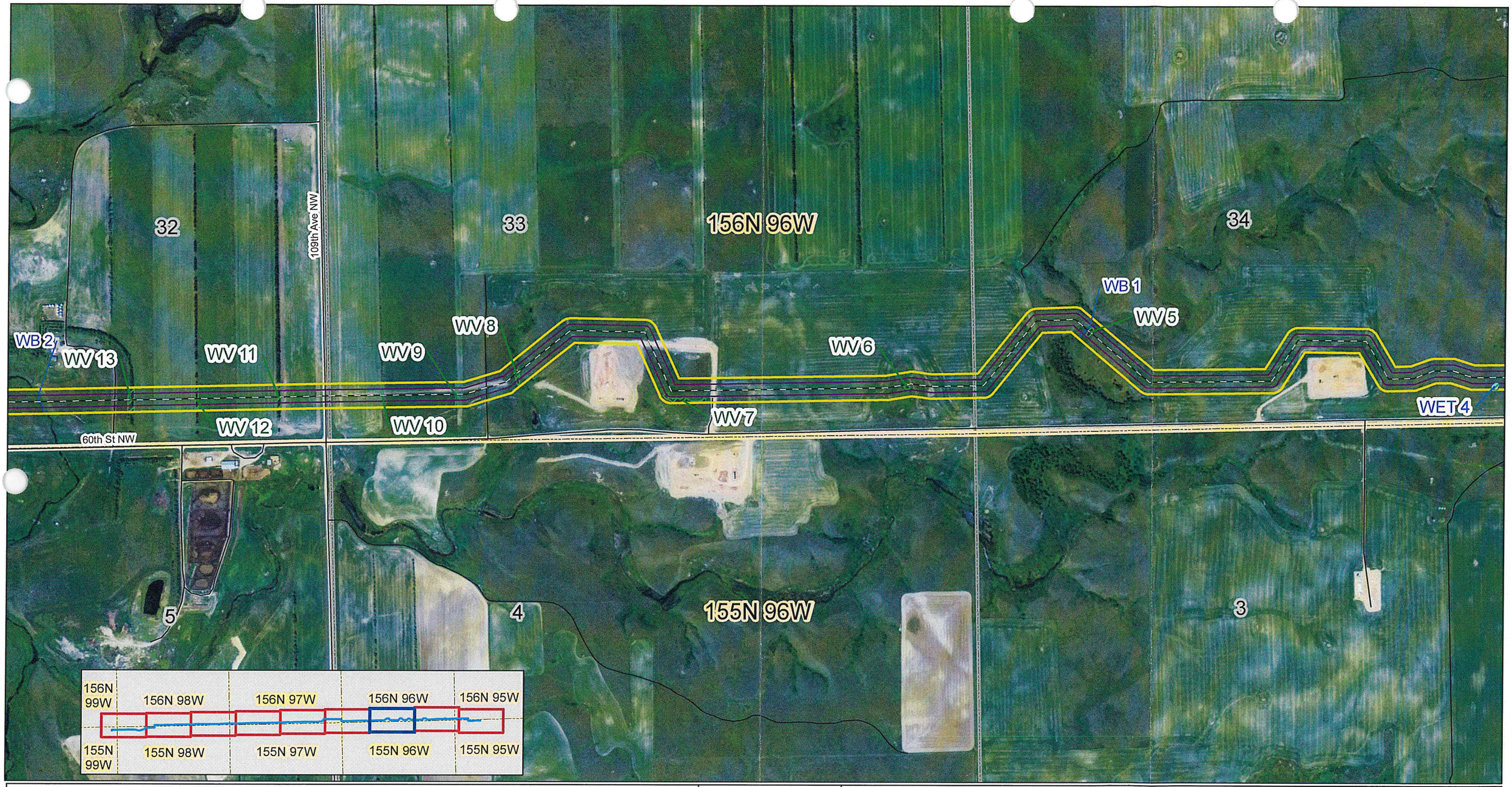
www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S



Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

Legend

- Field Surveyed/ Final Pipeline Alignment
- 200-foot-wide Surveyed Area
- 100-foot-wide Construction ROW
- Existing Road
- Stream
- Woody Vegetation
- Wetland
- Township/Range
- Section Line

SWCA®
ENVIRONMENTAL CONSULTANTS
116 North 4th Street
Suite 200
Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

www.swca.com

0 0.1 0.2 0.4 0.6 0.8 Miles

Scale: 1:12,000
Base Map: Aerial Photo, National Agricultural Imagery Program, 2010
Williams County, North Dakota

UTM Zone 13N, NAD83, Meters
August 30, 2011

N
W E
S

APPENDIX B
Photographic Log

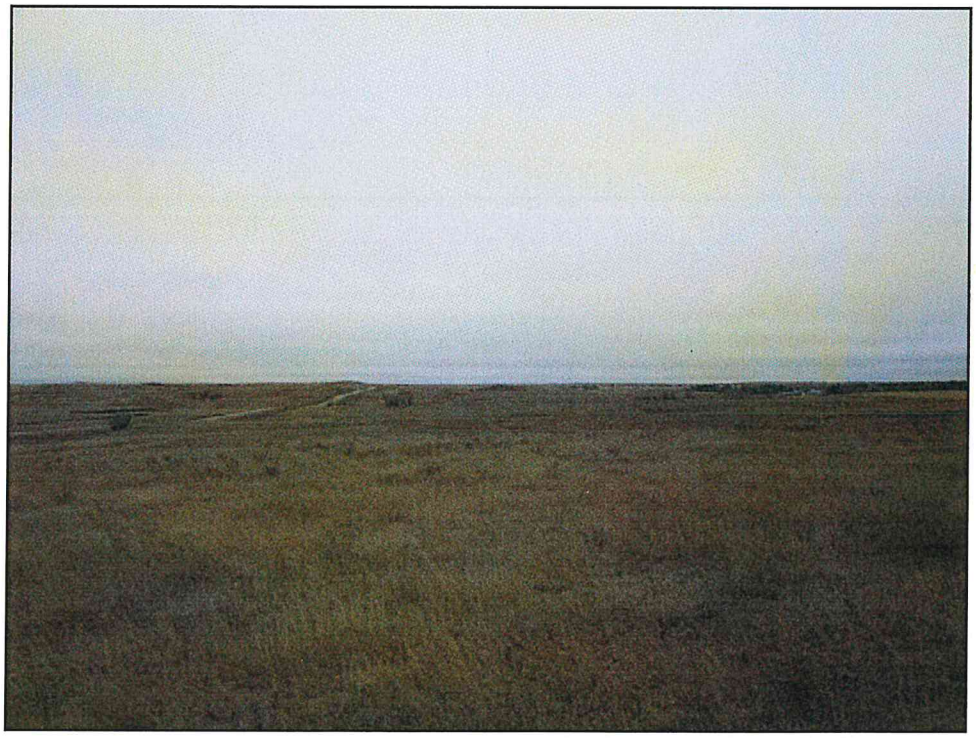
Photograph 1. Facing west looking across wheat stubble field.

Photograph 2. Facing west toward WET 1.

Photograph 3. Facing east toward waterbody near WET 6.

Photograph 4. Facing west toward Beaver Creek.

Photograph 5. Facing west toward Beaver Creek.



Photograph 6. Facing west along centerline.

Photograph 7. Facing east along centerline.

Photograph 8. Facing south toward termination point of proposed alignment.

APPENDIX C
USDA-NRCS Soil Map Unit Descriptions

AMOR

The Amor series consists of moderately deep, well-drained, moderately permeable soils found on sandstone bedrock uplands with slopes ranging from approximately 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42 degrees Fahrenheit (°F). This soil type is largely used for cultivation of small grains, flax, and corn. Native vegetation species common to this soil type include needleandthread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), and blue grama (*Bouteloua gracilis*) (Natural Resources Conservation Service [NRCS] 2009).

ARNEGARD

The Arnegard series consists of very deep, well- or moderately well-drained soils that formed in calcareous loamy alluvium on upland swales, terraces, fans, and foot slopes. Permeability is moderate. Slopes range from 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is 14 inches and the mean air temperature is 42°F. Most areas are cropped to spring wheat, oats, barley, and hay. Native vegetation is mid, tall, and short grasses such as western wheatgrass, green needlegrass (*Nasella viridula*), big bluestem (*Andropogon gerardii*), and blue grama (NRCS 2009).

BOWBELLS

The Bowbells series consists of very deep, well and moderately well drained soils found on glacial till plains and moraines. Permeability is moderate in the upper portions and moderately slow to slow in the substratum. Slopes range from approximately 0 to 9 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 42°F. This soil type is used for cultivation of small grains. Native vegetation species historically common to this soil type include western wheatgrass, green needlegrass, and big bluestem (NRCS 2009).

BOWDLE

The Bowdle series consists of well-drained soils formed in loamy alluvium underlain by sand and gravel. The soils are moderately deep over sand and gravel and are on outwash plains and stream terraces. Permeability is moderate in the solum and rapid or very rapid in the underlying material. Slopes range from 0 to 15 percent. The mean annual precipitation found throughout the spatial extent of this soil type is about 18 inches, and mean annual air temperature is about 44°F. This soil type is primarily cropped to small grain, alfalfa, and some flax and corn. Native vegetation is primarily western wheatgrass, blue grama, green needlegrass, needleandthread, forbs, and upland sedges (*Carex* spp.) (NRCS 2009).

CABBA

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2 and 70 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem (*Schizachyrium*

scoparium), green needlegrass, and other various herbs, forbs, and shrub species (NRCS 2009).

FARNUF

The Farnuf series consists of very deep, well-drained soils that formed in alluvium, glaciolacustrine, or glaciofluvial deposits. These soils are on alluvial fans, stream terraces, hills, sedimentary plains, glacial lake plains, moraines, and outwash plains. Slopes are 0 to 35 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 42°F. Farnuf soils are used mainly for irrigated and nonirrigated cropland. The potential native vegetation is primarily mid and short grasses such as western wheatgrass, prairie sandreed (*Calamovilfa longifolia*), green needlegrass, little bluestem, needleandthread, blue grama, shrubs, and forbs (NRCS 2009).

KORCHEA

The Korchea series consists of very deep, well-drained soils found on floodplains and low stream terraces. Permeability is moderate with slopes ranging from approximately 0 to 6 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil type is used most often for cultivation of small grains, hay, and corn. Alternatively, this soil is used for rangeland foraging. Native vegetation species common to this soil type include needleandthread, green needlegrass, and western wheatgrass (NRCS 2009).

LEHR

The Lehr series consists of very deep, somewhat excessively drained, shallow soils that formed in loamy alluvium over sand and gravel. Permeability is moderate or moderately rapid in the upper part and rapid or very rapid in the substratum. These soils are on outwash plains and stream valley terraces and have slopes ranging from 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is 14 inches and the mean annual air temperature is 40°F. Where cultivated, small grains, corn, and hay are the principal crops. In pastures, the native vegetation consists of mid and short prairie grasses such as western wheatgrass, blue grama, and upland sedges (NRCS 2009).

WABEK

The Wabek series consists of very deep, excessively drained, rapidly and very rapidly permeable soils formed in sand and gravel glaciofluvial deposits. These soils are on outwash plains, beach ridges, terraces, and terrace escarpments and have slopes of 0 to 45 percent. The mean annual precipitation found throughout the spatial extent of this soil type is 16 inches and the mean annual air temperature is 42°F. This series is used mainly for range and pasture. Native vegetation is blue grama, upland sedges, western wheatgrass, needleandthread, and forbs (NRCS 2009).

WILLIAMS

The Williams series consists of very deep, slowly permeable, well-drained soils found on glacial till plains and moraines with slopes at approximately 0 to 35 percent. The mean annual

precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation. Native vegetation species common to this soil type include western wheatgrass, needleandthread, blue grama, and green needlegrass (NRCS 2009).

ZAHL

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1 to 60 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem, and needleandthread (NRCS 2009).

REFERENCES CITED

Natural Resources Conservation Service (NRCS). 2009. Web Soil Survey. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Available online at http://websoilsurvey.ncrs.usda.gov and http://soildatamart.ncrs.usda. Accessed October 7, 2009.