TransCanada Keystone Pipeline, L.P.
Keystone XL Pipeline

Habitat Conservation Plan

Project Number:

TAL-00050388-75

Submitted By:

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Acronyms and Abbreviations

ABB:	American Burying Beetle
BGEPA:	Bald and Golden Eagle Protection Act
BMP:	Best Management Practice
bpd:	Barrels per Day
CEQ	Council on Environmental Quality
CMRP:	Construction, Mitigation, and Reclamation Plan
CFR:	Code of Federal Regulations
CWA:	Clean Water Act
EA:	Environmental Assessment
EES:	Electrical Equipment Shelter
EPA:	Environmental Protection Agency
ERP:	Emergency Response Plan
ERPPD:	Elkhorn Rural Public Power District
ESA:	Endangered Species Act of 1973, as amended
HCP:	Habitat Conservation Plan
HDD:	Horizontal Directional Drill
ITP:	Incidental Take Permit
MBTA:	Migratory Bird Treaty Act
MLV:	Mainline Valve
MOP:	Maximum Operating Pressure
NEPA:	National Environmental Policy Act
NE:	Nebraska
NESCA:	Nebraska Nongame and Endangered Species Act
NGO	Nongovernmental Organization
NGPC:	Nebraska Game and Parks Commission
NPDES:	National Pollutant Discharge Elimination System
NPPD :	Nebraska Public Power District
NRC:	National Response Center
NRCS:	Natural Resources Conservation Service
OCC:	Operations Control Center
OPS:	Office of Pipeline Safety
PEM:	Palustrine Emergent Wetlands
PFO:	Palustrine Forested Wetlands
PHMSA:	Pipeline Hazardous Materials Safety Administration
PMP:	Pipeline Maintenance Program
PSC:	Public Service Commission
PSS:	Palustrine Scrub-Shrub Wetlands
PUC:	Public Utilities Commission
ROW:	Right-of-Way
SCADA:	Supervisory Control and Data Acquisition
SD:	South Dakota
SDGF&P:	South Dakota Department of Game, Fish, and Parks
Service:	United States Fish and Wildlife Service
SPCC:	Spill Prevention, Control, and Countermeasure
SVC:	Static Var Compensator
TWA:	Temporary Workspace Area
USC:	United States Code
USACE:	United States Army Corps of Engineers
USDOT:	United States Department of Transportation
USEPA:	United States Environmental Protection Agency
USFWS:	United States Fish and Wildlife Service
USGS:	United States Geological Survey

VES:	Variable Frequency Drive Equipment Shelter
WCSB:	Western Canadian Sedimentary Basin
WPFO:	Western Prairie Fringed Orchid

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1.0 Introduction

TransCanada Keystone Pipeline, L.P. (Keystone) proposes to construct, operate, and maintain a crude oil pipeline and ancillary facilities from the United States (U.S.)-Canadian border to Steele City, Nebraska, referred to as the Keystone XL Pipeline project (Project). In addition to the pipeline, Keystone will construct permanent and temporary construction access roads, temporary facilities (contractor yards, pipe yards, construction camps, and rail sidings) and aboveground facilities including pump stations, delivery facilities, and mainline valves. Transmission and distribution lines will be built and operated by two power providers; Elkhorn Rural Public Power District (ERPPD) and Nebraska Public Power District (NPPD), to service two Project pump stations within the Plan Area (Plan Area is defined in Section 1.2). A new substation will be built by Basin Electric to service the Rosebud transmission line to pump station 20 in Tripp County, South Dakota.

There has been a long regulatory review of the Project, starting in 2008. A Final Environmental Impact Statement (FEIS) was issued by the U.S. Department of State (DOS) in 2011 with a Biological Assessment (BA). A Final Supplemental EIS (FSEIS) was issued in 2014 with an amended BA and a Biological Opinion (BO). After the FSEIS, the DOS and U.S. Fish and Wildlife Service (Service) reviewed and issued conference opinions on the rufa red knot and northern long-eared bat as not likely to adversely affect. Also, during this time, the Service confirmed that the Project effects on a list of species and conservation measures proposed to mitigate those effects in the BO were still applicable (USFWS 2017b).

On March 29, 2019, the President issued a new Presidential Permit, authorizing the Project to cross the U.S.-Canada border. As the President himself issued the Presidential Permit, the DOS no longer has a federal nexus to the Project and the previous Section 7 consultation and BO have been withdrawn. The Bureau of Land Management (BLM) and DOS completed second FSEIS to address the Nebraska Mainline Route Alternative Route (MAR) approved by the Nebraska Public Service Commission and to address the items identified by the Montana Federal District Court in its November 8, 2018 ruling. The draft SEIS was issued on October 4, 2019, the final SEIS was issued on December 20, 2019, and BLM issued a BO on the effects of the proposed Keystone XL Pipeline on the ABB on December 23, 2019 for all Federal actions associated with the Project.

Construction of the Project and associated facilities in South Dakota and Nebraska may cause the loss and disturbance of habitat used by the American burying beetle (*Nicrophorus americanus*) (ABB). This species was listed as endangered and protected under the Endangered Species Act of 1973, as amended (ESA) (16 USC 1531 – 1544). Effective November 16, 2020, the ABB was listed as threatened (50 CFR 17.11 and 17.47) and incidental take as a result of soil disturbance in the Northern Plains analysis area is prohibited. Therefore, Keystone is requesting a Section 10 (a)(1)(B) permit (Permit) to authorize the incidental take of a threatened listed species resulting from construction, operation, maintenance, and repair (both routine and emergency) of the Project. NPPD and Basin Electric may elect to request a Section 10 Permit on their own behalf for their respective electric power lines in this HCP. These activities are referred to collectively as Covered Activities. This Habitat Conservation Plan (HCP) has been prepared in support of the Permit applications by Keystone and NPPD.

An ESA Section 10 (a)(1)(B) permit is a tool by which a non-federal entity may voluntarily obtain authorization to take listed species in connection with otherwise lawful activities such as pipeline construction and operation. Among other things, an HCP specifies conservation measures that will be implemented to minimize and mitigate, to the maximum extent practicable, a specified level of incidental take of listed species. “Incidental take” is defined by the ESA and relevant regulations as take of any federally listed wildlife species that is incidental to, but not the purpose of, otherwise lawful activities (ESA Section 10(a)(1)(B)).

Two groups of species are addressed in this HCP: Covered Species and Evaluation Species. Covered Species are those for which an Incidental Take Permit (ITP) is being sought. The Covered Species addressed in this HCP is the ABB, which is known to occur in a portion of the Project area in South Dakota and Nebraska. Evaluation Species will not be covered by the Permit. Evaluation Species include federally,

and state listed, proposed, and candidate species that are known to occur or have a potential to occur within the Plan Area. Although these Evaluation Species occur in the Plan Area, they are not considered at risk of being taken by the Covered Activities. The Evaluation Species are the small white lady's slipper (*Cypripedium candidum*), western prairie fringed orchid (*Platanthera praeclara*), blowout penstemon (*Penstemon haydenii*), blacknose shiner (*Notropis heterolepis*), finescale dace (*Phoxinus neogaeus*), northern redbelly dace (*Phoxinus eos*), northern pearl dace (*Margariscus nachtriebi*), sturgeon chub (*Macrhybopsis gelida*), whooping crane (*Grus americana*), interior least tern (*Sternula antillarum athalassos*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), northern long-eared bat (*Myotis septentrionalis*) and northern river otter (*Lontra canadensis).*

In this HCP, potential incidental take of the ABB is quantified, however mitigation is provided based on the number of acres of known and potential habitat that will be directly and indirectly impacted by Covered Activities within the Permit Area. Use of acres of habitat as a proxy for impacts to individual ABBs is described in greater detail in Section 6.1 of this document. This Plan uses habitat as a proxy for mitigation, estimated take calculations are provided in Section 6.1.

1.1 Purpose and Need for Keystone XL Pipeline

The primary purpose of the Project is to transport Canadian crude oil production to serve Gulf Coast refinery demand which is currently being met through foreign imports of comparable heavy crude oil. Construction of the Project will enable Canadian producers to reach a market with improved safety, reliability and lower transportation costs compared to alternatives such as rail, trucking or barging, which benefits both buyer and seller. It will also enable Gulf Coast refineries to access a lower cost and more reliable source of production and avoid paying a premium to foreign producers for declining supplies of comparable crude oil for which their refineries are configured. The market need for the Project is demonstrated in part by confirmed contractual shipper commitments. Shippers evaluate the merits of various pipeline proposals and ultimately decide which projects to support. Shippers have committed to the available capacity of the Project. Shippers have already committed to binding contracts for the full capacity of the existing Keystone pipeline system to transport crude oil from Canada to Patoka, Illinois; Cushing, Oklahoma; and Nederland and Houston, Texas. These binding commitments demonstrate a material endorsement of support for the Project. The market need for the Project is to:

- Increase crude oil supply to U.S. refineries; and
- Provide a means to reduce U.S. dependence on foreign waterborne crude oil supplies.

In summary, the need for the Project is demonstrated by (1) confirmed shipper interest represented by binding contracts in support of the Project to transport crude oil from Canada to Nederland and Houston, Texas; (2) the large volume of heavy crude oil that is processed at U.S. Gulf Coast refineries, which is primarily imported to the Gulf Coast by tanker from foreign countries; (3) the limited existing pipeline capacity to move incremental volumes of Canadian heavy crude oil to the U.S. Gulf Coast; and (4) the cost and risks of transporting crude oil to the U.S. Gulf Coast by other modes of transportation.

The Project also has provision for the transportation of domestic U.S. crude oil produced in the Williston basin of North Dakota and Montana to the U.S. Gulf Coast, depending on market demand.

1.2 Plan Area and Permit Area

The Plan Area (Table 1, Figure 1) includes all lands within the known range of the ABB that are within counties that contain Project footprint. This includes portions of Tripp County in South Dakota and Keya Paha, Boyd, and Holt Counties and a part of Antelope County in Nebraska. The Plan Area also includes Cherry County, which is in the current range of the ABB and within which a Conservation Area consisting of 1,200 acres has been identified. The Conservation Area represents the area within which mitigation lands have been identified and will be protected in perpetuity through a conservation easement to offset impacts to ABB habitat.

The Permit Area is a subset of the Plan Area and includes all areas where take of Covered Species will occur and would be authorized by the ITP. As such, the Permit Area (Table 1, Figure 2) includes all Project footprint within the Plan Area that has been mapped as ABB habitat (poor or better).

Table 1. Areas Encompassed by the Plan Area and Permit Area

State	County	Plan Area acres (square miles)	Permit Area acres (square miles)
South Dakota	Tripp	1,034,519.28 (1,616.44)	705.00 (1.10)
Nebraska	Keya Paha	494,953.67 (773.37)	284.17 (0.44)
	Boyd	348,242.43 (544.13)	121.37 (0.19)
	Holt	1,546,979.39 (2,417.16)	644.31 (1.01)
	Antelope	549,191.54 (858.11)	0.0
	Cherry [1]	962,039.23 (1,503.19)	0.0
Both States	**Total**	**4,934,925.54 (7,712.38)**	**1,754.85 (2.74)**

[1] Conservation Area within which mitigation lands would be purchased.

1.3 Requested Permit Duration

This HCP is written in anticipation of issuance of a Section 10(a)(1)(B) ITP valid for 50 years (estimated life of the Project), covering the construction, operation, maintenance, and repair phases of the Covered Activities. Take may occur during the lifetime of the Project. The HCP will take effect when the Permit is issued. Take authorizations will not be valid until mitigation is provided in full for the Covered Species or as agreed upon by the Service and Keystone. If the life of the Project extends past 50 years, Keystone shall coordinate with the Service to renew or amend the Permit as required.

1.4 Alternatives to the Taking

Keystone considered various alternatives that would avoid take of the ABB. These alternatives included re-routing the Project east and west of the current proposed right-of-way (ROW). Keystone proposed alternative routes in the Nebraska Public Service Commission (NE PSC) process, and the Commission found that the route discussed in this HCP was the best alternative, considering all factors. Design alternatives, such as elevating the pipeline, may have removed some minor negative effects (i.e., soil heating) but would not have significantly reduced ground disturbance associated with construction through habitat. Additionally, construction of an elevated pipeline would likely have resulted in a greater area of permanent ABB habitat loss because of the placement of piers or other supports required to elevate the pipe. Similarly, elevated pipe may have resulted in take of other listed species.

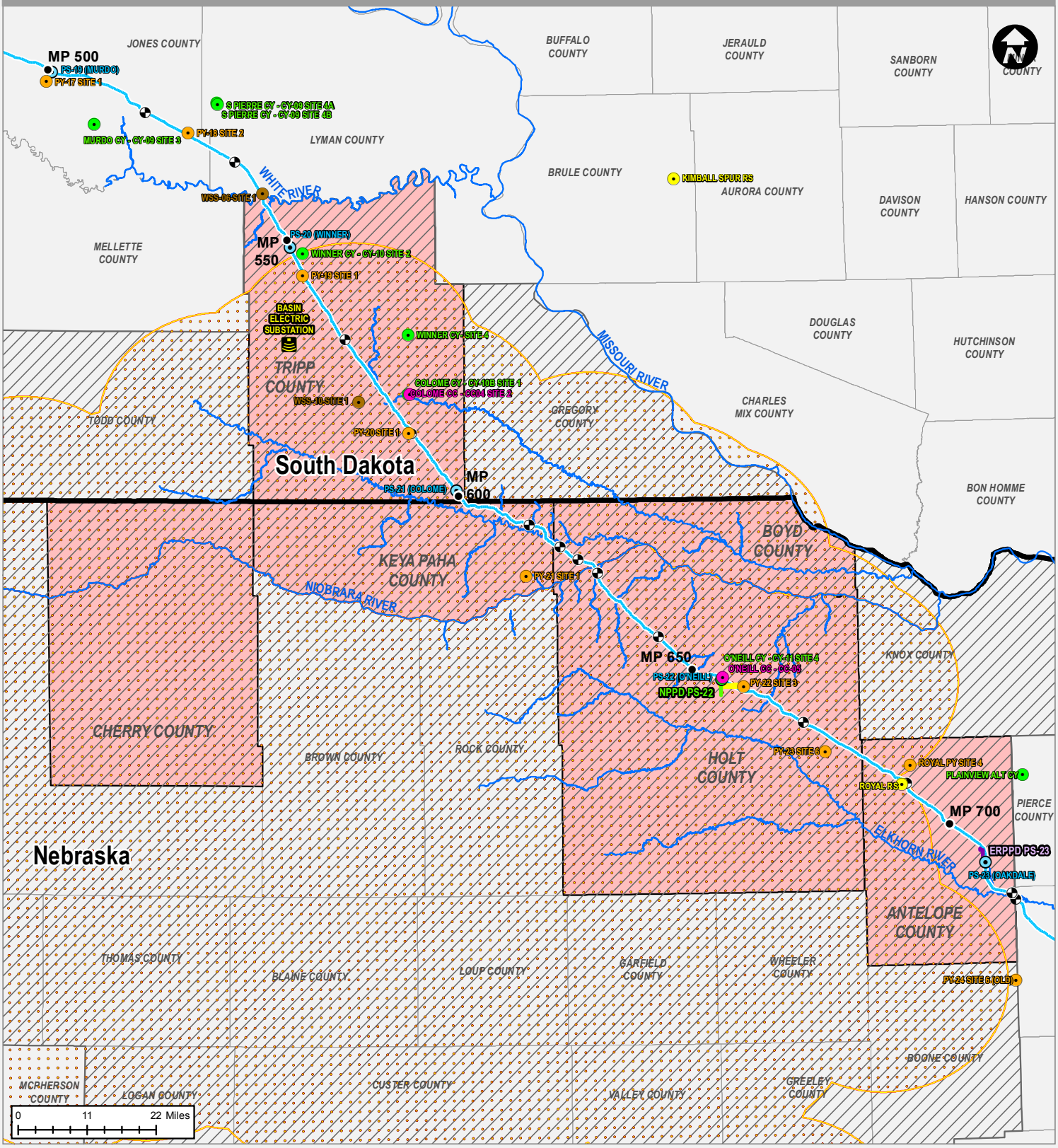
1.4.1 Proposed Action Alternative

The proposed action alternative is to construct and operate the Project as detailed in Section 2. Keystone considers this the only viable action alternative. Under this alternative, Keystone would submit this HCP along with an application for a Section 10 ITP. If issued, the ITP would cover incidental take of ABBs resulting from the Covered Activities.

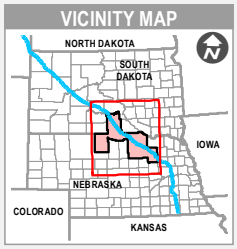
1.4.2 No Action Alternative

Under this alternative, Keystone would not construct the Project and, therefore, no take of the ABB would occur. This alternative would not require an HCP or ITP and would result in the increased transportation of oil supplies by rail, barge, truck and/or a different entity proposing a pipeline to move the supplies to market (FSEIS Sections 2.2.3 and 5.1). Under this alternative, the benefits of the Project would not occur.

HCP - FIGURE 1 - PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- RAIL SIDING
- WATER STORAGE SITE
- PUMP STATION
- VALVE SITE
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- ABB SSA ANALYSIS AREA
- ABB RANGE (USFWS)
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-01	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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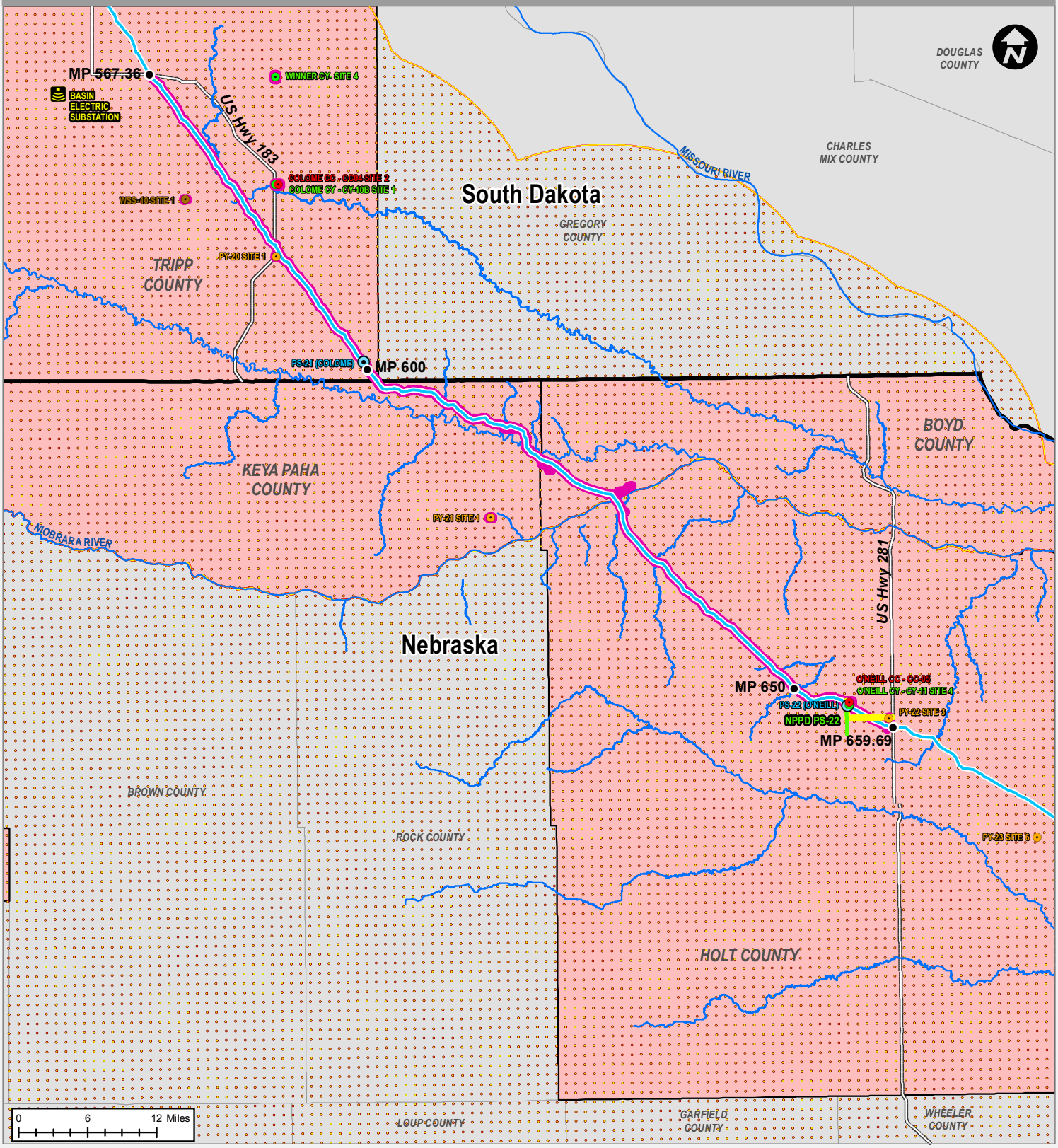
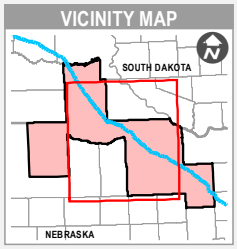
KEYSTONE XL PROJECT

TC Energy

HCP - FIGURE 2 - PERMIT AREA



VICINITY MAP



LEGEND

- MILE POST
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- WATER STORAGE SITE
- PUMP STATION
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES
- US HIGHWAY

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES
- PERMIT AREA
- ABB SSA ANALYSIS AREA
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-02	SCALE:	1 in = 12 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

TC Energy

1.5 Public and Agency Coordination

During the lengthy review of the Project, Keystone has actively pursued public and agency input. This included meeting with concerned groups, individuals, public officials, and agencies, to properly coordinate this proposed action with all potentially concerned entities. Public scoping meetings for the NEPA analyses completed for this Project were conducted from 2008 through late 2018. In addition, since 2008 Keystone has held numerous meetings with county, state, and federal agencies; landowner groups; and the public.

Additionally, the following agencies have been consulted or coordinated with during the process of addressing covered and evaluation species concerns for the Project.

- USFWS Nebraska Field Office, Grand Island;
- USFWS South Dakota Field Office, Pierre;
- USFWS Mountain Prairie Region Office, Lakewood, CO;
- South Dakota Department of Game Fish and Parks (SDGF&P); and
- Nebraska Game and Parks Commission (NGPC).

This document was originally prepared by EXP Energy Services, Inc. on behalf of Keystone and will be further developed through coordination with the Service and applicable state agencies, and utilization of the NEPA and ESA documents/findings prepared for this Project.

1.6 Regulatory Context

1.6.1 Endangered Species Act

Section 9 of the ESA prohibits the “take” of any federally listed endangered species or violate any regulation pertaining to any threatened species threatened wildlife species (16 USC 1538(a)). By definition, the Service has extended the take prohibition to most species listed as threatened. The ESA defines “take” as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 USC 1532(19)). “Harm” is not defined in the statute, but the Service’s regulations define it as “an act which actually kills or injures wildlife and may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering” (50 CFR 17.3 (2005)). Section 10(a)(1)(B) of the ESA (16 USC 1539(a)(1)(B)) authorizes the Service to issue a permit allowing take that is “incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.”

Section 10(a)(2)(A) of the ESA provides that, in order to obtain an ITP, the applicant must submit an HCP that identifies or satisfies several substantive criteria: (1) the impact that will likely result from the taking; (2) the steps the applicant will take to minimize and mitigate the impacts and the funding available to implement those steps; (3) what alternative actions to taking were considered and the reasons the alternatives were not chosen; and (4) other measures that the Service may require as necessary or appropriate for purposes of the conservation plan (16 USC 1539(a)(2)(A)). The Service’s ESA implementing regulations also provide permittees with “no surprises” assurances, which provide certainty as to their future obligations under an HCP (50 CFR 17.22, 17.32, 63 FR 8859). The Service’s Habitat Conservation Planning Handbook (HCP Handbook) provides overall guidance on the elements of an HCP (USFWS 2016a). On April 26, 2018, the Service issued a memorandum, “Guidance on trigger for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act where occupied habitat or potentially occupied habitat is being modified” that provided guidance on how one determines whether a project is likely to result in “take” of a listed species as it relates to habitat modification (USFWS 2018a). Additionally, the memorandum provided a questionnaire for potential applicants for incidental take authorization under Section 10(a)(1)(B) of the ESA.

Section 7(a)(2) of the ESA requires that each federal agency must consult with the Service to ensure that agency actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat (16 USC 1536(a)(2)).

"Jeopardize" is defined by the regulations as engaging in an action that would reasonably be expected, directly or indirectly, to appreciably reduce the likelihood of the survival and recovery of the species in the wild (50 CFR 402.02). Issuance of an ITP is considered an action for which consultation is required (HCP Handbook at 1–6). With respect to the issuance of ITPs, the Service functions as both the "action" agency and the "resource" agency, so that the Service is actually consulting "with itself." According to the HCP Handbook, the consultation must include consideration of direct and indirect effects on the species, as well as the impacts of the Project on listed plants and critical habitat, if any (HCP Handbook; 3–17 through 3–19).

1.6.2 National Environmental Policy Act

The Service considers issuance of an ITP a federal action subject to the requirements of NEPA (42 USC 4321–4327). NEPA requires federal agencies to: (1) study proposed projects to determine if they will result in significant environmental impacts; and (2) review the alternatives available for the Project and consider the impact of the alternatives on the environment (42 USC 4332(c)). The scope of NEPA is broader than the ESA in that it requires that the agency consider the impacts of the action on the "human environment," including a variety of resources such as water, air quality, and cultural and historic resources. In the context of an HCP and ITP, the scope of the NEPA analysis covers the direct, indirect, and cumulative effects of the proposed incidental take and the mitigation and minimization measures proposed in the HCP (HCP Handbook at 5–1).

As defined by NEPA regulations, indirect impacts are those effects "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern in land use, population density or growth rate…" (40 CFR 1508.8). In accordance with NEPA regulations, therefore, it is appropriate to consider the degree to which the Covered Activities and any connected actions are likely to induce other growth and development that may have further effects on the resources under consideration in this HCP.

The HCP Handbook describes the Service's procedures for complying with NEPA with respect to HCPs. Most HCPs require preparation of an Environmental Assessment (EA) to comply with NEPA. The Service will review Keystone's Permit application and HCP pursuant its requirements, as well as the extensive NEPA record prepared for this Project over the course of 11 years, including the most recent SEIS (DOS 2018, 2019) and previous FSEIS (DOS 2014). Incorporating by reference analysis from these EISs in any new decisions and NEPA analyses is consistent with Council on Environmental Quality (CEQ) regulations.

1.6.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 USC 668) prohibits taking, possession, and commerce of bald eagles and golden eagles or any part, nest, or eggs without a permit issued by the Secretary of the Interior. "Take" is defined as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." "Disturb" is defined in 50 CFR 22.3 as the act of agitating or bothering a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, the following: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or shelter behavior. Furthermore, "disturb" also includes impacts that result from human-induced alterations occurring near a nest site, which was used previously by eagles, during a time when eagles are absent from the area, and if, when the eagle returns, these alterations agitate or bother an eagle to the extent that it interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

The golden eagle was never listed as threatened or endangered under the ESA and on August 8, 2007, the Service removed the bald eagle from the List of Threatened and Endangered Wildlife due to the species' recovery (72 FR 37345). As a result, neither species is protected from "take" under the ESA, however, the BGEPA does provide protection for bald and golden eagles. The Service concluded that a mechanism should be available to authorize take of bald and golden eagles pursuant to the BGEPA (74 FR 46836). On November 10, 2009, the Service authorized limited take of bald and golden eagles under the BGEPA for cases where the take to be authorized is associated with otherwise lawful activities (74 FR 46836).

Keystone does not intend to apply for Authorization from the Service for the incidental take of bald or golden eagles pursuant to the BGEPA because such take is not anticipated since there would be no construction within 660 feet of active nests, or construction would take place outside the nesting window.

1.6.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-712) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. USFWS has provided guidance on measures to avoid or minimize the take of migratory birds during construction and operation of projects that would result in habitat disturbance for projects in general (USFWS, 2016b) and pipeline projects specifically (USFWS, 2010). Keystone will follow this guidance to minimize the take of a migratory bird during the MBTA nesting season. Those measures include:

- Habitat management through mowing in fall, or prior to spring nesting, to prevent nesting in the spring;
- Where mowing is impracticable, conducting pre-construction activity in the area prior to spring nesting to discourage nesting; or
- Where mowing or habitat disturbance is not feasible, conducting surveys for nesting migratory birds and consulting with USFWS if bird nests are found.

2.0 Proposed Action – Proposed Covered Activities

Keystone proposes to construct, operate, and maintain a crude oil pipeline and ancillary facilities from the US-Canadian border to Steele City, Nebraska. The Covered Activities include those necessary to construct and operate the pipeline within the Plan Area as addressed in this HCP (Figures 1 and 2).

2.1 Pipeline Construction Overview

The Project is planned to be constructed as follows:

- Keystone will be constructing approximately 883 miles of 36-inch diameter pipeline from the U.S.–Canadian border to Steele City, Nebraska.
- Construction is planned to start in 2020 and end in 2022.
- The area addressed in this HCP (Plan Area) contains a total of 176 miles of the mainline route, including 60 miles in South Dakota and 116 miles in Nebraska.

2.1.1 Pipeline ROW

Installation of the new 36-inch diameter pipeline would occur within a 110-foot-wide construction ROW, reduced to a 50-foot permanent ROW during operations. The construction ROW would be reduced to 85 feet in certain areas, which could include some wetlands, cultural sites, residential areas, and commercial/industrial areas. Acres of construction ROW footprint are provided in Table 2.

2.1.2 Additional Temporary Workspace Areas

In addition to the typical construction ROW, Keystone has identified various types of additional Temporary Workspace Areas (TWAs) that would be required (Table 2). These include areas requiring special construction techniques (e.g., river, wetland, and road/rail crossings, Horizontal Directional Drill (HDD) entry and exit points, steep slopes, and rocky areas) and construction staging areas.

2.1.3 Construction Camps, Pipe Stockpile Sites, Railroad Sidings, Water Storage Sites, and Contractor Yards

Extra workspace areas outside of the temporary construction ROW, and covering about 500 acres, would be required during the construction of the Project in the Plan Area to serve as pipe storage sites, railroad sidings, construction camps, water storage sites, and contractor yards (Table 2). Pipe storage yards along the pipeline route typically have been located in proximity to railroad sidings. Keystone would use existing commercial/industrial sites or sites that previously were used for construction if they exist close to the ROW. Existing public or private roads would be used to access each yard. Both pipe storage yards and contractor yards would be used on a temporary basis and would be restored, as appropriate, upon completion of construction.

Table 2. Proposed Project Construction Footprint in the Plan Area and Permit Area

Facility	Facility Footprint by County (acres) [6]					
	Tripp	Keya Paha	Boyd	Holt	Antelope	Total
Plan Area						
Pipeline ROW [1]	785.5	231.9	102.8	723.7	473.5	2,317.3
Additional TWAs [2]	117.2	18.4	2.8	46.3	37.3	222.0
Pipe Yards, Rail Sidings, Contractor Yards, Water Storage Sites [2]	206.5	30.0	0.0	122.2	137.0	495.7
Construction Camps [2]	50.0	0.0	0.0	89.2	0.0	139.2
Pump Stations [3]	16.3	0.0	0.0	15.0	14.0	45.3
Mainline Valves [4]	0.1	0.1	0.1	0.2	0.1	0.5
Access Roads - Permanent	1.3	0.0	2.3	15.73	0.5	19.83
Access Roads – Temporary [5]	16.0	3.8	13.4	2.4	1.6	37.2
Subtotal Plan Area [4]	**1,192.8**	**284.1**	**121.3**	**1,014.73**	**663.9**	**3,277.03**
Permit Area						
Pipeline ROW [1]	446.8	231.9	102.8	433.2	0.0	1,214.6
Additional TWAs [2]	50.5	18.4	2.8	28.9	0.0	100.6
Pipe Yards, Rail Sidings, Contractor Yards, Water Storage Sites [2]	146.1	30.0	0.0	76.1	0.0	252.2
Construction Camps [2]	50.0	0.0	0.0	89.2	0.0	139.2
Pump Stations [3]	8.4	0.0	0.0	15.0	0.0	23.4
Main Line Valves [4]	0.1	0.1	0.1	0.1	0.0	0.3
Access Roads - Permanent	1.3	0.0	2.3	15.73	0.0	19.33
Access Roads – Temporary [5]	1.8	3.8	13.4	0.9	0.0	19.9
Subtotal Permit Area [4]	**704.9**	**284.1**	**121.3**	**659.13**	**0.0**	**1,769.53**

[1] Pipeline ROW acreage is for 110-foot wide construction ROW; reduced to width of 50 feet for operations.
[2] These facilities are for construction only and represent temporary impacts.
[3] Pump stations remain during operations and represent permanent impacts.
[4] Main Line Valves (MLVs) are located with the construction and operation ROWs and are therefore not included in the total.
[5] Temporary access roads are considered footprint but are not considered impact on ABB habitat.
[6] Cherry County is not included in this table as they do not contain any Project facility footprint.

2.1.4 Access Roads

The Project would use existing public and private roads to provide access to most of the construction ROW. Paved roads are not likely to require improvement or maintenance prior to or during construction. Gravel roads and dirt roads may require maintenance during the construction period due to high use. Road improvements such as blading and filling generally would be restricted to the existing road footprint or up to 30 feet wide centered on the existing road. Widening of roads is also required in some areas where existing road curvature does not support larger construction equipment. Private roads and any new temporary access roads would be used and maintained only with permission of the landowner or applicable land management agency. Most access roads are temporary (i.e., used only for construction, see Table 2). The development and use of temporary access roads are not considered impacts to ABB habitat. The planned temporary access roads within the Permit Area largely follow existing dirt or gravel roads that have been previously compacted during construction or use and, therefore, are not currently suitable habitat (although they may be located within a block of land identified as marginal to prime ABB habitat).

2.1.5 Ancillary Facilities

In addition to the pipeline, Keystone proposes to install and operate aboveground facilities in the Plan Area. These include four pump stations in the Plan Area (two within the Permit Area), and 10 intermediate mainline valves (MLV) in the Plan Area (seven within the Permit Area). All of these facilities would be located within the permanent easement. Acres of Project footprint associated with these facilities are provided in Table 2.

2.1.5.1 Pump Stations

A total of four pump stations, each situated on approximately 5- to 15-acre sites, would be constructed within the Plan Area. Each pump station typically would consist of up to six pumps driven by electric motors, an electrical equipment shelter (EES), a variable frequency drive equipment shelter (VES), an electrical substation, one sump tank, a remotely operated MLV, a communication tower, a small maintenance building, and a parking area for station maintenance personnel. Pump stations would operate on locally purchased electric power and would be fully automated for unmanned operation. The pump stations would have an uninterruptable power supply (battery backup) on all communication and specific controls equipment in the case of a power failure. Communication towers at pump stations generally would be approximately 33 feet in height. However, antenna height at select pump stations, as determined upon completion of a detailed engineering study, may be taller (but in no event would exceed a maximum height of 190 feet). Communication towers would be constructed without guy wires. The pipe entering and exiting the pump station sites would be located below grade. The pipe manifold would be aboveground. Keystone would use down-shielding of exterior lights to minimize impacts to wildlife and would install a security fence around the entire pump station site. Inspection and maintenance personnel would access the pump stations through a gate that would be locked when no one is at the pump station.

2.1.5.2 Mainline Valves

Keystone proposes to construct ten intermediate MLV sites along the pipeline ROW in the Plan Area. Intermediate MLVs would be constructed within a fenced 40- by 50-foot site located within the permanent easement. Remotely operated intermediate MLVs would be located at major river crossings, other surface water features over 100 feet in width, and where required by regulation or permit conditions. Additional remotely operated MLVs would be located at pump stations. These remotely operated valves can be activated to shut down the pipeline in the unlikely event of a spill. The actual spacing intervals between the MLVs and intermediate MLVs would be based upon the location of the pump stations, surface water features wider than 100 feet, sensitive environmental resources, PHMSA requirements, and other hydraulic profile considerations.

Keystone would use high-resolution internal line inspection, maintenance, and cleaning tools known as “pigs” during operation of the Project. The Project would be designed to permit pigging of the entire length of the pipeline with minimal interruption of service. Pig launchers and/or receivers would be constructed and operated completely within the boundaries of the pump stations or delivery facilities.

2.2 Construction Procedures

The proposed facilities would be designed, constructed, tested, and operated in accordance with all applicable requirements included in the U.S. Department of Transportation (USDOT) regulations at 49 CFR Part 195, *Transportation of Hazardous Liquids by Pipeline*, other applicable federal and state regulations, and in accordance with the Project-specific special conditions recommended by Pipeline Hazardous Material Safety Administration (PHMSA) and agreed to by Keystone (Appendix Z of the FSEIS). These regulations and special conditions are intended to ensure adequate protection for the public and to prevent crude oil pipeline accidents. Project-specific special conditions (as well as 49 CFR Part 195) specify pipeline material and qualification to be used, minimum design requirements, and measures to ensure protection from internal, external, and atmospheric corrosion.

To manage construction impacts, Keystone would implement its Construction Mitigation and Reclamation Plan (CMRP) provided in Appendix C. The CMRP contains procedures that would be used throughout the Project to avoid and/or minimize permanent impacts and was developed and reviewed by resource and reclamation agencies and include procedures to restore Project areas.

A spread-specific Spill Prevention, Control, and Countermeasure (SPCC) Plan would be developed by the construction contractor following the template provided by Keystone in Appendix I of the FSEIS (DOS 2014) to avoid or minimize the potential for harmful spills and leaks during construction. The plan will describe spill prevention practices, emergency response procedures, emergency and personnel protection equipment, release notification procedures, and cleanup procedures. Keystone Environmental Inspectors would review the Project activities daily for compliance with state, federal, and local regulatory requirements and would have the authority to stop specific tasks as approved by the Chief Inspector. The inspectors would also be able to order corrective action in the event that construction activities violate any provisions of the CMRP, landowner requirements, or any applicable permit requirements.

These measures would apply to the basic design and construction specifications applicable to lands disturbed by the Project. This approach would enable construction to proceed with a single set of specifications for lands being crossed. On private lands, these requirements may be modified slightly to accommodate specific landowner requests or preferences.

2.2.1 General Pipeline Construction Procedures

The entire footprint within the Permit Area has been assessed and mapped for ABB habitat quality. Acquisition of ROW easements and any necessary property in fee would be completed before starting construction at a specific site. Engineering surveys of the ROW centerline and additional TWAs would be finalized where landowner permission has been previously denied.

Pipeline construction generally proceeds as a moving assembly line and is summarized below. Standard pipeline construction is composed of specific activities, including survey and staking of the ROW, clearing and grading, pipe stringing, bending, trenching, welding, lowering in, backfilling, hydrostatic testing, and cleanup. In addition to standard pipeline construction methods, special construction techniques would be used where warranted by site-specific conditions. These special techniques would be used when constructing across rugged terrain, surface water features, wetlands, paved roads, highways, and railroads.

Normal construction activities would be conducted during daylight hours, with the following exceptions.

- Completion of critical tie-ins on the ROW may occur after daylight hours. Completion requires tie-in welds, non-destructive testing, and sufficient backfill to stabilize the trench.
- HDD operations may be conducted after daylight hours, if determined by the contractor to be necessary to ensure a successful HDD. In some cases, that work may be required continuously until the HDD is completed; this may last one or more 24-hour days. Such operations may include drilling and pull-back operation, depending upon the site and weather conditions, permit requirements, schedule, crew availability, and other factors.

- While not anticipated, certain work may be required after the end of daylight hours due to weather conditions or for safety.

2.2.1.1 Survey and Staking

Before construction begins at any given location, the limits of the approved work area (i.e., the construction ROW boundaries and any additional TWAs) would be marked and the location of approved access roads and existing utility lines would be flagged. Landowner fences would be braced and cut, and temporary gates and fences would be installed to contain livestock, if present. Wetland boundaries and other environmentally sensitive areas also would be marked or fenced for protection. Before the pipeline trench is excavated, a survey crew would stake the centerline of the proposed trench and any buried utilities along the ROW.

2.2.1.2 Clearing and Grading

A clearing crew will follow the survey crew and will clear the work area of vegetation (including crops) and obstacles (e.g., trees, logs, brush, rocks). Standard agricultural implements would be used on agricultural lands and standard machinery used in timber clearing would be used in forested lands. The amount of top soil stripping would be determined pursuant to the CMRP and the con/rec units which were developed in consultation with the Natural Resources Conservation Service (NRCS) and local expertise (university, DOTs, county reclamation expert recommendations), and in consultation with the landowner (based on agricultural use). Full right-of-way stripping for forested lands would be avoided. Temporary erosion control measures such as silt fence or straw bales would be installed prior to or immediately after vegetation removal along slopes leading to wetlands and riparian areas. Grading would be conducted where necessary to provide a reasonably level work surface. Where the ground is relatively flat and does not require grading, rootstock would be left in the ground. More extensive grading would be required in steep side slopes or vertical areas and where necessary to safely construct the pipe along the ROW.

2.2.1.3 Trenching

The trench would be excavated to a depth that provides sufficient cover over the pipeline after backfilling. Typically, the trench would be seven to eight feet deep and four to five feet wide in stable soils. In most areas, the USDOT requires a minimum of 30 inches of cover and as little as 18 inches in rocky areas. To reduce the risk of third-party damage Keystone proposes to exceed the depth of cover requirements in most areas. In all areas, except areas of consolidated rock, the depth of cover for the pipeline would be a minimum of 48 inches (Table 3). In areas of consolidated rock, the minimum depth of cover would be 36 inches. Trenching may precede bending and welding or may follow based on several factors including soil characteristics, water table, and weather conditions at the time of construction.

Table 3. Minimum Pipeline Cover for Pipeline Installation

Location	Normal Cover (inches)	Rock Excavation Area Cover (inches)
Most Areas	48	36
Wetlands and Surface Water Features	60	36
Dry Creeks, Ditches, Drains, Gullies, etc.	60	36
Drainage Ditches @ Public Roads & Railroads	60	48

Generally, the crews on each construction spread are synchronized with the welding crews for efficiency. The amount and duration of open trench is minimized.

2.2.1.4 Pipe Stringing, Bending, and Welding

Prior to or following trenching, sections of externally coated pipe approximately 80 feet long (also referred to as “joints”) would be transported by truck over public roads and along authorized private access roads to the ROW and placed or “strung” along the ROW.

After the pipe sections are strung along the trench and before joints are welded together, individual sections of pipe would be bent to conform to the contours of the trench by a track-mounted, hydraulic pipe-bending machine. For larger bend angles, fabricated bends may be used.

After pipe sections are bent, joints would be welded together into long “strings” and placed on temporary supports. During welding, pipeline joints would be lined up and held in position until securely joined. Keystone proposes to non-destructively inspect 100 percent of the welds using radiographic, ultrasonic, or other USDOT-approved method. Welds that do not meet established specifications would be repaired or removed. Once welds are approved, a protective epoxy coating will be applied to the welded joints. The pipeline will then be electronically inspected for faults in the epoxy coating and visually inspected for any faults, scratches, or other coating defects. Damage to the coating would be repaired before the pipeline is lowered into the trench.

In rangeland areas used for grazing, construction activities potentially can hinder the movement of livestock. Construction activities may also hinder the movement of wildlife. To minimize the impact on livestock and wildlife movements during construction, Keystone would leave hard plugs (short lengths of unexcavated trench) or install soft plugs (areas where the trench is excavated and replaced with minimal compaction) to allow livestock and wildlife to cross the trench safely. Soft plugs would be constructed with a ramp on each side to provide an avenue of escape for animals that may fall into the trench.

2.2.1.5 Lowering In and Backfilling

Before pipe is lowered, the trench would be inspected to ensure it is free of livestock or wildlife, as well as rock and other debris that could damage the pipe or its protective coating. In areas where water has accumulated, dewatering may be necessary to permit inspection of the bottom of the trench. Discharge of water from dewatering would be accomplished in accordance with applicable discharge permits. The pipeline then would be lowered into the trench. On sloped terrain, trench breakers (e.g., stacked sandbags or foam) would be installed in the trench at specified intervals to prevent subsurface water movement along the pipeline. The trench would then be backfilled using the excavated material. In rocky areas, the pipeline would be protected with an abrasion-resistant coating or rock shield (fabric or screen that is wrapped around the pipe to protect the pipe and its coating from damage by rocks, stones, and roots). Alternatively, the trench bottom could be filled with padding material (e.g., sand, soil, or gravel) to protect the pipeline. No topsoil would be used as padding material. Topsoil would be returned to its original horizon after subsoil is backfilled in the trench.

2.2.1.6 Hydrostatic Testing

The pipeline would be hydrostatically tested in sections of approximately 30 miles (with a maximum 50 miles) to ensure the system can withstand the operating pressure for which it is designed. This process involves isolating the pipe segment with test manifolds, filling the segment with water, pressurizing the segment to a pressure a minimum of 1.25 times the maximum operating pressure (MOP) at the high point elevation of each test section, and maintaining that pressure for a period of 8 hours. Fabricated assemblies may be tested prior to installation in the trench for a period of 4 hours. The hydrostatic test would be conducted in accordance with 49 CFR Part 195.

Water for hydrostatic testing generally would be obtained from larger rivers and streams and municipal sources near the pipeline and in accordance with federal, state, and local regulations. Intakes would be screened to prevent entrainment of fish and intake and discharge locations would be determined with construction contractors. A preliminary list of potential hydrostatic test water sources is included in Table 4. Generally, the pipeline would be hydrostatically tested after backfilling and all construction work that would directly affect the pipe is complete. If leaks are found, they would be repaired, and the section of pipe retested until specifications are met. No chemicals are added to the test water. Water used for the testing would then be returned to the source or transferred to another pipe segment for subsequent hydrostatic testing. After hydrostatic testing, the water would be tested to ensure compliance with the National Pollutant Discharge Elimination System (NPDES) discharge permit requirements, treated if necessary, and discharged.

The used hydrostatic test water would be discharged either to the source within the same water basin or to a suitable upland area near the test discharge. To reduce the velocity of the discharge to upland areas, energy dissipating devices would be employed.

Hydrostatic test water would not be discharged into state-designated exceptional value waters, waters which provide habitat for federally listed threatened or endangered species, or waters designated as public water supplies, unless appropriate federal, state, or local permitting agencies grant written permission. To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water would occur without specific permitting approval to discharge into an alternative water basin. Discharge lines would be securely supported and tied down at the discharge end to prevent whipping during discharge. Hydrostatic testing is discussed further in the CMRP.

Table 4. Potential Hydrostatic Test Water Sources in the Plan Area

State	County	Approximate Milepost	Stream Name	Maximum Water Withdrawal (million gallons)[1]
South Dakota	Tripp	541.6	White River	73
Nebraska	Boyd	618.8	Keya Paha River	37
Nebraska	Holt	626.7	Niobrara River	37
Nebraska	Antelope	717.2	Elkhorn	37

[1] Water is returned to source after hydrotesting.

2.2.1.7 Pipe Geometry Inspection

The pipeline would be inspected prior to final tie-ins using an electronic caliper (geometry) pig to ensure the pipeline does not have any dents, bulging, or ovality that might be detrimental to the operation of the pipeline.

2.2.1.8 Final Tie-ins

Following successful hydrostatic testing and inspection, test manifolds would be removed, and the final pipeline tie-in welds would be made and inspected.

2.2.1.9 Commissioning

After the final tie-ins are complete and inspected, the pipeline will be cleaned and dewatered. Commissioning involves verifying that equipment has been installed properly and is working, that controls and communications systems are functional, and that the pipeline is ready for service. In the final step, the pipeline would be prepared for service by filling the line with crude oil.

2.2.1.10 Cleanup and Restoration

During cleanup, construction debris on the ROW will be disposed of and work areas will be graded. Preconstruction contours will be restored as closely as possible. Segregated topsoil will be spread over the surface of the ROW and permanent erosion controls will be installed. After backfilling, final cleanup will begin as soon as weather and site conditions permit. Every reasonable effort will be made to complete final cleanup (including final grading and installation of erosion control devices) within approximately 20 days after backfilling the trench (approximately 10 days in residential areas), subject to weather and seasonal constraints. Construction debris will be removed and taken to an appropriate disposal facility.

After permanent erosion control devices are installed and grading is complete, all disturbed work areas except cultivated fields will be seeded per the con/rec units. Seeding is used to stabilize the soil, re-vegetate areas disturbed by construction, and restore native vegetation. Timing of the reseeding efforts will depend upon weather and soil conditions and will be subject to the prescribed rates and seed mixes specified in the con/rec units. On agricultural lands, seeding will be conducted according to landowner requirements.

Keystone will repair or replace any breaches in fences required for access to the ROW. Keystone will also restrict access to the permanent easement using gates, boulders, or other barriers to minimize unauthorized

access. Pipeline markers will be installed at road and railroad crossings and other locations (as required by 49 CFR Part 195) to show the location of the pipeline. Markers will identify the owner of the pipeline and provide emergency contact information. Special markers providing information and guidance to aerial patrol pilots will also be installed.

The ROW will be inspected after the first growing season to gauge the success of re-vegetation and noxious weed control. Eroded areas will be repaired and areas that were not successfully re-vegetated will be reseeded by Keystone, or Keystone will compensate the landowner for reseeding. Weed Plans for each state, (prepared with input from weed boards and state expertise) will be used to control weed introduction on the ROW. Reclamation measures are outlined in the CMRP and are addressed in the NE PSC filing and SD PUC certificate.

2.2.2 Non-Standard Construction Procedures

In addition to standard pipeline construction methods, special construction techniques would be used where warranted by site-specific conditions. These special techniques would be used when crossing roads, highways and railroads; steep terrain; unstable soils; surface water features; wetlands; and residential and commercial areas. These special techniques are described below.

2.2.2.1 Road, Highway, and Railroad Crossings

Construction across paved roads, highways, and railroads would be in accordance with the requirements of road and railroad crossing permits and approvals. In general, all major paved roads, all primary gravel roads, highways, and railroads would be crossed by boring. Boring requires the excavation of a pit on each side of the feature, the placement of boring equipment in the pit, and boring under the road. Once the hole is bored, a prefabricated pipe section would be pulled through the borehole. For long crossings, sections can be welded onto the pipe string just before being pulled through the borehole. Each boring would be expected to take 1 to 2 days for most roads and railroads and 10 days for long crossings such as interstate or four-lane highways.

Smaller, unpaved roads and driveways would be crossed using the open-cut method where allowed by local authorities or private owners. Most open-cut road crossings can be finished, and the road resurfaced, in 1 or 2 days.

2.2.2.2 Pipeline, Utility, and Other Buried Feature Crossings

Keystone and its pipeline contractors would comply with USDOT regulations, utility agreements, and industry best management practices (BMP) with respect to utility crossing and separation specifications. One-call notification would be made for all utility crossings so respective utilities are identified.

Unless otherwise specified in a crossing agreement, the contractor would excavate to allow installation of the pipeline across the existing utility with a minimum clearance of 12 inches. The clearance would be filled with sandbags or suitable fill material to maintain the clearance.

For some crossings, the owner of the utility may require the facility to be excavated and exposed by their own employees prior to the Keystone construction activities. In those cases, Keystone would work with owners to complete work to their specifications. Where the owner of the utility does not require pre-excavation, the pipeline contractor would locate and expose the utility before conducting excavation.

2.2.2.3 Steep Terrain

Additional grading may be required in areas where the proposed pipeline route would cross steep slopes. Steep slopes often need to be graded for safe operation of construction equipment and to accommodate pipe-bending limitations. In such areas, slopes would be excavated prior to pipeline installation and reconstructed after installation is complete.

In areas where the pipeline route crosses along the side of a slope, cut and fill grading may be required to obtain a safe work area. Topsoil would be stripped from the entire ROW and stockpiled prior to cut and fill grading on steep terrain. Soil from the high side of the ROW would be excavated and moved to the low side

of the ROW to create a safe and level work terrace. After the pipeline is installed, the soil from the low side of the ROW would be returned to the high side and the slope's contour would be restored as near as practicable to preconstruction condition. Topsoil from the stockpile would be spread over the surface, erosion control features installed, and seeding implemented.

In steep terrain, temporary sediment barriers such as silt fences and straw bales would be installed during clearing to prevent the movement of disturbed soil into wetland, surface waters, or other environmentally sensitive areas. Temporary slope breakers consisting of mounded and compacted soil would be installed across the ROW during grading and permanent slope breakers would be installed during cleanup. Following construction, seed would be applied to steep slopes and the ROW would be mulched with hay, straw, or erosion control fabric per con/rec units and landowner requirements. Sediment barriers would be maintained across the ROW until permanent vegetation is established. TWAs may be required for storage of graded material and/or topsoil during construction.

2.2.2.4 Unstable Soils

Construction in unstable soils, if encountered, would be in accordance with measures outlined in the CMRP. Construction in these areas could require extended TWAs. Special construction and mitigation techniques would be applied to areas with high potential for landslides, erosion-prone locations, and blowouts. To facilitate reclamation, Keystone could implement measures such as the use of photodegradable mats and livestock controls.

2.2.2.5 Stream Crossings

Approximately 21 perennial streams would be crossed one or more times during construction in the Plan Area. Perennial streams would be crossed using either the open-cut method or HDD. These design methods are further described below. Stream crossings were assessed by qualified personnel with respect to the potential for channel aggradation or degradation and lateral channel migration. The pipeline would be installed at the design crossing depth for at least 15 feet beyond the design lateral migration zone of the channel. The design of the crossings also would include the specification of appropriate stabilization and restoration measures. The actual crossing method employed at a perennial stream would depend on permit conditions from the U.S. Army Corps of Engineers (USACE) and other relevant regulatory agencies, as well as additional conditions that may be imposed by landowners or land managers at the crossing location.

The preferred crossing method would be the open-cut crossing method. The open-cut method involves trenching through the stream while water continues to flow through the construction work area. Pipe segments for the crossing would be fabricated adjacent to the stream. Generally, backhoes operating from one or both banks would excavate the trench within the streambed. In wider rivers, in-stream operation of equipment may be necessary. Hard or soft trench plugs would be placed to prevent the flow of water into the upland portions of the trench. Trench spoil excavated from the streambed generally would be placed at least 10 feet away from the water's edge unless stream width is great enough to require placement in the stream bed. Sediment barriers would be installed where necessary to control sediment and to prevent excavated spoil from entering the water. After the trench is dug, the prefabricated pipeline segment would be carried, pushed, or pulled across the stream and positioned in the trench. When crossing saturated wetlands or waterbodies using the open-cut method, the pipe coating would be covered with reinforced concrete or concrete weights to provide negative buoyancy. The need for weighted pipe would be determined by detailed design and site conditions at the time of construction. The trench would then be backfilled with native material or with imported material if required by applicable permits. Following backfilling, the banks would be restored and stabilized.

Keystone plans to use the HDD method of construction for four stream/river crossings in the Plan Area (Table 5). The HDD method involves drilling a pilot hole under the stream, then enlarging the hole through successive passes until the hole is large enough to accommodate a prefabricated segment of pipe. Throughout the process of drilling and enlarging the hole, slurry consisting mainly of water and bentonite clay would be circulated to power and lubricate the drilling tools, remove drill cuttings, and provide stability to the drilled holes. Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area on the opposite side of the crossing and then pulled through the drilled

hole. Use of the HDD method results in no impact on the banks, bed, or water quality of the feature being crossed.

Table 5. Surface Water Features Crossed using HDD

Surface Water Feature	Milepost
White River	541.4
Keya Paha River	617.0
Niobrara River	626.5
Elkhorn River	717.1

There are 25 intermittent stream crossings within the Plan Area. When crossing streams, Keystone would adhere to the guidelines outlined in Keystone's CMRP and the requirements of its Clean Water Act (CWA) Section 404 Nationwide Permit from the USACE.

Additional TWAs would be required on both sides of all surface water features to stage construction, fabricate the pipeline, and store materials. These workspaces would be located at least 10 feet away from the ordinary high-water mark, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land. Before construction, temporary bridges would be installed across all perennial surface water features to allow construction equipment to cross.

During clearing, sediment barriers such as silt fences and staked straw bales would be installed and maintained on drainages across the ROW to minimize the potential for sediment runoff. Silt fences and straw bales located across the working side of the ROW would be removed during the day when vehicle traffic is present and would be replaced each night. Alternatively, drivable berms could be installed and maintained across the ROW in lieu of a silt fence or straw bales.

In most cases, equipment refueling and lubricating near surface water features would take place in upland areas that are 100 feet or more from the water. When circumstances dictate that equipment refueling and lubricating would be necessary in or near streams or wetlands (such as for water pumps necessary to support HDD water use and/or hydrotest use), Keystone's contractors would follow their SPCC Plan to address the handling of fuel and other hazardous materials and any such materials that would require secondary containment.

After the pipeline is installed, restoration would begin. Banks would be restored to preconstruction contours or to a stable configuration. Appropriate erosion control measures such as rock riprap, gabion baskets (rock enclosed in wire bins), log walls, vegetated geogrids, or willow cuttings would be installed as necessary on steep banks in accordance with permit requirements. More stable banks would be seeded with native grasses and mulched or covered with erosion control fabric. Banks would be temporarily stabilized within 24 hours of completing in-stream construction. Sediment barriers, such as silt fences, straw bales or drivable berms would be maintained across the ROW at all approaches until permanent vegetation is established. Temporary equipment bridges would be removed following construction.

2.2.2.6 Wetland Crossings

Data from wetland delineation field surveys were used to identify wetlands impacted by the Project. Where landowner access was denied, aerial photography, NRCS soils information, and National Wetland Inventory mapping were used to identify wetlands crossed by the proposed pipeline. Wetland crossings will typically be reduced to 85 feet and will be completed in accordance with the CMRP and USACE Nationwide Permit No. 12 conditions and any additional conditions imposed by the USACE. Pipeline construction across wetlands would be similar to typical conventional upland cross-country construction procedures, with several modifications where necessary to reduce the potential for pipeline construction to affect wetland hydrology and soils.

The wetland crossing method used would depend largely on the stability of the soils at the time of construction. If wetland soils are not excessively saturated at the time of construction and can support construction equipment without equipment mats, construction would occur in a manner similar to

conventional upland cross-country construction techniques. Topsoil would be segregated over the trench line. In most saturated soils, topsoil segregation would not be possible. TWA's would be required on both sides of particularly wide saturated wetlands to stage construction, fabricate the pipeline, and store materials. These additional TWAs would be located in upland areas a minimum of 10 feet from the wetland edge.

Construction equipment working in saturated wetlands would be limited to that area essential for clearing the ROW, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the ROW. In areas where there is no reasonable access to the ROW except through wetlands, non-essential equipment would be allowed to travel through wetlands only if the ground is firm enough or has been stabilized to avoid rutting.

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. To avoid excessive disruption of wetland soils and the native seed and rootstock within the wetland soils, stump removal, grading, topsoil segregation, and excavation would be limited to the area immediately over the trench line. Trench width would be that required to provide an even, safe, work area which depends upon topography, soil moisture content, and groundwater levels. Saturated soils usually require a wider trench in order to maintain a safe ditch and to avoid unstable trench walls. During clearing, sediment barriers, such as silt fence and staked straw bales, would be installed to minimize the potential for sediment runoff. Section 4.3 of Appendix C (CMRP) describes topsoil segregation procedures.

2.2.2.7 Fences and Grazing

Existing fences will be crossed or paralleled by the construction ROW. Before cutting any fence for pipeline construction, each fence would be braced and secured to prevent the slacking of the fence. To prevent livestock from escaping, the opening in the fence would be closed temporarily when construction crews leave the area. If gaps in natural barriers used for livestock control are created by pipeline construction, the gaps would be fenced according to the landowner's requirements. All existing improvements, such as fences, gates, irrigation ditches, cattle guards, and reservoirs would be maintained during construction and repaired to preconstruction conditions (or better) upon completion of construction activities.

2.3 Aboveground Facilities Construction Procedures

Construction activities at each of the new pump stations would follow a standard sequence of activities: clearing and grading, installing foundations for the electrical building and support buildings, and erecting the structures to support the pumps and/or associated facilities. A block valve is installed in the mainline with two side block valves; one to the suction piping of the pumps and one from the discharge piping of the pumps. Construction activities and the storage of building materials would be confined to the pump station construction sites and any additional TWAs.

The sites for the pump stations would be cleared of vegetation and graded as necessary to create a level surface for the movement of construction vehicles and to prepare the area for the building foundations. Foundations would be constructed for the pumps and buildings and soil would be stripped from the construction footprint.

After the completion of startup and testing, the pump station sites would be graded and a permanent security fence would be installed around each pump station site.

Where delivery and pigging facilities are co-located with a pump station, facilities will be located entirely within the facility.

Intermediate MLV construction would be carried out concurrently with the construction of the pipeline. Intermediate MLVs would be located near public roads to allow year-round access. If no existing public or private roads exist near MLV locations, permanent access roads or approaches would be constructed to the fenced MLV site.

2.4 Construction Schedule

Construction within the Plan Area is anticipated to begin in 2020.

2.5 Future Plans and Abandonment

No plans for abandonment of these facilities have been identified at this time. If abandonment of any facility is proposed in the future, abandonment would be implemented in accordance with applicable federal and state permits, approvals, codes, and regulations.

2.6 Operation and Maintenance

The Project's facilities would be maintained in accordance with 49 CFR Part 194, 49 CFR Part 195, and Project-specific special conditions recommended by PHMSA and agreed to by Keystone (Appendix Z of the FSEIS), as well as other applicable federal and state regulations. Operation and maintenance of the pipeline system would be accomplished by Keystone personnel.

An annual Pipeline Maintenance Program (PMP) would be implemented by Keystone to ensure the integrity of the pipeline. The PMP would include valve maintenance, periodic inline inspections, and cathodic protection readings. Data collected in each year of the program would be fed back into the decision-making process. Additionally, the pipeline would be monitored 24 hours a day, 365 days a year from the Oil Control Center (OCC) using leak detection Systems and Supervisory Control and Data Acquisition (SCADA). During operations, Keystone would have a Project-specific Emergency Response Plan (ERP) in place to manage a variety of abnormal events (Appendix B).

During operations, it is estimated that over the 50-year life of the permit, Keystone will be required to conduct ten inspections of the pipeline per PHMSA regulations. Over the course of those inspections, it is conservatively estimated that excavation will be required for inspection of coating, potential pipeline damage from third parties, or other reasons 0.05 times per mile. Over the 92.3 miles of pipeline within the Permit Area, this equates to five locations that will be excavated every inspection. The size of each excavation location is nominally estimated to be 0.13 acres for a total of 6.5 acres of excavation over the 50-year period. Keystone conservatively rounded this estimated impact to 10.0 acres to account for varying sizes of excavations and/or number of locations per year.

2.6.1 Normal Operations and Routine Maintenance

The pipeline would be inspected regularly via aerial and ground surveillance at a frequency consistent with 49 CFR Part 195 and the Project-specific special conditions. These surveillance activities would provide information on possible encroachments of nearby construction activities, erosion, exposed pipe, and other potential concerns that may affect the safety and operation of the pipeline. Evidence of population changes would be monitored, and High Consequence Areas would be identified. MLVs would be inspected twice annually and the results documented.

In order to maintain accessibility of the permanent easement and to accommodate pipeline integrity surveys, woody vegetation along the pipeline permanent easement would be periodically cleared. Trees would be removed from a 30-foot strip centered over the pipeline. Vegetation would be mowed within this strip but not such that the height of the vegetation is less than 8.0 inches so that ABB habitat would be maintained. Vegetation outside the 30-foot strip but within the 50-foot permanent easement will be mowed or cut at a frequency necessary to keep the ROW free from trees or shrubs over 15 feet tall. That frequency would likely be every 5 or more years. Keystone would use mechanical mowing or cutting along its permanent easement for normal vegetation maintenance. Trees along the paths of areas where the pipe was installed via HDDs would not normally require any maintenance activities. Cultivated crops would be allowed to grow in the permanent easement. No mowing will be necessary where the land is under agricultural production (row crop and/or pasture, even pasture grass seeded native prairie).

The ROW will be monitored to identify any areas where soil productivity has been degraded as a result of pipeline construction. Reclamation measures would be implemented to address any such concerns. Applicable reclamation measures are outlined in the CMRP.

Multiple overlapping and redundant systems would be implemented to ensure pipeline integrity and safety. These measures include (1) quality assurance program for pipe manufacture and pipe coating, (2) fusion-bonded epoxy coating for pipe, (3) cathodic protection, (4) non-destructive testing of 100 percent of the girth welds, (5) hydrostatic testing of the line pipe to 125 percent of the MOP, (6) periodic internal cleaning and high-resolution in-line inspection, (7) depth of cover exceeding federal standards, (8) periodic aerial surveillance, (9) public awareness program, (10) SCADA system, and (11) OCC (with complete redundant backup) providing monitoring of the pipeline every 5 seconds, 24 hours a day, every day of the year.

SCADA facilities would be located at all remotely operated pump stations and delivery facilities. The pipeline SCADA system would allow the control center to perform the following functions:

- Remote reading of automated MLV positions;
- Remote starting and stopping at pump stations;
- Remote reading of tank levels;
- Remote closing and opening of automated MLVs;
- Remote reading of line pressure and temperature at all automated intermediate valve sites, at all pump stations, and at delivery metering facilities; and
- Remote reading of delivery flow and total flow.

The Keystone OCC is manned by an experienced and highly trained crew 24 hours per day every day of the year. A fully redundant backup OCC would be available as needed.

Real time information communication systems, including backup systems, will provide up-to-date information from the pump stations to the OCC plus the ability to contact field personnel. The OCC will have highly sophisticated pipeline monitoring systems and complementary, overlapping leak detection systems (See Section 2.6.2.1).

2.6.2 Abnormal Operations

The preparation of manuals and procedures for responding to abnormal operations would comply with 49 CFR Section 195.402. Section 195.402(a) requires a pipeline operator to prepare and follow a manual of written procedures for conducting normal operations and maintenance activities and handling abnormal operations and emergencies. Section 195.402(d) (Abnormal Operation) requires the manual to include procedures to ensure safety when operating design limits have been exceeded.

2.6.2.1 SCADA and Leak Detection

Keystone proposes to utilize a SCADA system to remotely monitor and control the pipeline system. Highlights of Keystone's SCADA system would include:

- Redundant fully functional backup system available for service at all times;
- Automatic features installed as integral components within the SCADA system to ensure operation within prescribed pressure limits;
- Additional automatic features installed at the local pump station level would also be utilized to provide pipeline pressure protection in the event communications with the SCADA host are interrupted; and
- Pipeline is monitored every 5 seconds, 24 hours a day, every day of the year.

Keystone would also have a number of complementary leak detection methods and systems available within the OCC. These methods and systems are overlapping to ensure early detection of leaks. The leak detection methods are as follows:

- Remote monitoring performed by the OCC Operator, which consists primarily of monitoring pressure and flow data received from pump stations and valve sites, by the Keystone SCADA system. Remote monitoring is typically able to detect leaks down to approximately 25 percent to 30 percent of pipeline flow rate.
- Software based volume balance systems that monitor receipt and delivery volumes. These systems are typically able to detect leaks down to approximately 5 percent of pipeline flow rate.
- Computational Pipeline Monitoring or model-based leak detection systems that divide the pipeline system into smaller segments and monitor each of these segments on a mass balance basis. These systems are typically capable of detecting leaks down to a level of approximately 1.5 percent of pipeline flow rate.
- Computer based, non-real time, accumulated gain/loss volume trending to assist in identifying low rate or seepage releases below the 1.5 percent by volume detection threshold.
- Direct observation methods, which include aerial patrols, ground patrols and public and landowner awareness programs that are designed to encourage and facilitate the reporting of suspected leaks and events that may suggest a threat to the integrity of the pipeline.

2.6.2.2 Emergency Response Plan

A comprehensive ERP for the existing Keystone Pipeline Project has been provided to PHMSA, and that ERP would be used as the basis for preparation of an ERP specific to the Project. When finalized, Keystone will submit the Project ERP to the Office of Pipeline Safety (OPS) within PHMSA prior to commencing operations. A draft ERP was considered in the FSEIS and is attached in Appendix B.

The National Response Center (NRC) would be notified immediately in the event of a release of crude oil that: (1) violates water quality standards, (2) creates a sheen on water, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines (40 CFR 112). In addition to the NRC, timely notifications would also be made to other agencies, including the appropriate local emergency planning committee, sheriff's department, appropriate state agencies, the U.S. Environmental Protection Agency (EPA), and affected landowners. Keystone must provide immediate notification of all reportable incidents in accordance with 49 CFR Part 195 and will notify the appropriate PHMSA regional office within 24 hours of any non-reportable leaks occurring on the pipeline.

Under the National Contingency Plan, the EPA is the lead federal response agency for oil spills occurring on land and in inland waters. The EPA would evaluate (1) size and nature of a spill, (2) its potential hazards, (3) the resources needed to contain and clean it up, and (4) the ability of the responsible party or local authorities to handle the incident. The EPA would monitor all activities to ensure that the spill is being contained and cleaned up appropriately. All spills meeting legally defined criteria (see criteria above per 40 CFR Part 112) must be monitored by the EPA. Keystone would be responsible for recovery and cleanup of any spill. The usual role of local emergency responders is to notify community members, direct people away from the hazard area, and address potential impacts to the community such as temporary road closings.

A fire associated with a spill is rare. According to historical data (PHMSA 2008), only about 4 percent of reportable liquid spills are ignited. In the event of a fire, local emergency responders would execute the roles listed above and firefighters would take actions to prevent the crude oil fire from spreading to residential areas. Local emergency responders typically are trained and able to execute the roles described above without any additional training or specialized equipment. Keystone would also work with emergency response agencies to provide pipeline awareness education and other support.

2.6.2.3 Remediation

This HCP does not cover take associated with a fuel or oil spills. However, in the case of a fuel or oil spill, corrective remedial actions would be dictated by federal regulations and enforced by the EPA. Required remedial actions may range from the excavation and removal of contaminated soil to allowing the contaminated soil to recover through natural environmental processes (e.g., evaporation, biodegradation). Decisions concerning remedial methods and extent of the cleanup would take state-mandated remedial cleanup levels, potential effects to sensitive receptors, volume and extent of the contamination, potential violation of water quality standards, and the magnitude of adverse impacts caused by remedial activities into account.

In the event of a spill, several federal regulations define the notification requirements and response actions, including the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), the CWA, and the Oil Pollution Act. At the most fundamental level, these interlocking programs mandate notification and initiation of response actions in a timeframe and on a scale commensurate with the threats posed. The appropriate remedial measures would be implemented to meet federal and state standards designed to ensure protection of human health and environmental quality.

2.6.2.4 Maintenance Schedules

Aerial patrols will be conducted over the restored ROW at least 26 times a year at intervals not to exceed 3 weeks. Ground surveillance of HDD crossings would be conducted on foot a few times each year. Personnel will drive to pump stations and MLVs periodically to perform maintenance on these facilities. The pipeline ROW will be mowed periodically to control brush and woody vegetation.

3.0 Covered Species - American Burying Beetle

This HCP covers one species, the ABB, for incidental take. It also describes the potential for impacts to individuals and potentially suitable habitat for the Covered Species. It is important to note that the ESA does not prohibit impacts to potential habitat for listed species, rather, it prohibits take of an individual of a listed species. Thus, even if a parcel of property contains potential habitat for listed species, that does not mean that the habitat is occupied by a given species at a particular time. It is also important to note that potential habitat for listed species or habitat occupied by listed species is not necessarily “critical habitat” as defined by the ESA. In order for listed species habitat to be considered critical habitat within the regulatory context, the Service must go through a formal rulemaking process, including allowing opportunity for public review and comment. To date, no critical habitat has been designated for the ABB. In 2019, the USFWS released a Species Status Assessment Report for the ABB (USFWS 2019b) and proposed down-listing the species from endangered to threatened (84 FR 19013). The final rule (85 FR 65241) was published on October 15, 2020 down-listing the ABB to threatened, effective November 16, 2020.

3.1 Status and Distribution

The ABB is a large black beetle with orange markings. The size range of individuals is 1.0–1.8 inches (Backlund and Marrone 1997). The species historically occurred across a large range with documented occurrences from 150 counties in 34 states in the eastern and central U.S., as well as southern Canada (USFWS 1991). Documentation of records is not uniform throughout this broad historical range. More records exist from the Midwest, southern Canada and the northeastern U.S., relative to the southern Atlantic and Gulf of Mexico regions (USFWS 1991). During the 20th century, the ABB disappeared from over 90 percent of its historical range (Ratcliffe 1996). Historic population levels are not known, but the species is thought to have been at least locally common. Populations of ABBs rapidly declined across the eastern portion of their range and became almost completely extirpated from areas east of the Mississippi River by the mid-1970s (a small population remained at Block Island off the coast of Rhode Island). Presently, the species is mainly found along the western periphery of its former range. Larger populations are found in two general areas: Arkansas and Oklahoma and Nebraska and South Dakota. The species has also been documented to occur in limited areas of Texas, Kansas, and Missouri. Reintroduction programs are ongoing

in certain areas within the former range. Figure 3 provides the Service's ABB range map within the states of South Dakota and Nebraska (USFWS 2019).

The ABB is a member of the genus *Nicrophorus* which includes other species that occur in areas supporting the ABB. Species in the genus are generally referred to as burying, sexton, or undertaker beetles because they share the unique behavior of burying carrion to provide a source of nutrition for developing young. The ideal size carrion appears to be in the weight range of approximately 100 – 200 grams (Kozol et al. 1988). Primary carrion sources are small birds and mammals. Northern bobwhites (*Colinus virginianus*) and mourning doves (*Zenaida macroura*) are examples of birds which would provide appropriate-sized carrion. Small mammals such as eastern cottontails (*Sylvilagus floridanus*), gray squirrels (*Sciurus carolinensis*), and rats (*Neotoma* spp.) are examples of mammals in the preferred size range. ABBs are reported to utilize other carrion within the appropriate size range such as snakes and fish. Kozol et al. (1988) found no significant difference in the ABBs preference for avian verses mammalian carcasses. At Fort Chaffee, Holloway and Schnell (1997) found that ABB numbers were higher in areas with high densities of small mammals.

The life history of the ABB is similar to that of other burying beetles (Kozol et al. 1988, Pukowski 1933, Scott and Traniello 1987). The ABB is a nocturnal species that lives only for one year. ABBs are active in the summer months and bury themselves in the soil during the winter. Young tenerals emerge in late summer, over-winter as adults, and comprise the breeding population the following summer (Kozol 1990). Adults and larvae are dependent on carrion for feeding and reproduction.

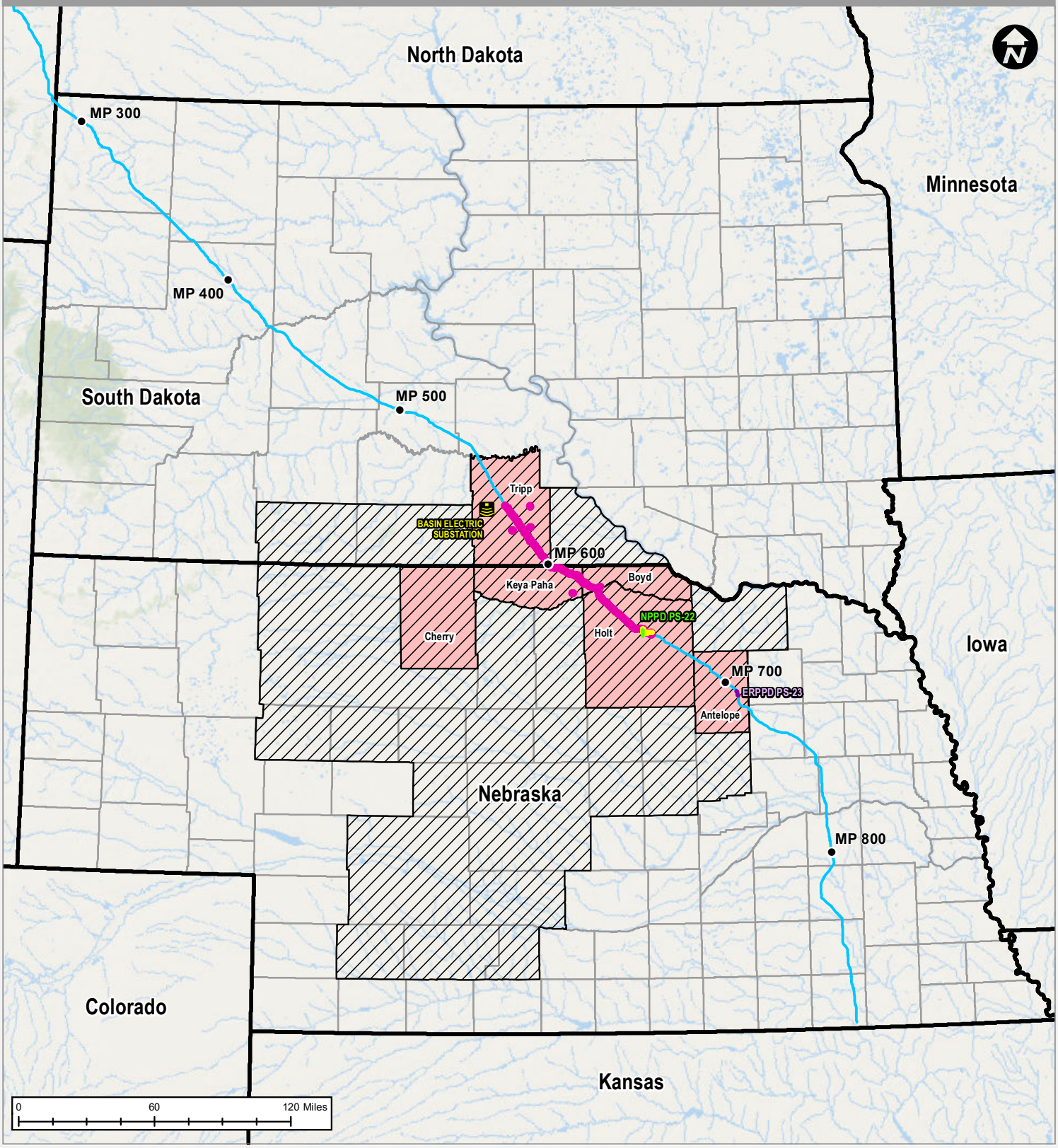
When the nighttime ambient air temperature is consistently below 60° F (15.5° C), ABBs bury into the soil and become inactive (USFWS 1991). Based on their historical wide ranging distribution and occurrence in northern states where soil temperatures decline to below freezing during winter, Dr. Wyatt Hoback, who has studied the American burying beetle for more than 10 years, considers that American burying beetles likely have adapted an overwinter survival strategy that requires either freezing or cooling, to very near freezing, that slows metabolism to a point that fat reserves are sufficient to last overwinter until emergence in late May or early June (Hoback, personal communication).

The ABB is active in the summer months, emerging from their winter inactive period when ambient nocturnal air temperatures consistently exceed 60° F. They are most active from 2 to 4 hours after sunset, with no captures recorded immediately after dawn (Bedick et al. 1999). During the daytime, ABBs are believed to shelter under soil or leaf litter.

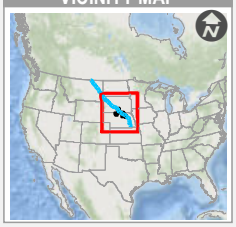
ABBs are nocturnal and highly mobile. The longest distance recorded for an individual was 6.2 miles over six nights. The maximum distance moved by one ABB was 1.8 miles in one night (Creighton and Schnell 1998). When not involved with brood rearing, carrion selection by adult ABBs for food can include an array of available carrion species and size (Trumbo 1992). Burying beetles can find a carcass between 1 and 48 hours after death at a distance up to 2 miles (Ratcliffe 1996).

The ABB displays an interesting and relatively complex reproductive behavior. Reproductive activity usually occurs in June or July. In summer months and during hours of darkness, adult male ABBs search for dead animals using chemoreceptors located on their antennae. ABBs can detect carrion up to two miles away under ideal wind conditions. When suitable carrion is located males release pheromones that attract females. When females arrive, there is often competition between the males for mates. Mating pairs then prepare the carcass (by removing hair or feathers and covering it with body secretions that act as preservatives) and excavate a brood chamber where the carcass will be buried. ABBs are known to move carcasses to areas with soils more suitable for burying the carrion. ABBs then mate and lay eggs in the soil near the brood chamber. Larvae emerge a few days later and feed on the buried carcass. ABBs are unique insects because they provide bi-parental care for the developing young.

HCP - FIGURE 3 - USFWS RANGE MAP FOR ABB IN SOUTH DAKOTA AND NEBRASKA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- PERMIT AREA
- ABB RANGE (USFWS)
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-03	SCALE:	1 in = 60 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

TC Energy

3.2 Habitat Characteristics and Use

ABBs are considered feeding habitat generalists and have been successfully live-trapped in several vegetation types including native grasslands, grazed pasture, riparian zones, coniferous forests, mature forest, and oak-hickory forest, as well as on a variety of various soil types (Creighton et al. 1993, Lomolino and Creighton 1996, Lomolino et al. 1995, USFWS 1991). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (Ratcliffe 1996, USFWS 1991). The ABB readily moves between different habitats (Creighton and Schnell 1998, Lomolino et al. 1995).

The ABB appears to be most common in areas representing broad transition zones between forested and open habitats. Although ABBs obviously use forested habitat, population densities seem to reach their maximum in areas that can be described as savannas or early successional series of regenerating forested habitats. In other words, ABBs appear to prefer habitats containing a mix of open areas, scattered trees, and patchy areas of brush or small saplings. Field observations (Dr. David Williams personal communication) suggest that the ABB is neither a prairie specialist (such as *Nicrophorus marginatus*) nor a forest specialist (such as *N. orbicollis*). Rather the ABB appears to mainly utilize patchy habitat or ecotones representing the interface of these general habitat types (Lomolino et al. 1995). According to the ABB Species Status Assessment Report (SSA) (USFWS 2019b) the Plan Area falls mainly within the Niobrara River Analysis Area. The vegetation is described as having small portions dominated by a mixture of forest types, but large portions are dominated by grassland/pasture lands with some trees and shrub cover. Grasslands and pasturelands are mainly used for grazing and hay production. Unlike ABB in the southern states, grazing and short grasses does not seem to have a negative impact on their presence. This could potentially be due to change in carrion species (prairie dog and ground squirrel) that are better suited to short vegetation. However, American burying beetles are rarely found in areas such as agricultural lands that are tilled frequently.

3.3 Occurrence in the Plan Area

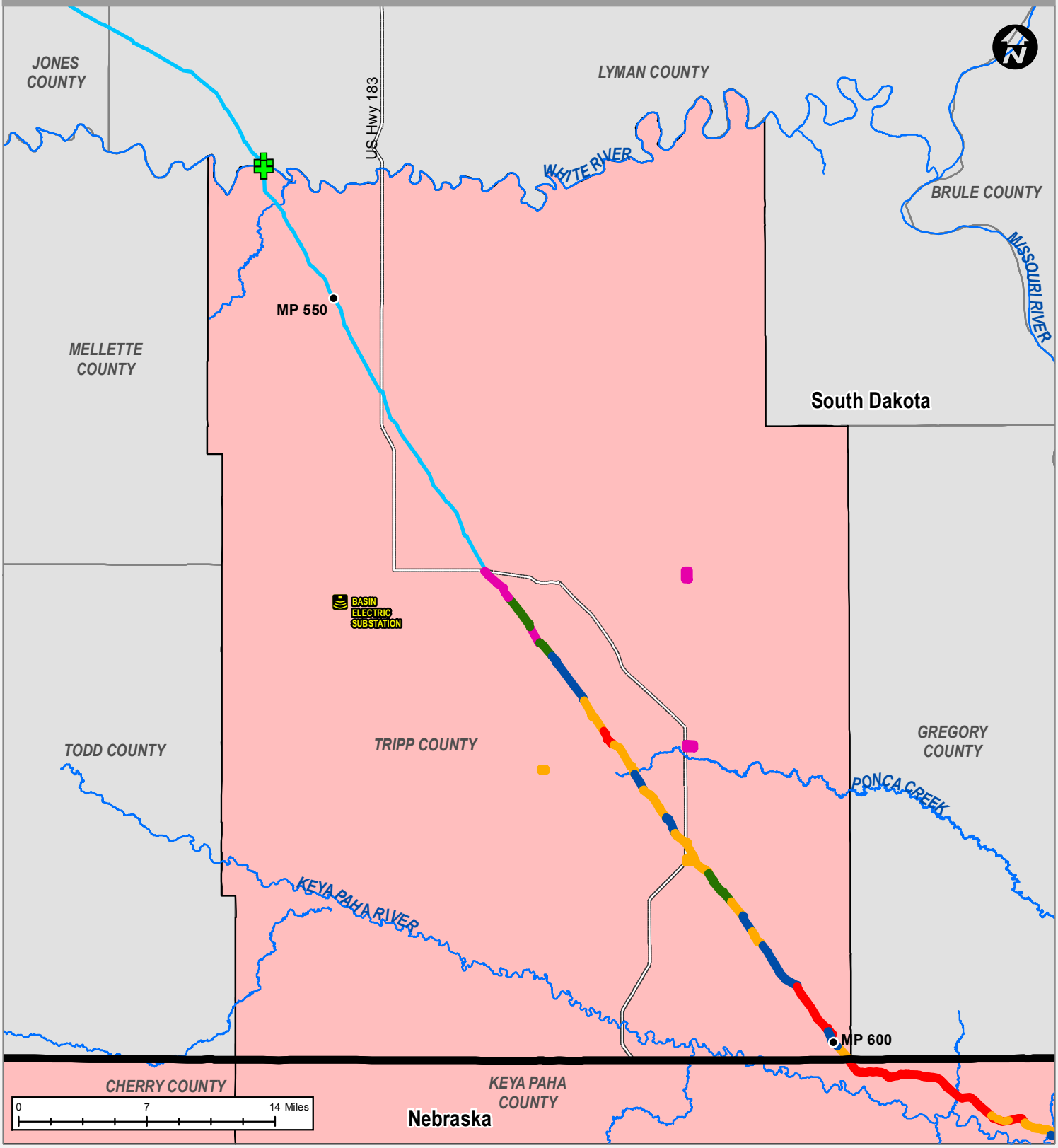
The proposed Project passes through a total of approximately 58 miles within three counties in Nebraska with known ABB presence (Permit Area in Keya Paha, Boyd, and Holt counties). The Conservation Area in Cherry County is also in a region with documented ABB presence. Survey results indicate that fewer ABBs occur in the loess prairie region of Nebraska than in the Sandhills. There have been no documented occurrences of ABB in Antelope County or southern Holt County within the last 10 years (Keystone's response to DOS Data Request 59), thus these portions of the Plan Area should be considered as being in historical ABB range, and outside the Permit Area.

In South Dakota, ABBs are known to occur within the Plan Area only south of State Highway 18/ US Highway 183 in Tripp County (Backlund et al. 2008) where the pipeline route crosses approximately 34 miles of potential ABB habitat (Permit Area in South Dakota). However, desktop analysis of land usage reveals substantial increases in row crop land use (poor or fair habitat) and declines in the amount of ABB habitat designated as prime or good (Keystone's response to DOS Data Request 59).

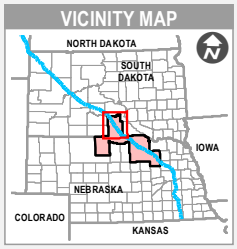
The proposed Project would result in approximately 600 miles of pipeline construction through South Dakota and Nebraska, with only 92 miles occurring within the current ABB range (Permit Area, Figure 2). Figures 4-7 indicate the location of ABB habitat within the Project footprint by county.

Jenkins et al (2018) modeled ABB occurrence within the loess plains region where they observed quality of ABB habitat declined to the east in Nebraska and South Dakota. A prior route design had higher densities of ABB and the pipeline was re-routed to the east where high quality habitat is less prevalent.

HCP - FIGURE 4 - ABB HABITAT RATING OVERVIEW TRIPP COUNTY



VICINITY MAP



LEGEND

- MILE POST
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

ABB HABITAT

- FAIR
- GOOD
- MARGINAL
- POOR
- PRIME
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	TRIPP
CHECKED BY:	DH	STATE	SOUTH DAKOTA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-04	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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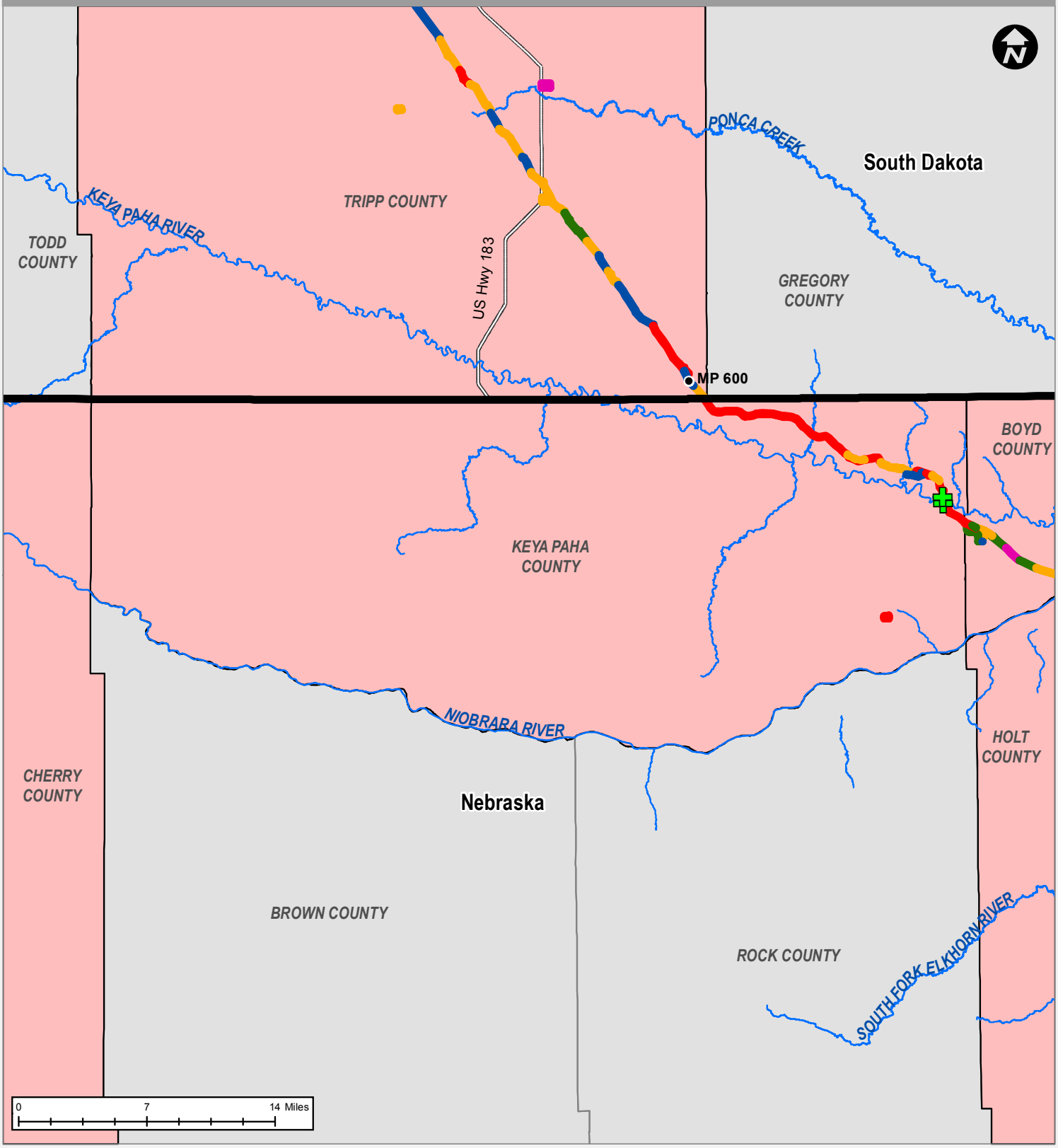
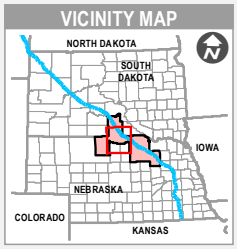
KEYSTONE XL PROJECT

TC Energy

HCP - FIGURE 5 - ABB HABITAT RATING OVERVIEW KEYA PAHA COUNTY



VICINITY MAP



LEGEND

- MILE POST
- HDD ENTRY/ EXIT
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

ABB HABITAT

- FAIR
- GOOD
- MARGINAL
- POOR
- PRIME
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	KEYA PAHA
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-05	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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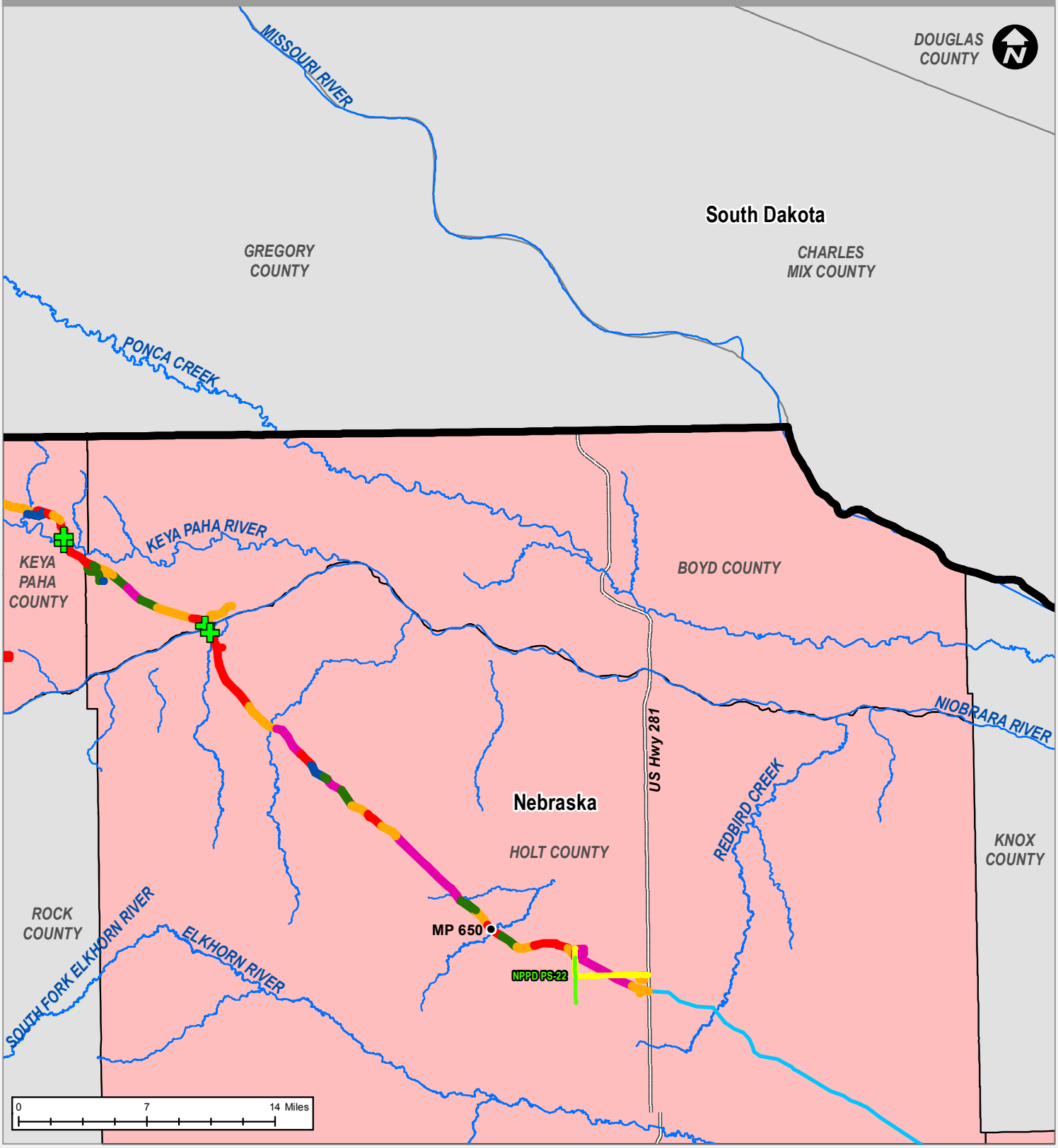
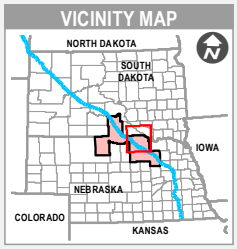
HCP - FIGURE 6 - ABB HABITAT RATING OVERVIEW BOYD COUNTY



VICINITY MAP



LEGEND

- MILE POST
- HDD ENTRY/ EXIT
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES

ABB HABITAT

- FAIR
- GOOD
- MARGINAL
- POOR
- PRIME
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	BOYD
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-06	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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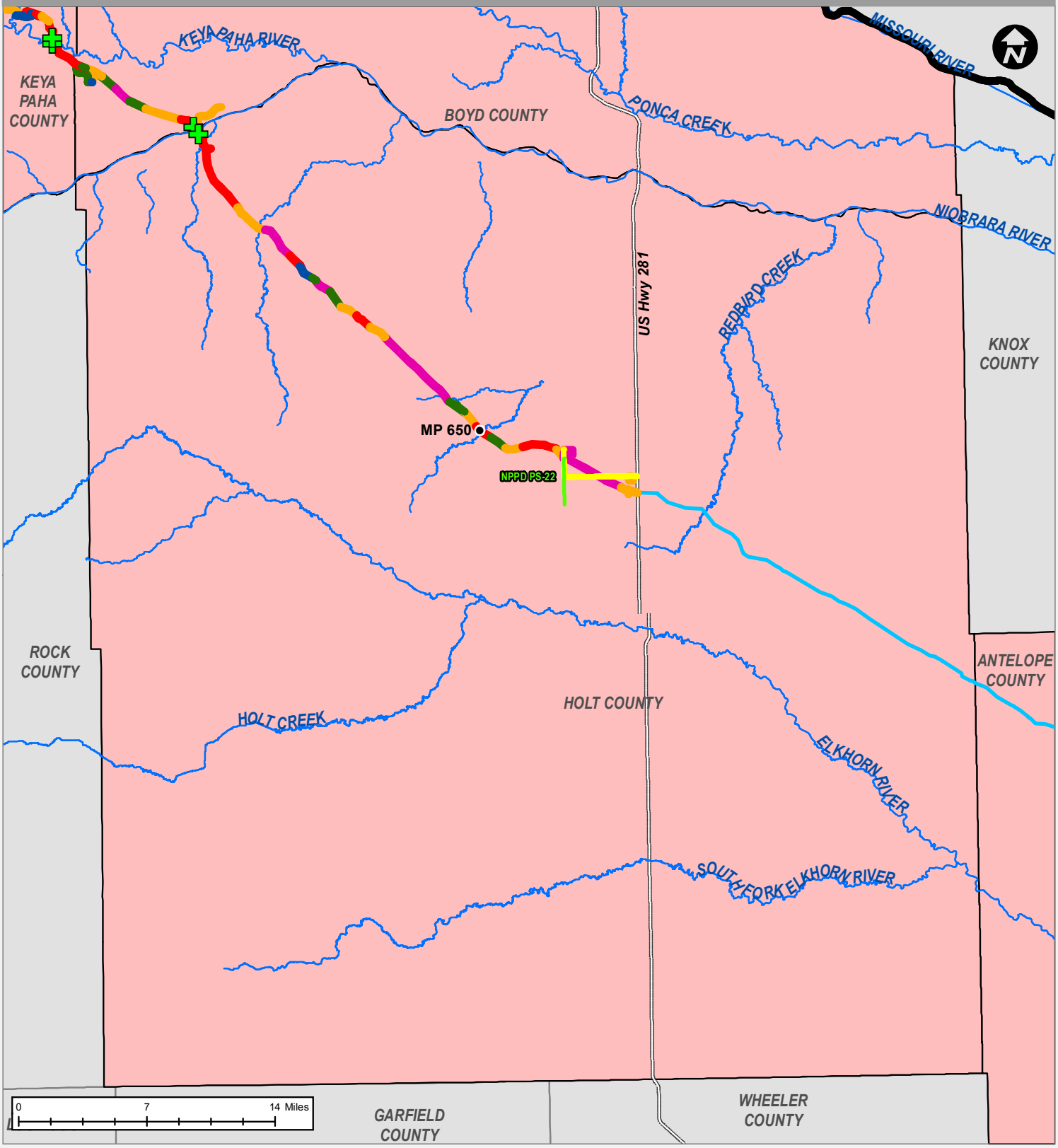
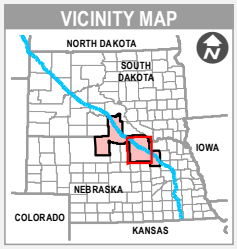
HCP - FIGURE 7 - ABB HABITAT RATING OVERVIEW HOLT COUNTY



VICINITY MAP



LEGEND

- MILE POST
- HDD ENTRY/ EXIT
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES

ABB HABITAT

- FAIR
- GOOD
- MARGINAL
- POOR
- PRIME
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	HOLT
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-07	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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3.4 Reason for Decline

Many hypotheses have been presented to provide a causal mechanism for the ABB's decline. These hypotheses include conversion of habitat (habitat loss), inter and intra-specific competition, habitat fragmentation, increase in edge habitat, increased competition for carrion, decrease in prey abundance, soil compaction, pesticide use, light pollution, loss of genetic diversity in isolated populations, disease/pathogens, DDT, agricultural and grazing practices, and invasive species. (Sikes and Raithel 2002, Schnell et al. 2007, USFWS 2019b). Other causes have been proposed as well. Most of the proposed causal factors relate to anthropogenic habitat alteration or disturbance (i.e., landscape level changes in land use practices). It is likely that the several of these factors have contributed to declines in ABB populations and drastic reductions in their distribution. Unfortunately, most of these causal mechanisms are difficult or impossible to reverse. Efforts to conserve the species must take these factors into account. Effective conservation strategies should focus on both reducing impacts to existing populations and protecting existing habitat.

The causes for the ABB's decline are complex and not well-understood. The ABB's vulnerability to extinction is likely due to its complex life history and dependence on carrion which is a finite resource that varies widely spatially and temporally (Karr 1982, Pimm et al. 1988, Peck and Kaulbars 1987). The general explanation for the species' decline is usually attributed to anthropogenic habitat alteration or changing land use practices at the landscape level. Most ABB populations within the Plan Area are in rural areas and have potential risks associated with agricultural land uses. Risks associated with the effects of changing climate, including increasing temperatures, are now a significant threat for some areas (USFWS, 2019b). Some examples of these anthropogenic alterations include direct loss of habitat associated with urbanization, industrial development, row crop farming, fragmentation of habit, wide scale use of pesticides, interruption of behavior caused by artificial lighting, and various other proposed causal factors including extinction of the once common passenger pigeon (*Ectopistes migratorius*). The passenger pigeon, which formerly occurred in the billions across most of the ABB's range, was an ideal size and almost certainly provided an abundant and important carrion source. The decline and disappearance of this species occurred just prior to the ABB's. Other suitable carrion species, such as northern bobwhites and greater prairie-chickens (*Tympanuchus cupido*), have also experienced drastic declines. Competition for limited carrion is apparently exacerbated by increasing numbers of mid-sized mammals such as skunks (*Mephitis mephitis*), raccoons (*Procyon lotor*), foxes (*Vulpes* spp.), and coyotes (*Canis latrans*) which have increased in number in response to extinction or extirpation of large predators and a drastic reduction in fur trapping. These medium sized mammals, which often compete with ABBs for carrion, often thrive in the patchy and fragmented habitat of the modern landscape.

Relatively recently, fire ants (*Solenopsis invicta*) have become competitors for carrion and a potential source of mortality for burying beetles where they co-occur (Warriner 2004, Godwin and Minich 2005). Collins and Scheffrahn (2005) noted that fire ants may reduce populations of ground-nesting rodents and birds, and in some instances, may completely eliminate ground-nesting species from a given area. Fire ant infestations are not evenly distributed; rather, they tend to be more numerous in open, disturbed habitats. Fire ants now infest large areas within the ABB range in Oklahoma (USDA 2003).

It is clear that no single factor can explain the decline of ABBs. It is apparent that the organism simply cannot tolerate the wide scale landscape changes and other human activities imposed upon them in past decades. Perhaps the species' complex and highly evolved life cycle makes it more susceptible to negative effects from high levels of disturbance and landscape alteration relative to other species. Large populations today seem to be limited to relatively large blocks of lands with low human population densities, intact native plant communities, and high populations of small birds and mammals.

4.0 Evaluation Species

Under the Nebraska Nongame and Endangered Species Conservation Act (NESCA) (Nebraska Revised Statutes §§ 37-801 to -811), NGPC has developed a list of threatened and endangered species which require further protection within the state of Nebraska. Any species that occurs in Nebraska and is federally

listed as threatened or endangered under the ESA is automatically listed under NESCA. Under NESCA, state agencies are required to ensure actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered or threatened species or result in the destruction or modification of habitat of such species that is determined by the NGPC to be critical.

Similarly, the South Dakota Game, Fish and Parks Commission (SDGF&P) promulgated a list of those species of wildlife which are determined to be endangered or threatened within the state. The SDGF&P and the Department of Agriculture ensure the necessary procedures for the conservation, management, protection, restoration, and propagation of endangered, threatened, and nongame species of wildlife are carried out. However, there is no special requirement for coordination with SDGF&P during drafting of an HCP.

As such, all Nebraska and South Dakota state-listed and all federally listed species with ranges in the Plan Area were evaluated for impacts in this section. No take of the evaluation species is anticipated from the Project. Other portions of the Project outside the Plan Area in both states have been addressed in prior NEPA documents and associated ESA informal and formal consultations. Table 6 provides the state and federally listed threatened and endangered evaluation species located within the Plan Area.

Table 6. Evaluation Species Status Within Plan Area

Common Name	Scientific Name	Status		
		State - Nebraska [1]	State - South Dakota [2,3]	Federal
Small white lady's slipper	*Cypripedium candidum*	ST	--	--
Western prairie fringed orchid	*Platanthera praeclara*	ST	--	FT
Blowout Penstemon [4]	*Penstemon haydenii*	SE	--	FE
Blacknose shiner	*Notropis heterolepis*	SE	SE	--
Finescale dace	*Phoxinus neogaeus*	ST	SE	--
Northern redbelly dace	*Phoxinus eos*	ST	ST	--
Northern pearl dace	*Margariscus nachtriebi*	--	ST	--
Sturgeon chub	*Macrhybopsis gelida*	SE	ST	
Whooping crane	*Grus americana*	SE	SE	FE
Interior least tern	*Sternula antillarum athalassos*	SE	SE	FE
Piping plover	*Charadrius melodus*	ST	ST	FT
Rufa red knot	*Calidris canutus rufa*	ST	ST	FT
Northern long-eared bat	*Myotis septentrionalis*	ST	ST	FT
River otter	*Lontra canadensis*	ST	ST	--
ST= State Threatened, SE= State Endangered, FT= Federally Threatened, FE= Federally Endangered				

[1] Sources: NNHP 2014, NGPC 2013a, NGPC 2016,
[2] Sources: SDGF&P 2016
[3] Osprey (*Pandion haliaetus*) and peregrine falcon (*Falco peregrinus*) are state-listed as threatened and endangered respectively in South Dakota, and the migratory range encompasses Tripp County; however, the county list (SDDGF&P 2016) indicates they are not present in Tripp County – presumably as a resident, and were therefore not included as evaluation species.
[4] Current range of the blowout penstemon within the Plan Area includes only portions within Cherry County, Nebraska.

4.1 Federally Listed Evaluation Species

4.1.1 Western Prairie Fringed Orchid

The western prairie fringed orchid (WPFO) can grow to 3 feet in height but 18 to 30 inches is more common. Pollination is required for seed production. This species is pollinated by a few species of sphinx (*Sphingidae*) moths (USFWS 2009, NGPC 2018a). Vegetative shoots develop from a perennating bud and

emerge from the soil in the late spring after a period of soil warming (USFWS 1996). In Nebraska, orchids begin growth in early May and flower from mid-June to mid-July depending on geographic location and growing conditions (USFWS 2017a, NGPC 2018a). Flowering occurs for up to 3 weeks with individual flowers lasting up to 10 days (NGPC 2018a). Flowering may be suppressed by litter accumulation and stimulated by fire (USACE 2015).

4.1.1.1 Status and Distribution

The WPFO was federally listed as threatened on September 28, 1989 (54 FR 39857). No critical habitat has been designated for the WPFO. Historically, the WPFO was distributed throughout much of the western central lowlands and eastern Great Plains physiographic provinces of the central U.S., and Interior Plains in extreme south-central Canada.

The decline in WPFO populations in Nebraska has primarily been the result of conversion of native grasslands to cropland, as well as overgrazing, herbicides, and exotic plant invasion. Invasive plants that may displace the WPFO through competition include leafy spurge (*Euphorbia esula*), Kentucky bluegrass, and musk thistle (*Carduus nutans*) (USFWS 2017a, NGPC 2018a). Additionally, since the WPFO is reliant on sphinx moths for pollination and seed production, any threat to these insects, such as the use of insecticides, is also a threat to the WPFO (NGPC 2018a).

4.1.1.2 Habitat Characteristics and Use

The WPFO is an erect, stout herbaceous perennial found in wet to moist soils with full sunlight within tallgrass prairies, ranging from 8 to 47 inches tall (USFWS 1996, 2017a). It is most often found in unplowed, calcareous prairies and sedge meadows (USFWS 1996) and may occur along ditches and roadsides (USFWS 2017a). In central and northeast Nebraska, it occurs in wet prairies and meadows (NGPC 2018a). In tallgrass prairies, the WPFO is typically associated with big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and Indiangrass (*Sorghastrum nutans*). In wetter sites, it is commonly associated with tufted hairgrass (*Deschampsia caespitosa*) and switchgrass (*Panicum virgatum*), and in sedge meadows is associated with *Carex* spp. and spikerushes (*Eleocharis* spp.) (USACE 2015).

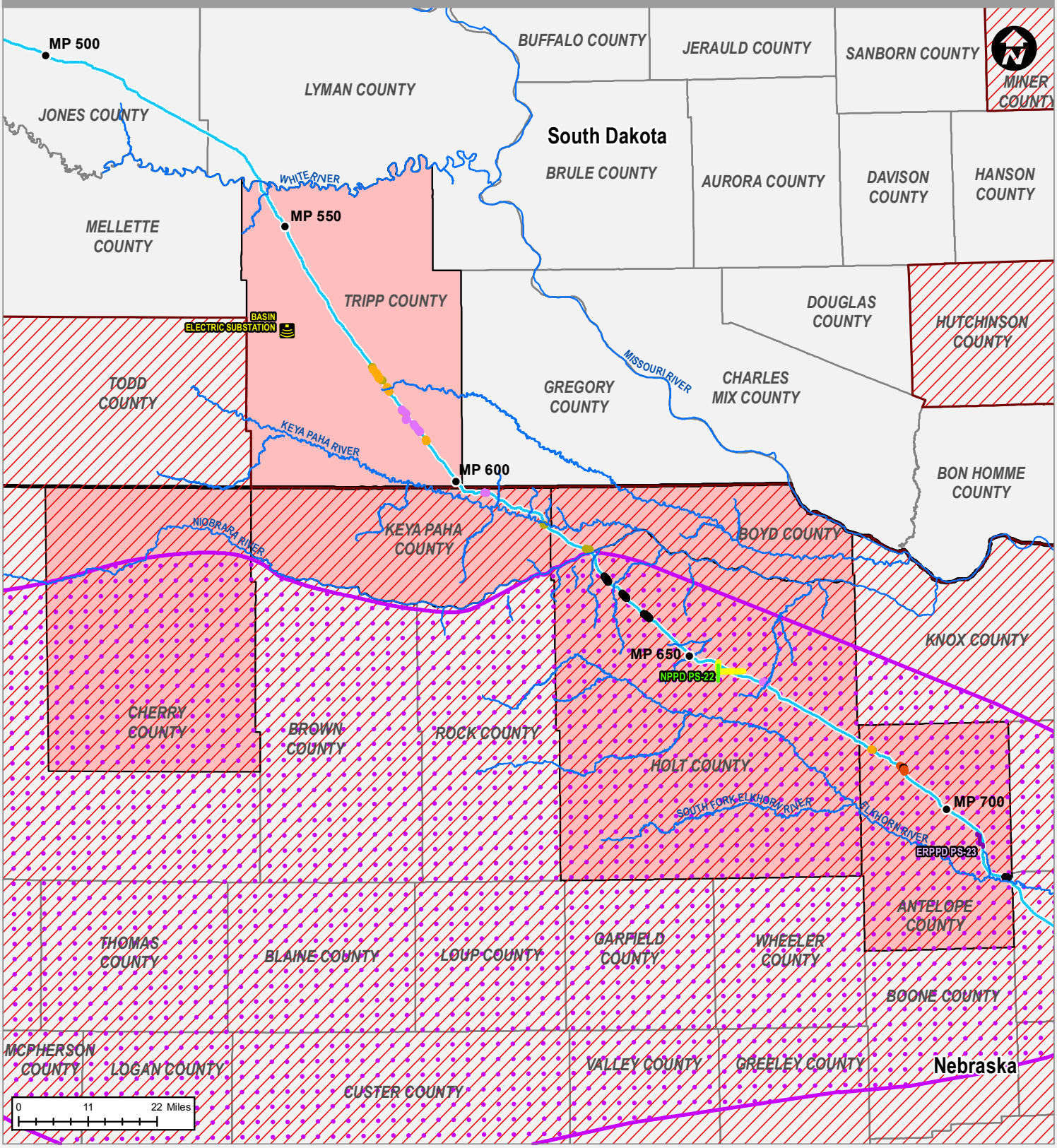
Moist soil near the ground surface is critical to maintain WPFO populations, however, standing water may adversely affect populations depending on the depth and duration of flooding. Water may also be important for the dispersal of seeds (USFWS 2009) with approximately 99 percent of reproduction occurring via seeds (USFWS 2006). Their ecology also appears to be tied to mycorrhizal associations (USACE 2015).

4.1.1.3 Occurrence in Plan Area

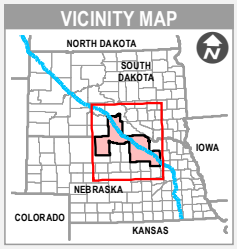
Currently, there are no known populations of this species in South Dakota (USFWS 2009). Status surveys have been completed for the orchid in South Dakota and none have been found; however, because of the ecology of this species, there is a possibility that plants may be overlooked where suitable habitat exists (USFWS 2016).

This species is now extirpated from a number of counties in Nebraska where it occurred historically (USFWS 2009) and it has experienced a 60 percent decrease in its range (NGPC 2018a). Within the Plan Area (Figure 8), Keya Paha and Antelope Counties are the only counties where suitable habitat was found during Project field surveys in 2013, 2018, and 2019. No WPFOs were found during these surveys. Suitable habitat identified in the Plan Area along project footprint is shown on Figure 8 and quantified in Table 7. Suitable habitat could occur on mitigation lands in Cherry County, which is within the range of WPFO. Conserving land for ABB could also benefit this species.

HCP - FIGURE 8 - WESTERN PRAIRIE FRINGED ORCHID RANGE WITHIN PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL PIPELINE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- WPFO RANGE (STATE)
- WPFO RANGE (FEDERAL)

HABITAT RATING

- POOR
- FAIR
- GOOD
- NO HABITAT
- NO SURVEY
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-08	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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Table 7. Orchid Habitat Identified along the Project within the Plan Area

State	Orchid Habitat [1] in the Plan Area by Habitat Rating (acres)				
	Excellent	Good	Fair	Poor	All
South Dakota	0.00	111.93	13.24	67.95	193.12
Nebraska	0.00	2.76	33.89	22.96	59.61
Total [2]	0.00	114.68	47.13	90.92	252.73

[1] Habitat is rated the same for both small white lady's slipper and western prairie fringed orchid.
[2] Approximately 51 acres of ROW and TWAs in Nebraska have not been assessed/rated.

4.1.2 Blowout Penstemon

4.1.2.1 Status and Distribution

The blowout penstemon is a perennial plant with blue-green waxy leaves and long lavender tubular flowers. It has been federally listed as an endangered plant since 1987 and state-listed as an endangered species in Nebraska since 1986. Historically, the plant occurred throughout the central part of the Sandhills. The species was thought to be extinct by 1940 only to be rediscovered in 1968. It is currently found in only a few counties in the Sandhills of Nebraska and in Carbon County, WY (NGPC 2012b). Approximately 7,000 plants occurred on less than 25 total acres scattered throughout the Sandhills (NGPC 2012b).

4.1.2.2 Habitat Characteristics and Use

The blowout penstemon, as the name implies, is found in sand blowout areas (open sand habitats) in Nebraska and Wyoming sand hill habitat. This plant occurs in early successional blowout habitat where it has little competition for scarce water and nutrients from other plants; however, as blowout habitats mature and become stabilized, other plants become established, and the blowout penstemon disappears. Thus, stabilization of blowouts and other disturbances that result in physical loss of these habitats can have an adverse effect on this species.

4.1.2.3 Occurrence in Plan Area

Blowout penstemons are found in the Sandhills of north central Nebraska, which include portions of Cherry County (Figure 9). The USFWS' 2012 5-year review (2012c) cites Stubbendieck's 2008 unpublished annual monitoring report for this species, which indicates that there were 32 known blowout penstemon populations (10 native population sites and 22 introduced population sites) in the Sandhills. All 32 of these populations occur west of where Project impacts would occur. Some populations occur within Cherry County but not within the Conservation Area. All known populations are west of the Project footprint so the species has been eliminated from analysis.

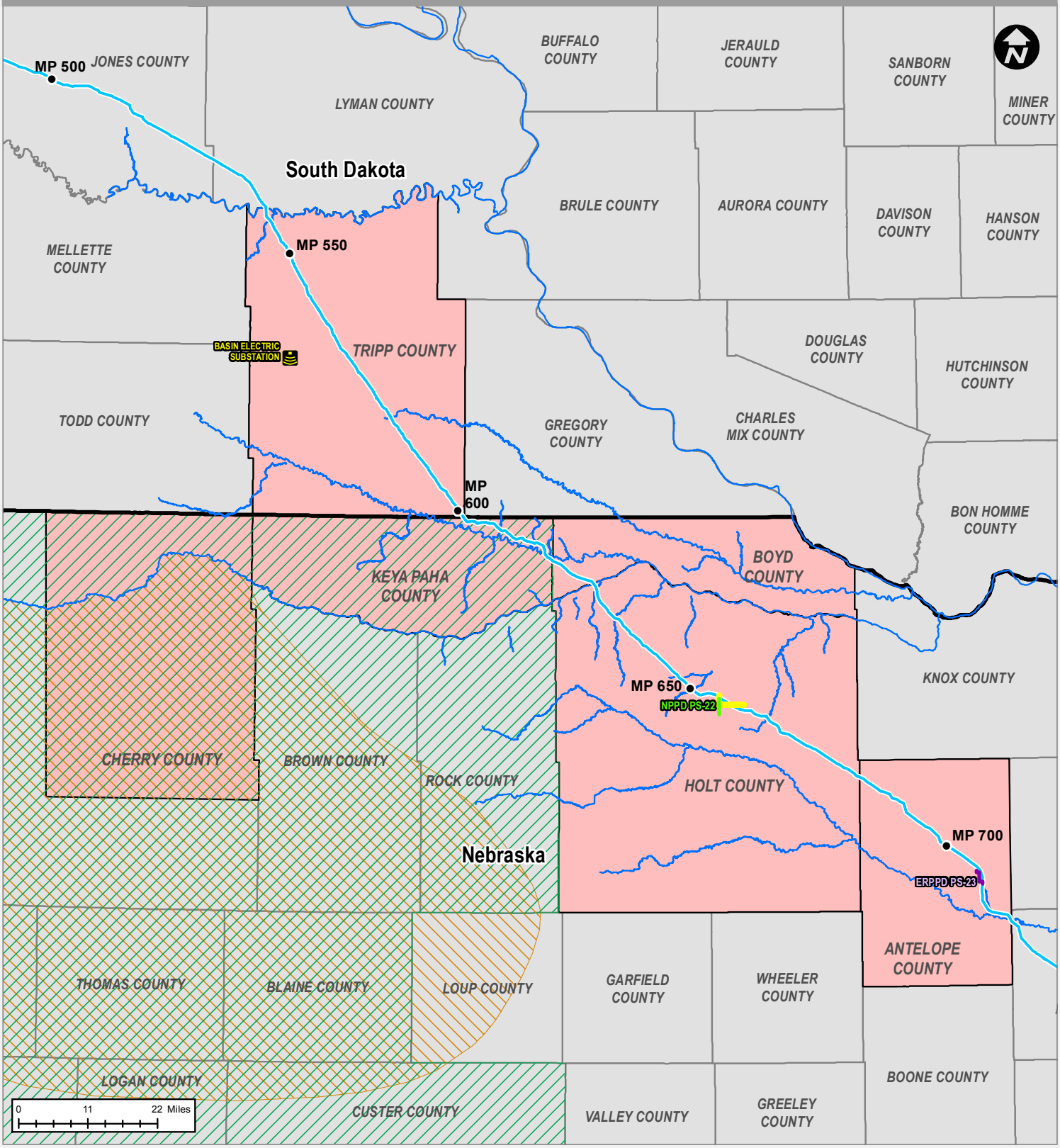
4.1.3 Whooping Crane

4.1.3.1 Status and Distribution

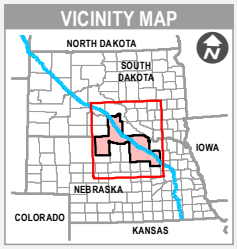
The whooping crane was listed under the ESA as endangered on March 11, 1967 (32 FR 4001). It is also state listed as endangered in South Dakota and Nebraska. Critical habitat for whooping cranes has been federally designated and in Nebraska includes a segment of the 3-mile-wide, 56-mile-long reach of the Platte River from Lexington to Denman, Nebraska (43 FR 20938-942, CWS and USFWS 2005).

Whooping cranes occur only in North America with a total wild population estimated at 686 birds in 2018 (ICF 2018). This estimate includes 505 birds in the Aransas-Wood Buffalo National Park population that winters in coastal marshes in Texas and migrates to Canada to nest in the Wood Buffalo National Park and adjacent areas. The other populations include 181 captive-raised birds that exist in a non-migratory population in Florida and in Louisiana, as well as an eastern migratory population between Florida and Wisconsin (ICF 2018). The overall decline of whooping cranes has been attributed to habitat loss, direct

HCP - FIGURE 9 - BLOWOUT PENSTEMON IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD

- 488TH AND 879TH ROAD DITCHES
- USFWS BLOWOUT PENSTEMON RANGE
- NGPC BLOWOUT PENSTEMON RANGE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-09	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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disturbance and hunting by humans, predation, disease, and collisions with manmade features (CWS and USFWS 2005).

During spring and fall migration, the Aransas-Wood Buffalo National Park population moves through the central Great Plains including portions of Montana, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. Birds from this population depart from their wintering grounds in Texas from March through April. Fall migration typically begins in mid-September with most birds arriving on wintering grounds between late October and November (CWS and USFWS 2005, Jorgensen and Brown 2017).

4.1.3.2 Habitat Characteristics and Use

Whooping cranes use a variety of habitats during migration (Howe 1987, Lingle 1987, Lingle et al. 1991, Johns et al. 1997). The whooping crane is most closely associated with river bottoms, marshes, potholes, prairie grasslands, and croplands (CWS and USFWS 2005). Whooping cranes generally use seasonally or semi-permanently flooded palustrine wetlands, broad river channels, and shallow portions of reservoirs for roosting and various cropland and emergent wetlands for feeding (Austin and Richert 2001, Johns et al. 1997). They generally feed on small grains (including a number of cultivated crops), aquatic plants, insects, crustaceans, and small vertebrates (Oklahoma State University 1993). Cranes roost on submerged sandbars in wide unobstructed channels that are isolated from human disturbance (Armbruster 1990).

4.1.3.3 Occurrence in Plan Area

Whooping cranes do not nest or winter in the Plan Area but pass through Plan Area during the spring and fall migrations between nesting and wintering areas. The whooping crane migration corridor, based on reported observations of whooping cranes and recorded satellite tracking stop over locations (Pearse et al. 2018), is shown in Figure 10. Portions of the whooping crane migration corridor encompassing 95 percent, 75 percent, and 50 percent of these sightings/locations are also indicated in the figure. The entire Plan Area lies within the 95-percent migratory corridor; approximately 85 percent is within the 75-percent migration corridor, and 60 percent is within the 50-percent corridor (Table 8).

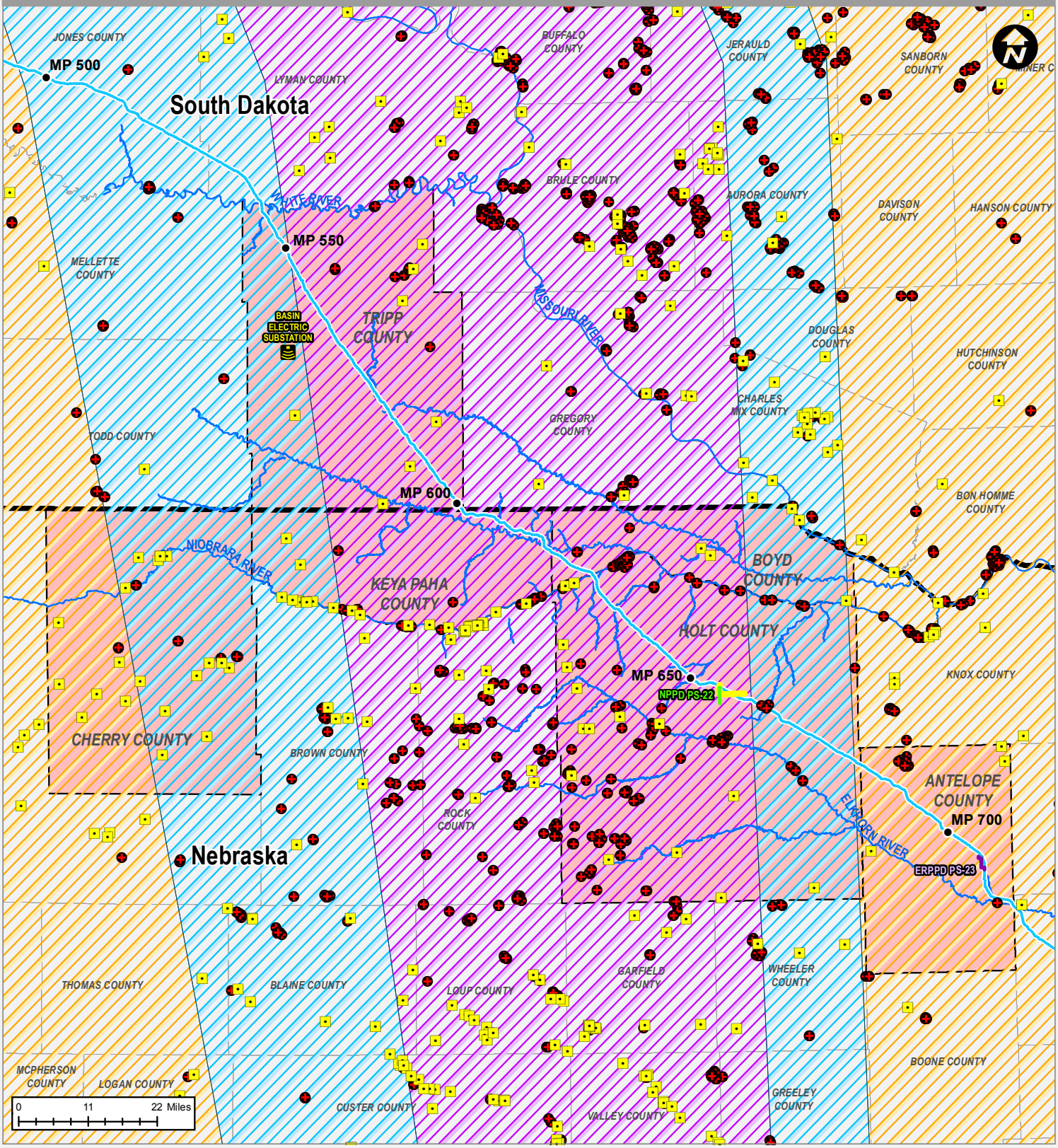
Table 8. Whooping Crane Migration Corridor and Observational Data in the Plan Area.

Migration Corridor Portion	In Plan Area			Project Footprint (acres)	Sightings within 5 Miles of Project Footprint	
	Area (square miles) [1]	Observations (sightings) [1]	Telemetry (points) [2]		Observations (sightings) [1]	Telemetry (points) [2]
50 % corridor [3]	3,722	36	369	1,992	4	75
75 % corridor [4]	5,298	46	391	2,495	--	85
95% corridor [5]	6,209	49	440	3,103	--	133
All	6,209	49	440	3,103	4	133

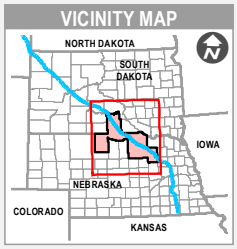
[1] Observation data for Central Flyway 1940s-2019 from USFWS.
[2] GPS data points from collared whooping cranes 2009-2017 from USFWS.
[3] The 50% corridor includes the area in which 50% of the sightings are located (Pearse et al. 2018).
[4] The 75% corridor includes the area in which 75% of the sightings are located and includes the 50% corridor (Pearse et al. 2018).
[5] The 95% corridor is area in which 95% of sightings are located and includes the 50% and 75% corridors (Pearse et al. 2018).

Whooping cranes stop at locations along their migration to rest and feed, where suitable roosting and feeding habitat exists. The cranes may spend several days at a given stop over site (Howe 1987); however, migration through the states of Nebraska and South Dakota occurs over a relatively short time generally lasting 2-4 weeks in the spring and 1-2 weeks in the fall (CWS and USFWS 2007). Analysis of USFWS tracking and observational data reveals 133 telemetry locations and 4 observational sightings have occurred within 5.0 miles of Project footprint (Table 8). These data include all public sightings in the USFWS database collected from the 1940's to 2019, and GPS telemetry data collected from 71 radio-collared cranes from 2009 through 2017. The data indicate moderate use of the Plan Area (Table 8, Figures 11-15) except along some of the larger rivers. Suitable migration stopover habitats include sandy shorelines of lakes and rivers as well as large palustrine wetlands and row crop agricultural fields within Antelope, Holt, Boyd, Keya Paha, Tripp, and Cherry counties. The Niobrara River and the Elkhorn River

HCP - FIGURE 10 - WHOOPING CRANE MIGRATION CORRIDOR AND TELEMETRY LOCATIONS



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES

MIGRATION CORRIDOR

- 50%
- 75%
- 95%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-10	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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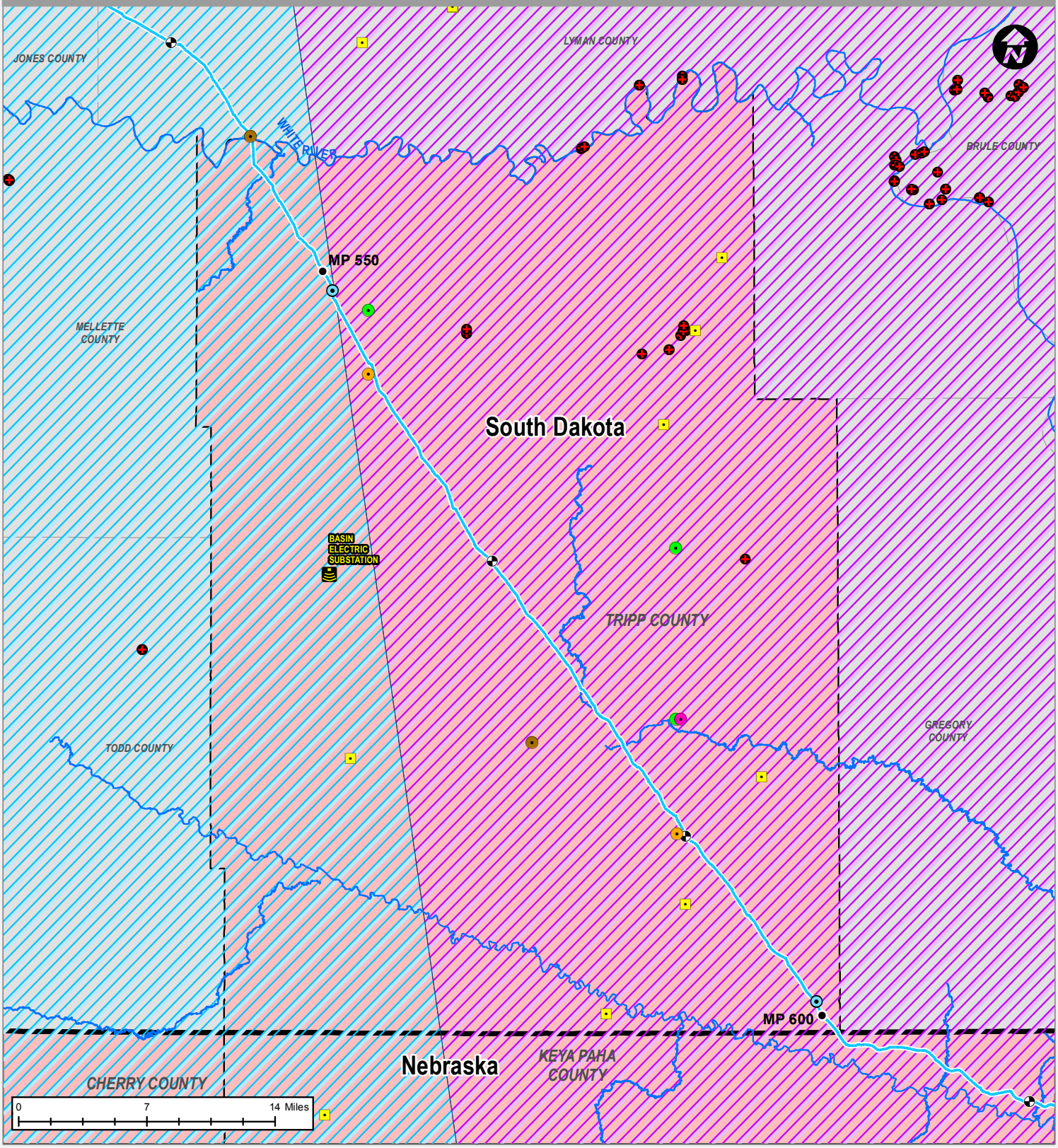
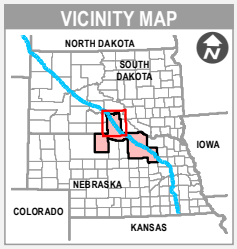
HCP - FIGURE 11 - WHOOPING CRANE AND PROJECT FACILITIES IN TRIPP COUNTY



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- WATER STORAGE SITE
- PUMP STATION
- VALVE SITE
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE

MIGRATION CORRIDOR

- 50%
- 75%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	TRIPP
CHECKED BY:	DH	STATE	SOUTH DAKOTA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-11	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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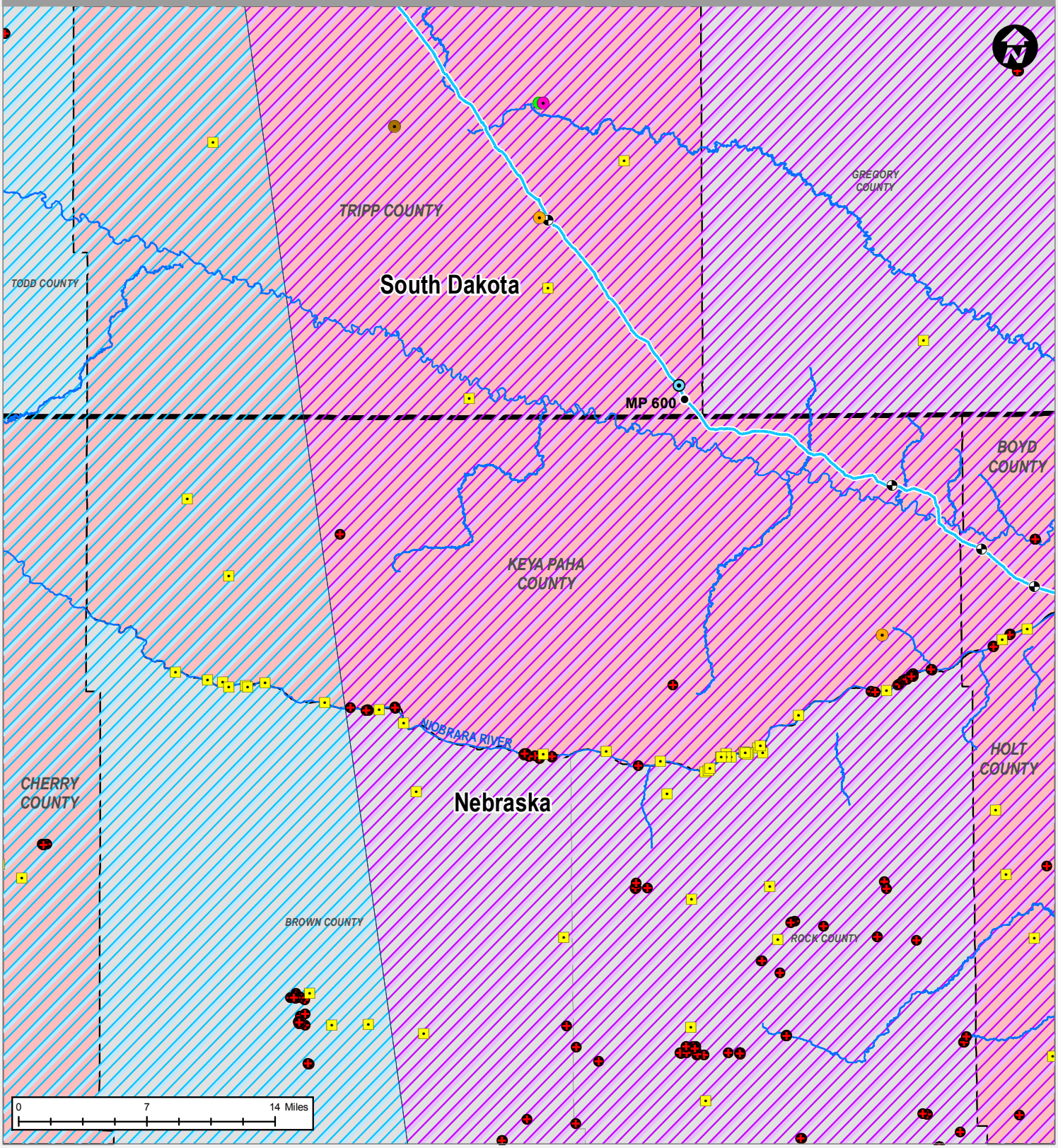
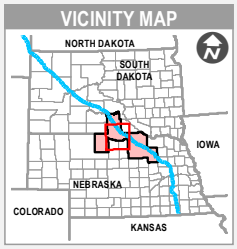
HCP - FIGURE 12 - WHOOPING CRANE AND PROJECT FACILITIES IN KEYA PAHA COUNTY



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- WATER STORAGE SITE
- PUMP STATION
- VALVE SITE
- KEYSTONE XL ROUTE

MIGRATION CORRIDOR

- 50%
- 75%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	KEYA PAHA
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-12	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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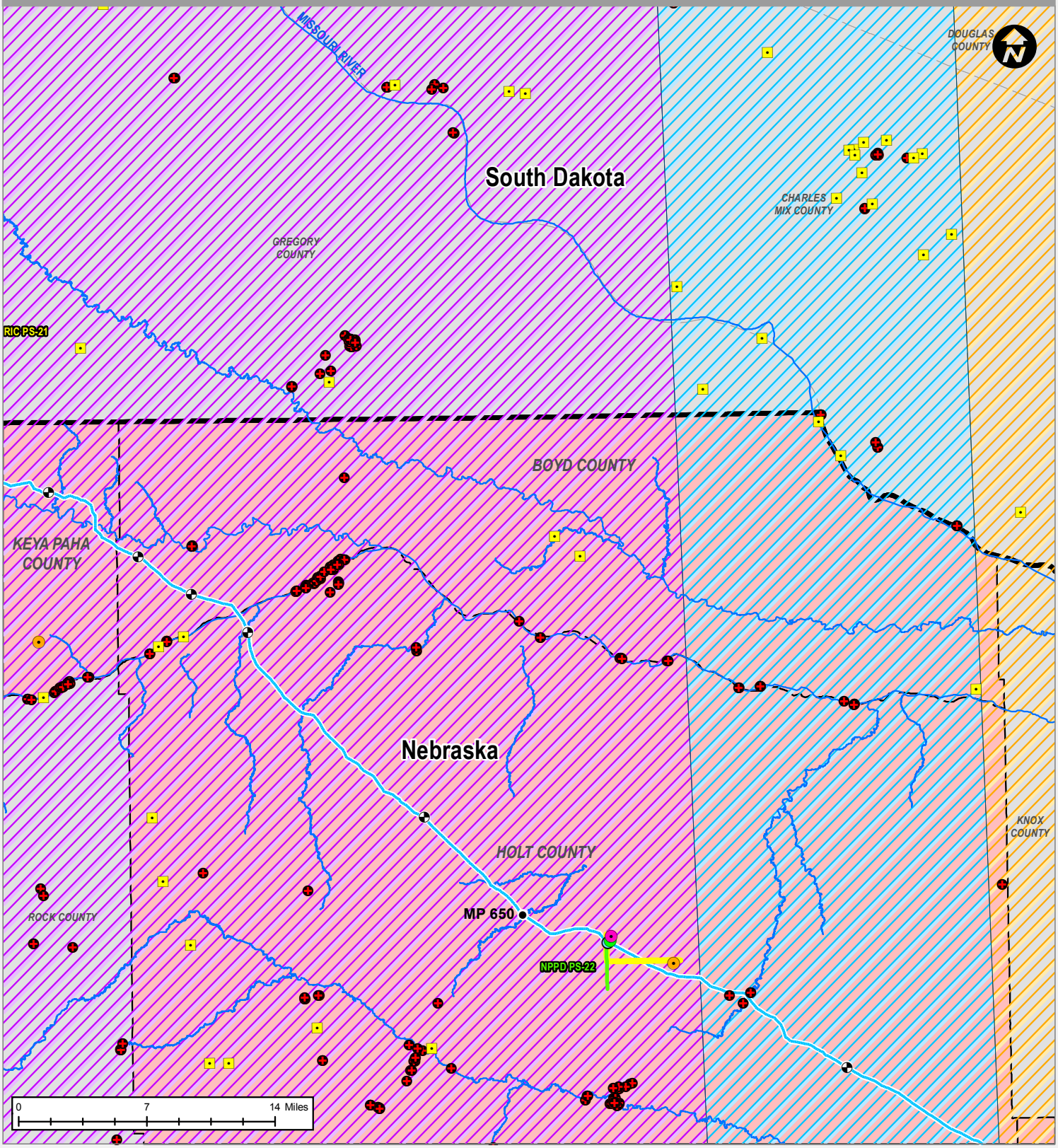
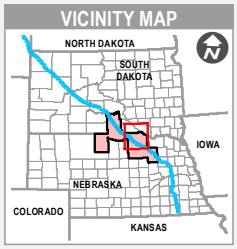
HCP - FIGURE 13 - WHOOPING CRANE AND PROJECT FACILITIES IN BOYD COUNTY



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- PUMP STATION
- VALVE SITE
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES

MIGRATION CORRIDOR

- 50%
- 75%
- 95%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	BOYD
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-13	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
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2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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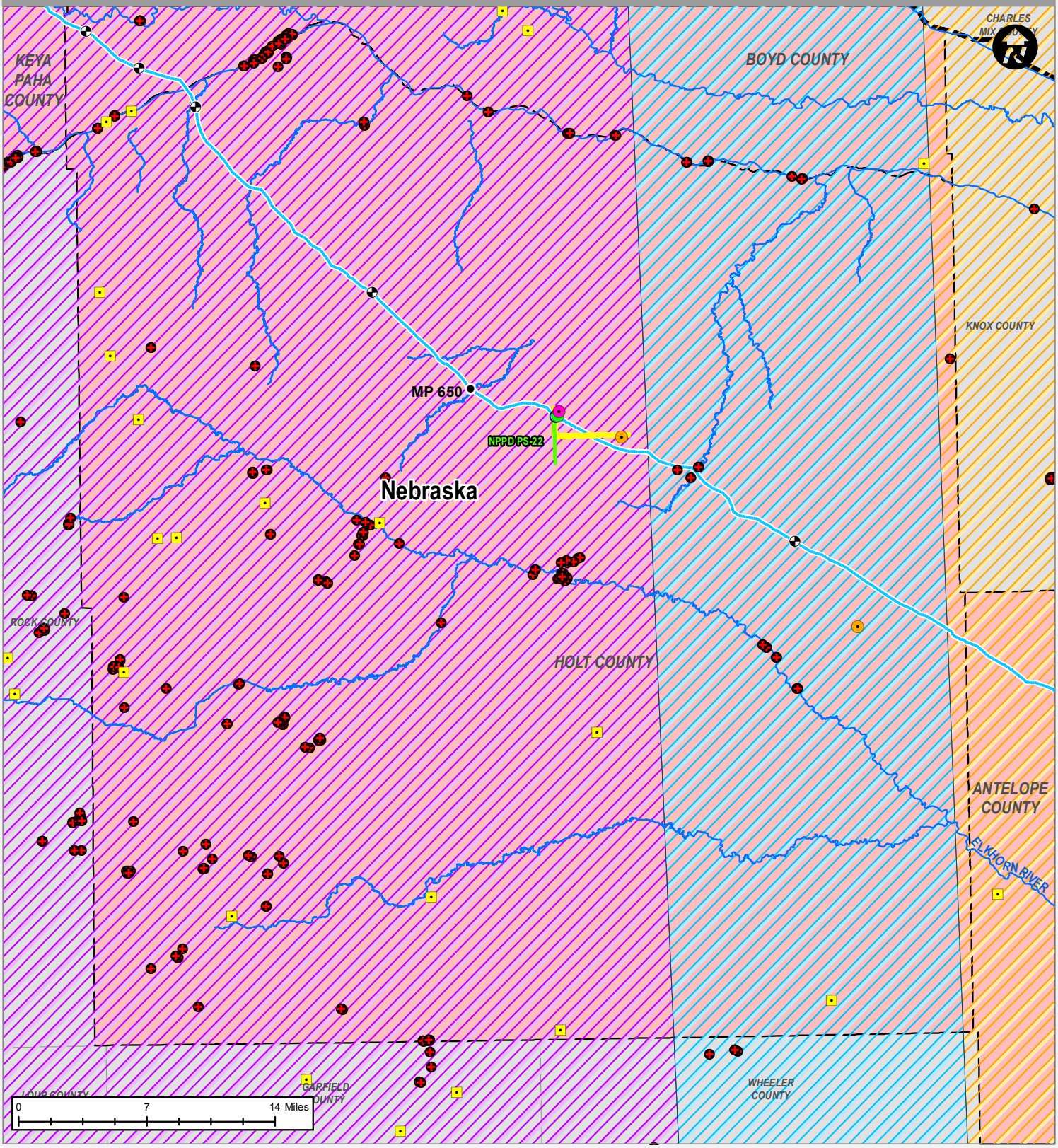
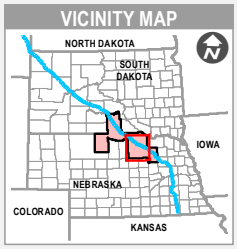
HCP - FIGURE 14 - WHOOPING CRANE AND PROJECT FACILITIES IN HOLT COUNTY



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- PUMP STATION
- VALVE SITE
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES

MIGRATION CORRIDOR

- 50%
- 75%
- 95%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	HOLT
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-14	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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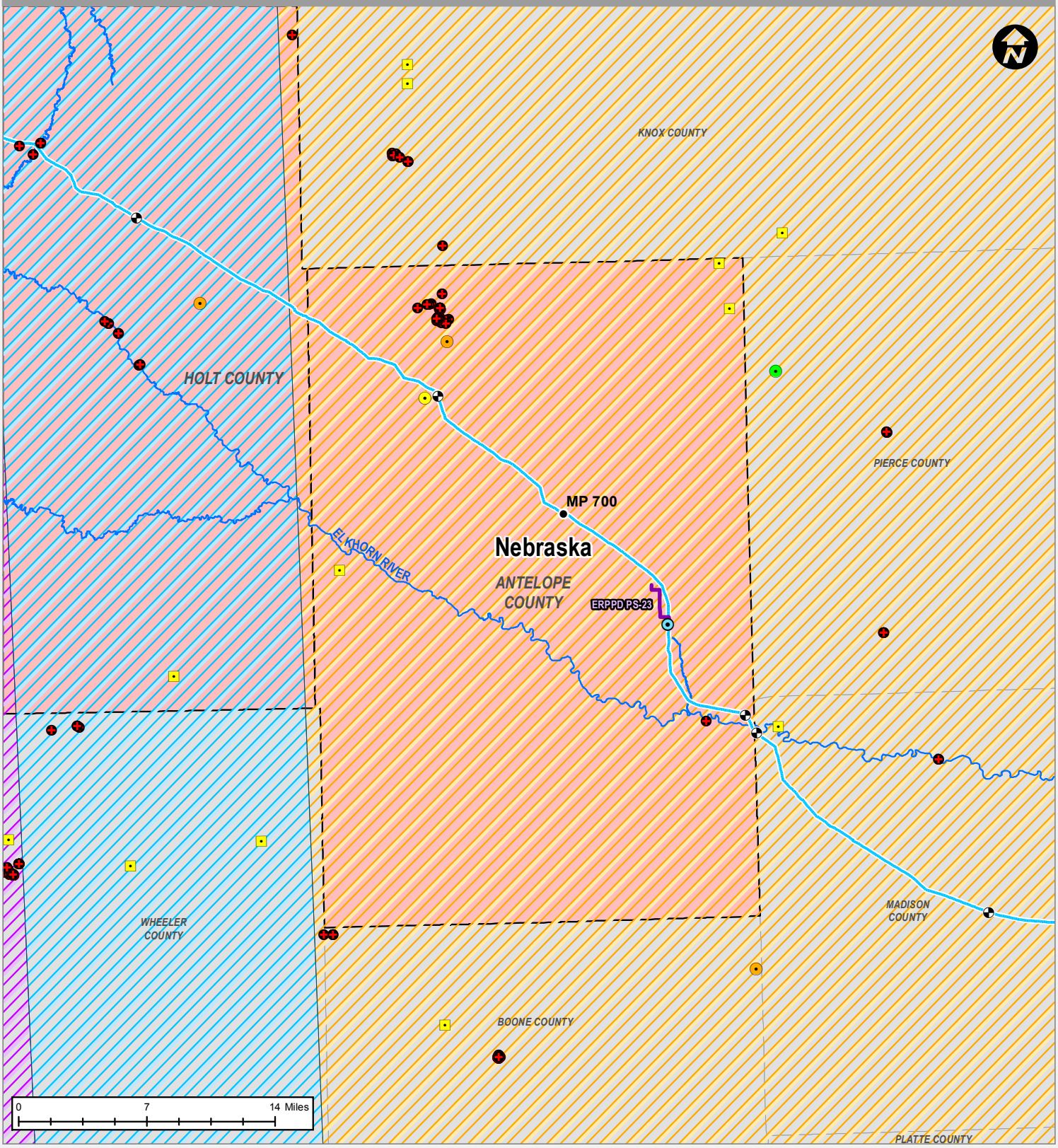
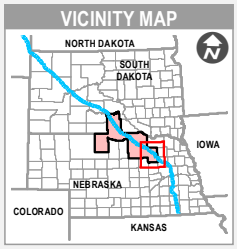
HCP - FIGURE 15 - WHOOPING CRANE AND PROJECT FACILITIES IN ANTELOPE COUNTY



VICINITY MAP



LEGEND

- MILE POST
- USFWS CENTRAL FLYWAY
- USFWS GPS TELEMETRY
- CONTRACTOR YARD
- PIPE YARD
- RAIL SIDING
- PUMP STATION
- VALVE SITE
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- ERPPD

MIGRATION CORRIDOR

- 50%
- 75%
- 95%
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	ANTELOPE
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-15	SCALE:	1 in = 7 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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contain suitable stopover habitat for whooping cranes, which is also crossed by the Plan Area. All whooping crane critical habitat in Nebraska is well out of the Plan Area and, therefore, would not be impacted by the Project.

4.1.4 Interior Least Tern

The least tern is the smallest member of the tern family with a wingspan of 20 inches and is typically 8 to 10 inches in length. They have a grayish back and wings and snowy white undersides. Least terns can be distinguished from all other terns by their combination of a black crown, white forehead, and a variable black-tipped yellow bill (USFWS 2011b). During breeding, the least tern has a black cap ending at a white forehead with a short white eye stripe and a yellow bill with a black tip. Its back is light gray, and its underside is white. The wings have a black leading edge. In non-breeding plumage, the least tern has a black eye stripe extending to the back of the head, white top of the head, and a black bill. The juvenile interior least tern has U-shaped marks across the back and resembles the non-breeding adult (Cornell Lab of Ornithology 2012).

4.1.4.1 Status and Distribution

The interior population of the least tern was listed under the ESA as endangered on May 28, 1985 (50 FR 21784-21792) (USFWS 1985b) and is state listed as endangered in both South Dakota and Nebraska. Historically, the breeding range of this population extended from Texas to Montana and from eastern Colorado and New Mexico to southern Indiana, and included the Rio Grande, Red, Missouri, Arkansas, Mississippi, and Ohio River systems. It continues to breed along most of these historic river systems, although its distribution generally is restricted to less altered river segments (USFWS 1990). The interior least tern winters along the Gulf Coast, the coast of Caribbean Islands, the eastern coast of Central America, and northern South America.

Alteration and destruction of riverine habitats, primarily as a result of changes in channel characteristics due to channelization, irrigation, and construction of reservoirs and pools, is a threat to the long-term survival of this species. These types of disturbances may eliminate nesting sites, disrupt nesting interior least terns, or may result in sandbars that are unsuitable for nesting due to vegetation encroachment or frequent inundation. The regulation of river flow regimes using dams may also eliminate nesting sites or disrupt nesting interior least terns. Historically, summer flow periods were fairly predictable and consisted of a high flow in May and June and a decline in flow for the remainder of the summer. This decline in flow levels allowed interior least terns to nest as water levels dropped and sandbars became available. The current human regulation of river flow regimes using dams may result in high flow periods extending into the normal nesting period or occurring after nesting has begun, thus flooding active nest sites (USFWS 1990).

4.1.4.1 Habitat Characteristics and Use

Interior least terns spend 4 to 5 months at their breeding sites, arriving at breeding areas from late April to early June. Nesting habitat includes sparsely vegetated sand and gravel bars within a wide, unobstructed river channel or salt flats along lake shorelines (Nelson 1998; USFWS 1990). Nesting locations are usually well above the water's edge, because nesting is typically initiated during high river flows, when much of the sandbars and shorelines are flooded. The extent of available nesting area depends on water levels and the resulting amount of exposed sandbar and shoreline habitat. The interior least tern also nests on artificial habitats such as sand and gravel pits next to large river systems and dredge islands (Campbell 2003, USFWS 1990).

Least terns are considered colonial nesters. Colonies generally consist of up to 20 nests, however, colonies with up to 75 nests have been recorded on the Mississippi River. Most least tern nesting areas on the rivers crossed by the Project would be limited to a few nesting pairs. Least terns nest on the ground in a simple unlined scrape, typically on sites that are sandy and relatively free of vegetation. Usually two to three eggs are laid by late May (USFWS 1990) or early June. Both the male and female share incubation duty, which generally lasts from 20 to 25 days. Fledging occurs within 3 weeks after hatching. Departure from colonies varies but is usually complete by early September (USFWS 1990).

The interior least tern is piscivorous, feeding in shallow waters of rivers, streams, and lakes. In addition to small fish, terns also may feed on crustaceans, insects, mollusks, and annelids. On the Great Plains, fish are the primary diet of this species (Nelson 1998, USFWS 1990). Although terns nesting at sand and gravel pits or other artificial habitats may travel up to 2 miles to forage (USFWS 1990), terns usually feed close to their nesting sites. Feeding behavior involves hovering and diving over standing or flowing water.

4.1.4.2 Occurrence in Plan Area

The interior least tern has the potential to occur within the Plan Area along the Niobrara River in Keya Paha County, and on the Elkhorn River in Antelope County in Nebraska (Figure 16). Nesting has been documented along the Niobrara River (Lott et al. 2013) and on one occasion along the Elkhorn River (USFWS 2011a) one mile east of the Antelope County line (in Madison County) near the proposed Elkhorn River crossing. Four least terns and suitable nesting habitat were observed along the Niobrara River in Keya Paha County during Project surveys in 2012. The mitigation lands are not located directly on a river where suitable nesting habitat is present. During surveys on the Elkhorn River in 2011, 6 least tern nests were documented (USFWS 2011a). The proposed Project crossing of the Niobrara River has since been moved approximately 10 miles downstream. Surveys have not been conducted at the crossing location due to lack of access, however, suitable nesting and foraging habitat is likely present at the new crossing location as well, and future pre-construction surveys are described in Section 7.1.3.

4.1.5 Piping Plover

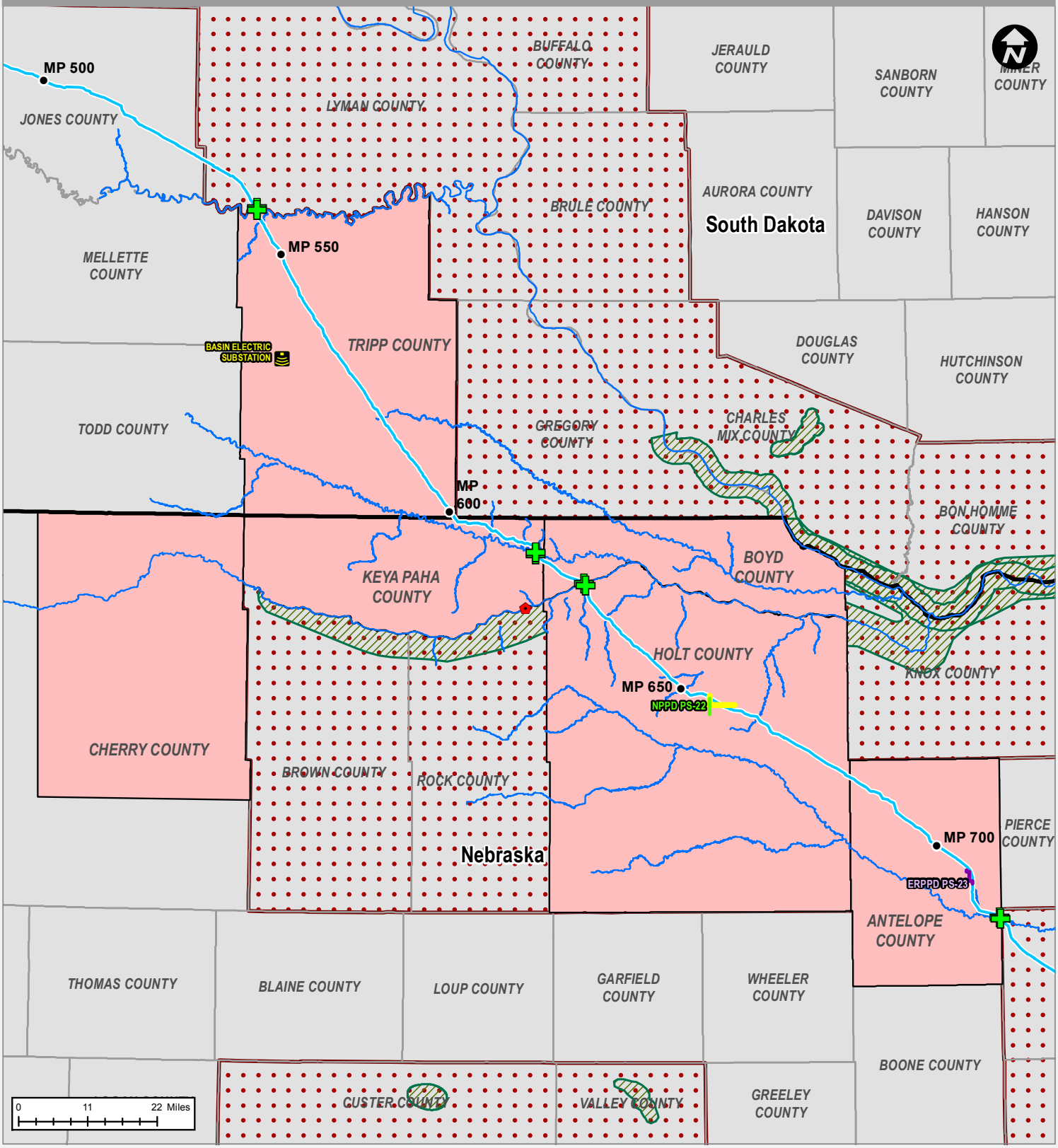
4.1.5.1 Status and Distribution

The piping plover was listed as endangered and threatened December 11, 1985 (50 FR 50726) (USFWS 1985a). The Great Lakes population of piping plover is federally listed as endangered, while the remaining Atlantic and Northern Great Plains populations are listed as threatened. The piping plover is also state listed as threatened in both South Dakota and Nebraska. Migrating and wintering populations of piping plover were also classified as threatened. Populations of piping plover within the Plan Area are considered to belong to the threatened Northern Great Plains population.

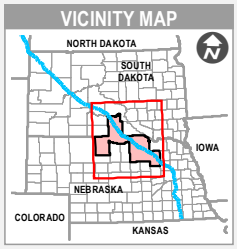
Critical habitat has also been federally designated under the ESA for the piping plover, including areas along much of the Missouri River in both South Dakota and Nebraska. The final rule designating critical habitat for the Northern Great Plains breeding population of the piping plover (67 FR 57638) within and along river segments bounding Nebraska has been vacated by the Service. Primary constituent elements of critical habitat include: (1) prairie alkali lakes and wetlands; (2) shallow, seasonally to permanently flooded, mixosaline to hypersaline wetlands with sandy to gravelly, sparsely vegetated beaches, salt-encrusted mud flats, and/or gravelly salt flats; (3) springs and fens along edges of alkali lakes and wetlands; (4) adjacent uplands 200 feet above the high water mark of alkali lakes or wetlands; (5) rivers with sparsely vegetated channel sandbars, sand and gravel beaches on islands, temporary pools on sandbars and islands, and the interface with the river; and (6) reservoirs with sparsely vegetated shoreline beaches, peninsulas, and islands composed of sand, gravel, or shale (67 FR 57638).

Historically, piping plover bred across three geographic regions: (1) U.S. and Canadian Northern Great Plains from Alberta to Manitoba south to Nebraska; (2) Great Lakes beaches; and (3) Atlantic coastal beaches from Newfoundland to North Carolina. Wintering areas are not well known, although wintering birds have been most often seen along the Gulf of Mexico, southern U.S. Atlantic coastal beaches from North Carolina to Florida, eastern Mexico, and scattered Caribbean Islands (Haig 1986; USFWS 1988). The piping plover's current breeding range is similar except that breeding populations in the Great Lakes have almost disappeared (Haig and Plissner 1993). In Nebraska, the current range follows the Platte River, Loupe River, lower Elkhorn River, Niobrara River, and portions of the Missouri River.

HCP - FIGURE 16 - INTERIOR LEAST TERN RANGE IN PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- HDD ENRTY/ EXIT
- SURVEYED LOCATION- 2012
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES
- DISTRIBUTION LINE WITHIN PLAN AREA
- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- LEAST TERN RANGE (STATE)
- LEAST TERN RANGE (FEDERAL)
- PLAN_AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-16	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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4.1.5.2 Habitat Characteristics and Use

Piping plover begin arriving on breeding grounds in mid-April, and most birds have arrived in the Northern Great Plains and initiate breeding behavior by mid-May (USFWS 1994). Populations that nest on the Missouri, Platte, Niobrara, and other rivers use beaches and dry barren sandbars in wide, open channel beds. Nesting habitat of inland populations consists of sparsely vegetated shorelines around small alkali lakes, large reservoir beaches, river islands and adjacent sandpits, and shorelines associated with industrial ponds (Haig and Plissner 1993). Vegetation cover is usually 25 percent or less (USFWS 1994). The piping plover feeds by probing sand and mud for insects, small crustaceans, and other invertebrates in or near shallow water. This species feeds by alternating running and pausing to search for prey (Bent 1929).

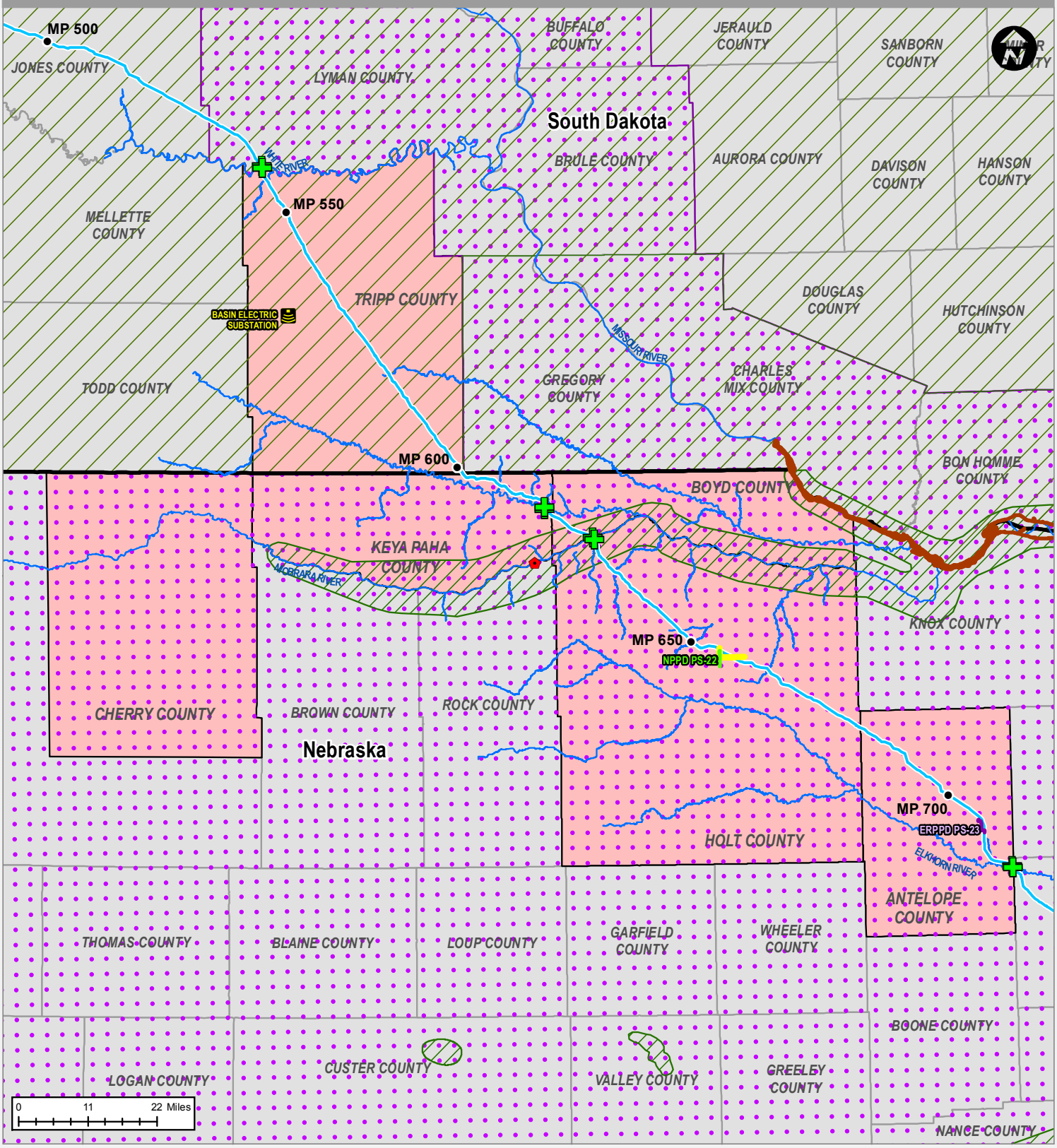
Nests consist of shallow scrapes in the sand with the nest cup often lined with small pebbles or shell fragments. The nest is typically far from cover. Nesting piping plover have been found in least tern nesting colonies at a number of sites on Great Plains river sandbars and sand pits (USFWS 1994). Egg laying commences by the second or third week in May. The female generally chooses from several nest sites the male has constructed. Complete clutches contain three to four cryptically colored eggs (USFWS 1994). Incubation is shared by the male and female and averages 26 days. Incubation begins only after the last egg is laid and eggs typically hatch on the same day. Brooding duties also are shared by the male and female. Broods remain in nesting territories until they mature unless they are disturbed. Fledging takes approximately 21 to 35 days (USFWS 1994). If a nest fails or is destroyed, adults may re-nest up to four times (USFWS 1987). Breeding adults begin leaving nesting grounds as early as mid-July with the majority gone by the end of August (Wiens 1986, as cited in USFWS 1994).

Threats to piping plover nesting habitat include reservoirs, channelization of rivers, and modifications of river flows that have eliminated hundreds of kilometers of nesting habitat along Northern Great Plains' rivers (USFWS 1994). Eggs and young are vulnerable to predation and human disturbance, including recreational activities and off-road vehicle use. Human-caused disturbance to wintering habitats is also a threat to the continued existence of this species. Motorized and pedestrian recreational activities, shoreline stabilization projects, navigation projects, and development can degrade and eliminate suitable wintering habitat for this species.

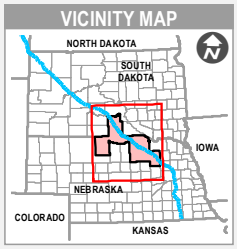
4.1.5.3 Occurrence in Plan Area

In Nebraska, the current range of the piping plover within the Plan Area is limited to the Niobrara River in Keya Paha, and Boyd Counties, the Missouri River in Boyd County, and to a lesser extent the Elkhorn River in Antelope County (Figure 17). In South Dakota, all of Tripp County is included within the current range (Figure 17). The piping plover may be found nesting within the Plan Area or migrating through it. Suitable migration stopover habitats include sandy shorelines of lakes and rivers (Campbell 2003), gravel bars, or mudflats in agricultural fields. Suitable nesting and breeding habitat are found along the Niobrara River in Nebraska within Keya Paha County. Project surveys were conducted in 2008 and 2011 at the planned Niobrara River associated with a prior route; one piping plover was observed in 2008, none were observed in 2011. The proposed Project crossing of the Niobrara River has since been moved approximately 10 miles downstream and access has not been granted for surveys at the new crossing. Recent Project surveys have not found suitable habitat near the current proposed pipeline crossing of the Elkhorn River; however, sandbars and potentially suitable habitat for nesting piping plovers have been observed in Antelope County historically a mile downstream from the current pipeline crossing (USFWS 2011a). Adult plovers were observed at the site but no evidence of nesting was observed (USFWS 2011a). Critical habitat for piping plovers is located along the Missouri River along the northeastern boundary of Boyd County (Figure 17). No Project surveys for piping plover have been performed within the Conservation Area.

HCP - FIGURE 17 - PIPING PLOVER RANGE IN PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- HDD ENRTY/ EXIT
- SURVEYED LOCATION- 2012
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES
- **DISTRIBUTION LINE WITHIN PLAN AREA**
- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- PIPING PLOVER CRITICAL HABITAT
- PIPING PLOVER RANGE (FEDERAL)
- PIPING PLOVER RANGE (STATE)
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-17	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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4.1.6 Rufa Red Knot

4.1.6.1 Status and Distribution

The rufa red knot was federally listed as a threatened species on December 11, 2014. No critical habitat has been designated. It is a casual or irregular occurrence within the non-coastal portion of the Central Flyway (Central Flyway Council 2013). There are very few records of this species in South Dakota or Nebraska.

Red knots migrate primarily along the coastline, especially the eastern coastline, from breeding grounds in the Canadian arctic to as far south as Tierra del Fuego, South America, although many birds also winter along the coast of the southeastern U.S., Gulf of Mexico, and northern Brazil (USFWS 2013). There is no breeding or wintering habitat along any portion of the Plan Area.

4.1.6.2 Habitat Characteristics

Most red knot migrate along the eastern coastline, feeding on mollusks and softer invertebrate prey (Piersma and van Gils 2011, Harrington 2001). The primary locations for these types of food sources are coastal marine and estuarine habitats with exposed intertidal sediment, sand, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons (Cohen et al. 2010, Cohen et al. 2009, Niles et al. 2008, Harrington 2001, Truitt et al. 2001). Since long-distance migrants, such as the red knot, are highly dependent on quality food sources at specific stop-over points, they typically congregate in areas where abundant food is consistently available (USFWS 2013).

4.1.6.3 Occurrence in the Plan Area

The federal range map (USFWS 2019) indicates the rufa red knot is found in Tripp County during migration but not in any of the Nebraska counties in the Plan Area. Formal surveys for red knot are not required as their records in Nebraska are extremely rare and only as an infrequent migrant observed and reported incidentally by public or professionals (see Appendix D-Agency Correspondence Letters). A review of reported occurrences revealed a very few occurrences within the Plan Area in both South Dakota and Nebraska. Four records of red knots occurring in Nebraska 5-30 miles from the Project were found, with the most recent being along the Niobrara River in 2011 approximately 26 miles from the proposed Project, and the closest to the Project being near Columbus in 1986 (eBird 2018). Two records of red knots occurring near Blunt, South Dakota approximately 46 miles from the Project were found. No records were found of red knots occurring within 1.0 mile of the Project (SDNHP 2018, NNHP 2018). These records indicate red knots sometimes occur in the Plan Area in suitable habitat during migration, but any such occurrences are very infrequent and in very low numbers. There are no traditional stopovers in the Plan Area.

4.1.7 Northern Long-Eared Bat

4.1.7.1 Status and Distribution

The northern long-eared bat is federally listed under the ESA as a threatened species, and, therefore, is state listed by South Dakota and Nebraska. The Service also published an ESA Section 4(d) rule in the Federal Register on January 14, 2016, which specifically defines take prohibitions to protect maternity colonies and hibernacula for projects within the white-nose syndrome zone (50 CFR Part 17). No critical habitat has been established.

The range of this bat extends across much of the eastern and north central United States from Maine to eastern Montana and adjacent Canada and south as far as parts of Louisiana and Alabama. The historical and current ranges are considered to encompass all of South Dakota, and all of Nebraska except for a few southwestern counties. Historically, the bat has been patchily distributed throughout its range but has been decidedly most common in the northeastern U.S. and Canada and less common in the southern and western parts of the range. The primary threat to the northern long-eared bat is the white-nose syndrome, an infectious disease responsible for unprecedented mortality in some hibernating insectivorous bats of the northeastern United States. The disease is believed to have resulted in population declines of 99 percent in affected areas of the historic range.

4.1.7.2 Habitat Characteristics and Use

Caves and mines are used for hibernation, with hibernation commencing as early as August and continuing through the winter months. Beginning in late-summer to early-fall, males swarm near the hibernacula to initiate breeding. Females have delayed fertilization with a gestation period ranging between 50 and 60 days with birthing of a single pup occurring the following May to July (DOS 2017, Foster and Kurt 1999).

In the summer, northern long-eared bats are found in forested areas, including riparian corridors, for roosting, feeding, travel, and maternity colonies (Menzel et al. 2002, Owen et al. 2002, Foster and Kurta 1999). These summer roosting areas and colonies may be 30 miles or more from winter hibernacula. Forested habitats as well as interspersed non-forested habitats (e.g., emergent wetlands, edges of agricultural fields and pastures) and linear features (e.g., fencerows, wind-breaks, hedgerows) are utilized. Roosting occurs primarily under the bark of dead and dying trees, or on tree species with peeling bark or bark that contains a lot of crevices (Menzel et al. 2002, Owen et al. 2002, Foster and Kurta 1999). Typical roosts are trees or snags at least 3 inches diameter at breast height (USFWS 2015b). The northern long-eared bat appears to be opportunistic in roost selection and will use a variety of tree species as well as occasionally roosting in artificial structures (e.g., buildings). Northern long-eared bats are known to switch roosts often, typically using the same site for only 1 to 3 days (Foster and Kurta 1999, Owen et al. 2002). They roost either singularly or in colonies (USACE 2015). The bats typically forage on the edge and understory or heavily forested areas and along hillsides, ridges, water, and clearings.

4.1.7.3 Occurrence in the Plan Area

The entire Plan Area is within the range of the northern long-eared bat; however, suitable habitat is limited because so much of the natural land cover has been converted from forest to agriculture. Suitable habitat is generally restricted to extant forested riparian corridors along the major rivers or streams. Surveys to assess habitat suitability have been conducted in riparian areas traversed by the Project where access has been granted (Westech 2013b, 2015, 2018b). These surveys were completed from public roads and based on a review of high-quality aerial imagery. Limited amounts of suitable habitat were observed at Shingle Creek, Wolf Creek, Spotted Tail Creek, and the Elkhorn River. A number of streams likely to hold habitat were not surveyed due to lack of access, such as Alkali Creek, Keya Paha River, Beaver Creek, Big Sandy Creek. Surveys have not been conducted in South Dakota nor in Cherry County within the Conservation Area. No known maternity roost trees or hibernacula have been documented in the Plan Area (Keystone's response to DOS Data Request No. 63).

The Plan Area is entirely within the White-Nose Syndrome Zone; however, the syndrome has not been documented in hibernacula within the Plan Area (USFWS 2018b).

4.2 State Listed Species

4.2.1 Small White Lady's Slipper

The small white lady's slipper is a medium sized perennial orchid that flowers in Nebraska from mid-May through early June.

4.2.1.1 Status and Distribution

The small white lady's slipper is found over much of mid-U.S. from New York west to South Dakota and south to Missouri and Virginia, and in southern Canada. In Nebraska, it is found in 17 or 18 counties where its distribution follows the Niobrara, Elkhorn, and Loup River drainages. The small white lady's slipper is not listed under the ESA and is not state-listed in South Dakota but is state-listed in Nebraska as a threatened species (Table 6).

The small white lady's slipper is associated with tall grass prairie ecosystem and its decline has therefore likely followed the decline of the tall grass prairie, a decline of more than 95 percent. The greatest threat to the plant is conversion of prairie habitat to crop production or development. Livestock grazing also has been shown to severely impact the plants (Nebraska Game and Parks 2018).

4.2.1.2 Habitat Characteristics and Use

The small white lady's slipper is found in wet prairies (northern sedge fen meadows, northern cordgrass wet prairies, and mesic-to-wet tallgrass prairies), generally with calcareous soils (eFloras.org 2010 in NDEQ 2012). Small white lady's slipper plants also have been observed in roadside ditches and growing in association with smooth brome *(Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*), although this is not considered typical habitat (NDEQ 2012).

4.2.1.3 Occurrence in Plan Area

The distribution of the small white lady's slipper includes portions of all Nebraska counties in the Plan Area (Figure 18), where documented occurrences of this species follows the Niobrara and Elkhorn River systems (see townships with Nebraska Natural Heritage database sightings in Figure 17). Small white lady's slippers could potentially occur within suitable habitat along the proposed Project route in these areas. Portions of the route within the Plan Area identified as possibly containing suitable habitat for the small white lady's slipper were surveyed in the field in June-July 2013 and 2018 for the presence of the small white lady's slipper and its habitat (Westech 2013, 2018). A total of approximately 252.73 acres of potentially suitable (90.9 acres of poor, 47.1 acres of fair, and 114.7 acres of good) habitat was found in 20 locations within those portions of the Plan Area for which access was granted; no small white lady's slippers were observed (Figure 17, Table 7). No Project surveys were conducted within the Conservation Area.

4.2.2 Blacknose Shiner

The blacknose shiner is a small minnow, commonly 3 to 5 inches in length.

4.2.2.1 Status and Distribution

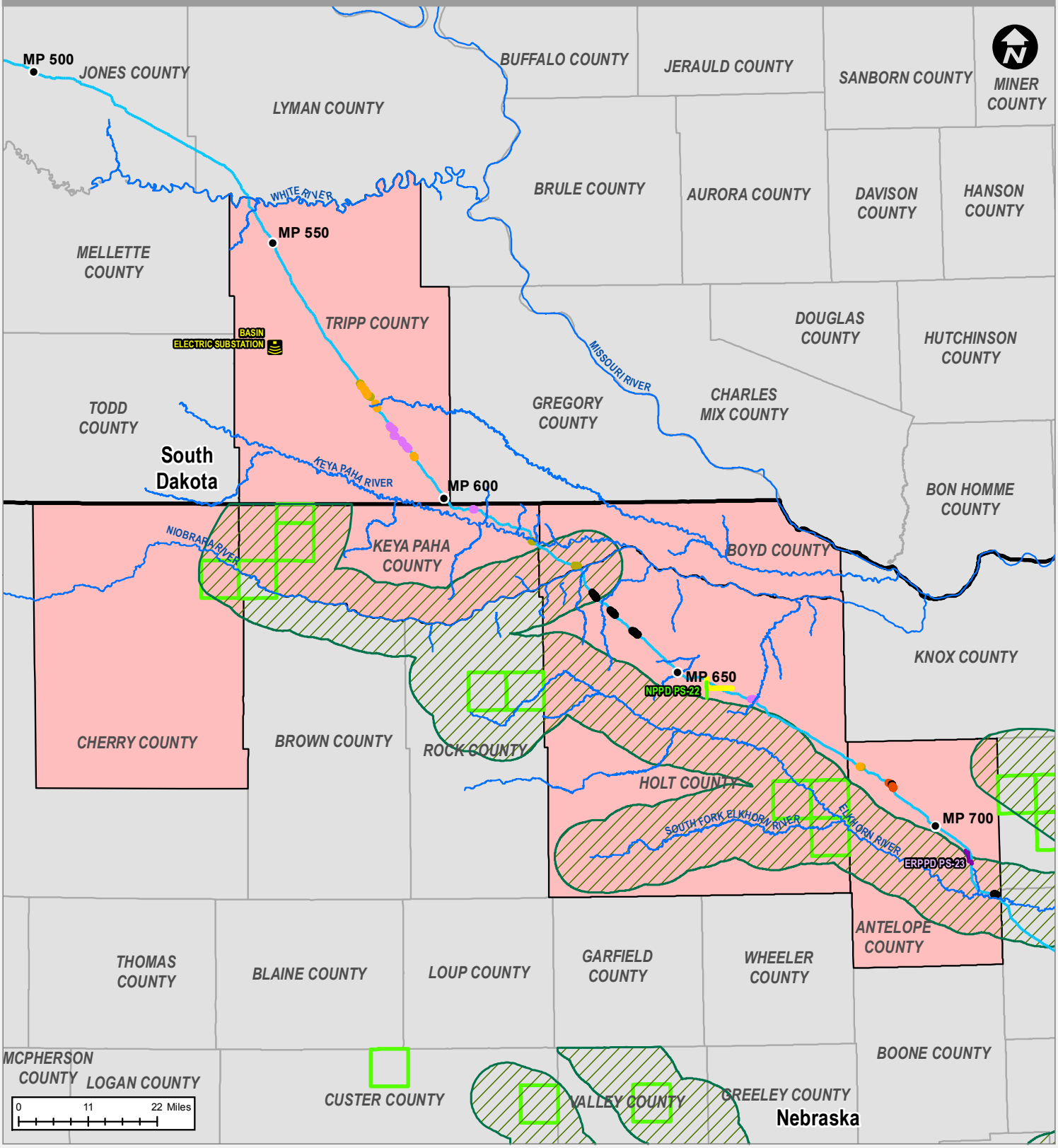
The range of the blacknose shiner extends from Nova Scotia to Saskatchewan in Canada and south to Missouri and Kansas in the U.S., where it is found primarily in the Hudson Bay, Great Lakes and Mississippi River watersheds. In South Dakota, the species is still present the Upper Minnesota River basin in northeastern part of the state (USGS 2004), Big Sioux River drainage (USGS 2004) in southeastern South Dakota, and in the Niobrara River/Keya Paha River (Cunningham et al. 1995) drainages. In Nebraska it is found in a few disjointed populations in the Sandhills and panhandle region and the Niobrara River/Keya Paha River drainages near the South Dakota border (NNHP 2013).

The blacknose shiner is not listed under the ESA and is considered secure globally (G4, NatureServe 2019). It is, however, state-listed as endangered in both South Dakota and Nebraska. The species has declined throughout its range due to wetland loss, increased water turbidity, and siltation caused by erosion and pollution (Hubbs 1951, Harlan and Speaker 1956, Cross 1967, Smith 1979, Trautman 1981, Becker 1983, Cross and Moss 1987) and these types of impacts are thought to be the reasons for observed declines in blacknose shiners in South Dakota (Bailey and Allum 1962) and Nebraska.

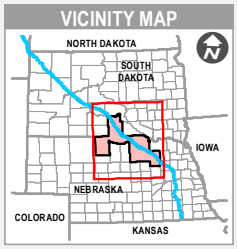
4.2.2.2 Habitat Characteristics and Use

The blacknose shiner is found in small streams, slow-moving rivers, and lakes with sandy bottoms. It prefers streams or creeks with cool, clear water and large pools, and is often found in areas with extensive vegetation. Cool, clean, well oxygenated streams with abundant aquatic vegetation. It frequents clear prairie streams in quiet pools with considerable vegetation, muck, and organic debris, often overlaying sand, gravel, or rock bottoms (Pflieger 1997). In Nebraska, the blacknose shiner is found in clean, cool, well oxygenated streams with abundant aquatic vegetation. The minnow's preferred habitat is areas swept by currents, island heads, and sand bars (NDEQ 2012). Blacknose shiners are intolerant of turbid water and pollution. Their diet consists of small aquatic invertebrates, insects, crustaceans, and algae. Spawning occurs over sandy substrate, usually in the last week of June.

HCP - FIGURE 18 - SMALL WHITE LADY'S SLIPPER RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL PIPELINE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- SMALL WHITE LADY'S SLIPPER RANGE IN NEBRASKA
- TOWNSHIP OF SPECIES OCCURENCE

HABITAT RATING

- POOR
- FAIR
- GOOD
- NO HABITAT
- NO SURVEY
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-18	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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4.2.2.3 Occurrence in Plan Area

Based on the ranges of state-listed species and the Project footprint it was determined that the blacknose shiner could potentially occur within suitable habitat in tributaries of the Keya Paha and Niobrara Rivers in Keya Paha County and Cherry County, Nebraska and Tripp County, South Dakota. Townships with Nebraska Natural Heritage database sightings are indicated in Figure 19. In consultation with biologists at SDGF&P and NG&PC, 11 tributaries (Table 9) were identified as possibly holding suitable habitat for the blacknose shiner and other state listed fish species. Fish surveys were conducted in 2012 at proposed crossings of the tributaries for which property access was granted and additional crossing locations were surveyed in 2013 as the route alignment shifted and additional access was obtained (Table 9) (Westech 2012, 2013). No blacknose shiners were observed at any of the accessible crossings. It also was concluded that it is unlikely the sampled locations provide habitat for the species. Although blacknose shiner are likely present in Cherry County, the estimated current range within Cherry County is outside the Plan Area.

Table 9. Locations and Findings of Surveys for Listed Fish Species in the Plan Area

Year	Milepost	Lat/Lon	County	Stream	Finding [1,2]
May 2013	611.2	42.948 -99.372	Keya Paha	Wolf Creek	BS, RS, CS, CC, LD
May 2013	614.2	42.942 -99.315	Keya Paha	Spotted Tail Creek	BS, CC
May 2013	617.7	42.919 -99.263	Keya Paha	Alkali Creek	Access denied
August 2012	-- [3]	42.912 -99.455	Keya Paha	Spring Creek	CC, LD, SS, WS
May 2013	621.9	42.877 -99.210	Boyd	Big Creek	No sample due to lack of water
May 2013	627.6	42.835 -99.120	Boyd	Beaver Creek	Access denied
August 2012	-- [3]	42.807 -99.298	Keya Paha	Simpson Creek	No fish found
August 2012	-- [4]	42.774 -99.128	Holt	Beaver Creek	BS, BM, CS, CC/LD, WS
May 2013	633.5	42.767 -99.060	Holt	Big Sandy Creek	Access denied
August 2012	650.2	42.605 -98.826	Holt	M.B. Eagle Creek	BS, BM, CS, CC, LD
August 2012	664.0	42.537 -98.586	Holt	Redbird Creek	CC, SS
August 2012	684.2	42.380 -98.263	Antelope	Big Springs Creek	No fish found

[1] BS is big mouth shiner *Notropis dorsalis*, RS is red shiner *Cyprinella lutrensis* , SS is sand shiner *Notropis stramineus*, BM is brassy minnow *Hybognathus hankinsoni*, CS is central stoneroller, CC is creek chub *Semotilus atromaculatus*, LD is longnose dace *Rhinichthys cataractae*, WS is white sucker *Catostomus commersonii.*
[2] No evaluation species or other listed species were observed.
[3] Route has moved since this survey was undertaken; the current route does not cross this stream.
[4] Route has moved since this survey was undertaken; the proposed route crosses this stream at another location, which was proposed for survey in 2013 but access was not granted.

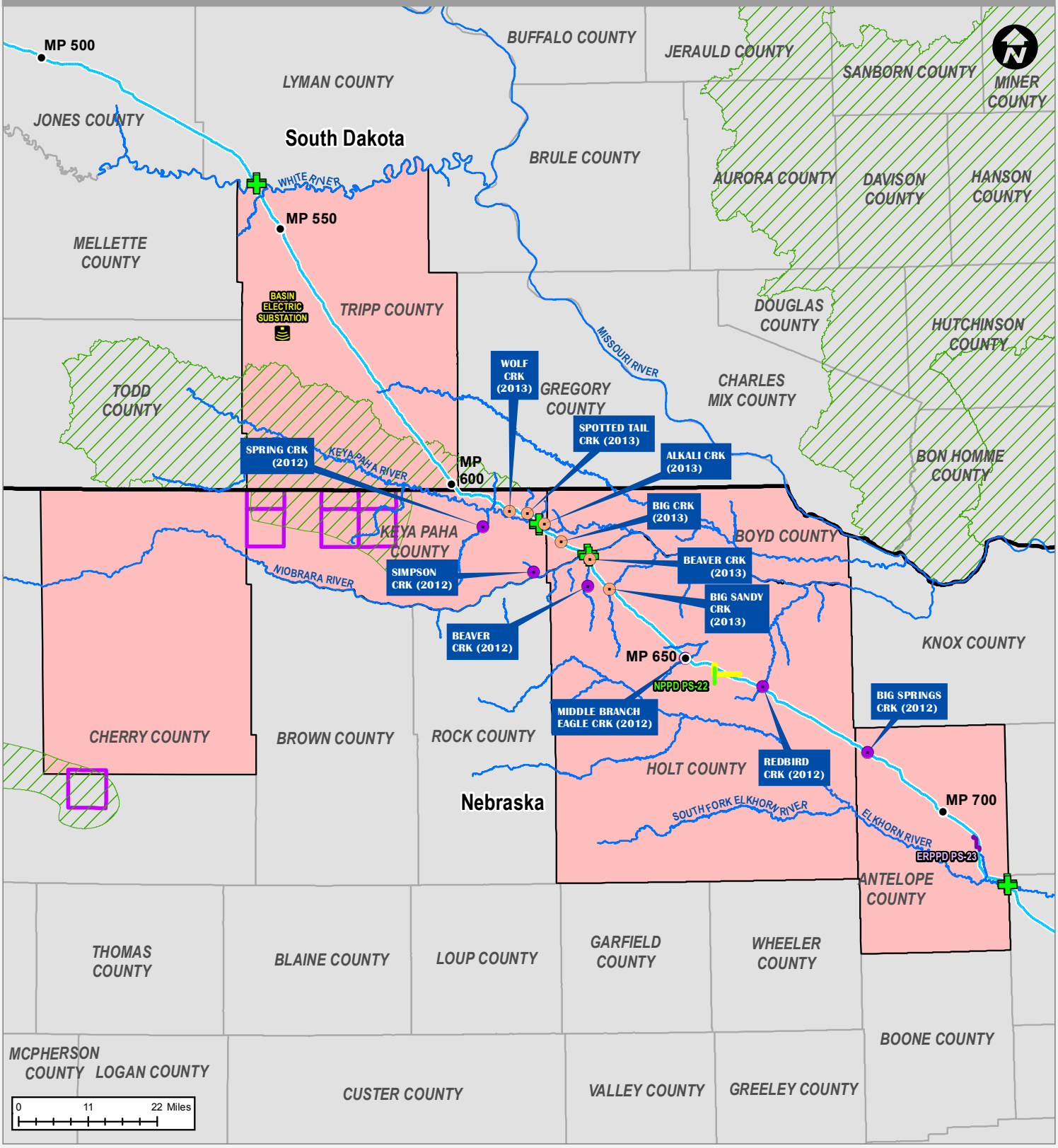
4.2.3 Finescale Dace

The finescale dace is a small minnow, generally 3 to 5 inches in length at adulthood. It is sympatric over much of its range with the northern redbelly dace, which uses similar habitats, often occupies the same streams, and sometimes hybridizes with the finescale dace.

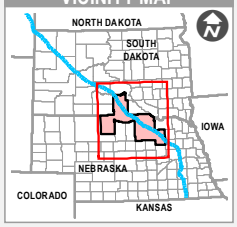
4.2.3.1 Status and Distribution

The range of the finescale dace extends across northern U.S. from Maine to Minnesota south to New York and southern Wisconsin, and much of Canada (USGS 2019). Isolated glacial relict populations occur in Montana, Wyoming, North Dakota, South Dakota, and Nebraska (Stasiak and Cunningham 2006). In Nebraska, the finescale dace historically was found throughout much of the central Nebraska and the panhandle, but the range has been reduced and is currently limited primarily to the Sand Hills and several small tributaries of the North Platte and South Loup Rivers (NDEQ 2012, NNHP 2013). In South Dakota they are found primarily along the southern border in the Niobrara River/Keya Paha River and Little White

HCP - FIGURE 19 - BLACKNOSE SHINER RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- FISH SURVEY LOCATIONS 2013 LABEL
- FISH SURVEY LOCATIONS 2012 LABEL
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- TOWNSHIP OF SPECIES OCCURENCE
- BLACKNOSE SHINER RANGE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-19	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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River drainages and in western South Dakota in upper tributaries of the Cheyenne and Belle Fourche Rivers (Pasbrig 2018b).

The finescale dace is considered to be secure over most of its range, with a NatureServe (2019) global rank of G5. It is not federally listed under the ESA (Table 6) but is state listed threatened in several western states with relict populations, including Nebraska (state-threatened) and South Dakota (state-endangered) where its occurrence has been markedly reduced. The extremely limited distribution is presumably due to habitat alteration, introduction of nonnative fishes, and climate change (Pasbrig 2018b).

4.2.3.2 Habitat Characteristics and Use

Habitat for the finescale dace includes sluggish, spring-fed streams with abundant vegetation and woody debris, small spring-fed lakes and bogs, and beaver pond complexes (Stasiak and Cunningham 2006).

4.2.3.3 Occurrence in Plan Area

Within the Plan Area, the range of the finescale dace includes Tripp County, South Dakota, and Keya Paha County, and Cherry County in Nebraska (Figure 20). There are reported occurrences In Tripp County, in Spring Creek, a Little White River tributary, and Sand Creek, a Keya Paha River tributary (Felts 29013, Pasbrig 2018b), and in several tributaries of the Keya Paha River in Keya Paha County, Nebraska. Townships with Nebraska Natural Heritage database sightings are indicated in Figure 19. Through the consultation process, state agencies recommended that surveys be conducted for this species in tributaries of the Keya Paha, Niobrara, and Elkhorn rivers that would be crossed by the Project. These fish surveys are discussed in Section 4.2.2. Survey locations are indicated on Figure 19 and the results are provided in Table 9. No finescale dace were observed at any of the surveyed crossings. It also was determined that the existence of suitable habitat for this species in the vicinity of the survey locations is unlikely. No Project surveys were conducted within the Conservation Area.

4.2.4 Northern Redbelly Dace

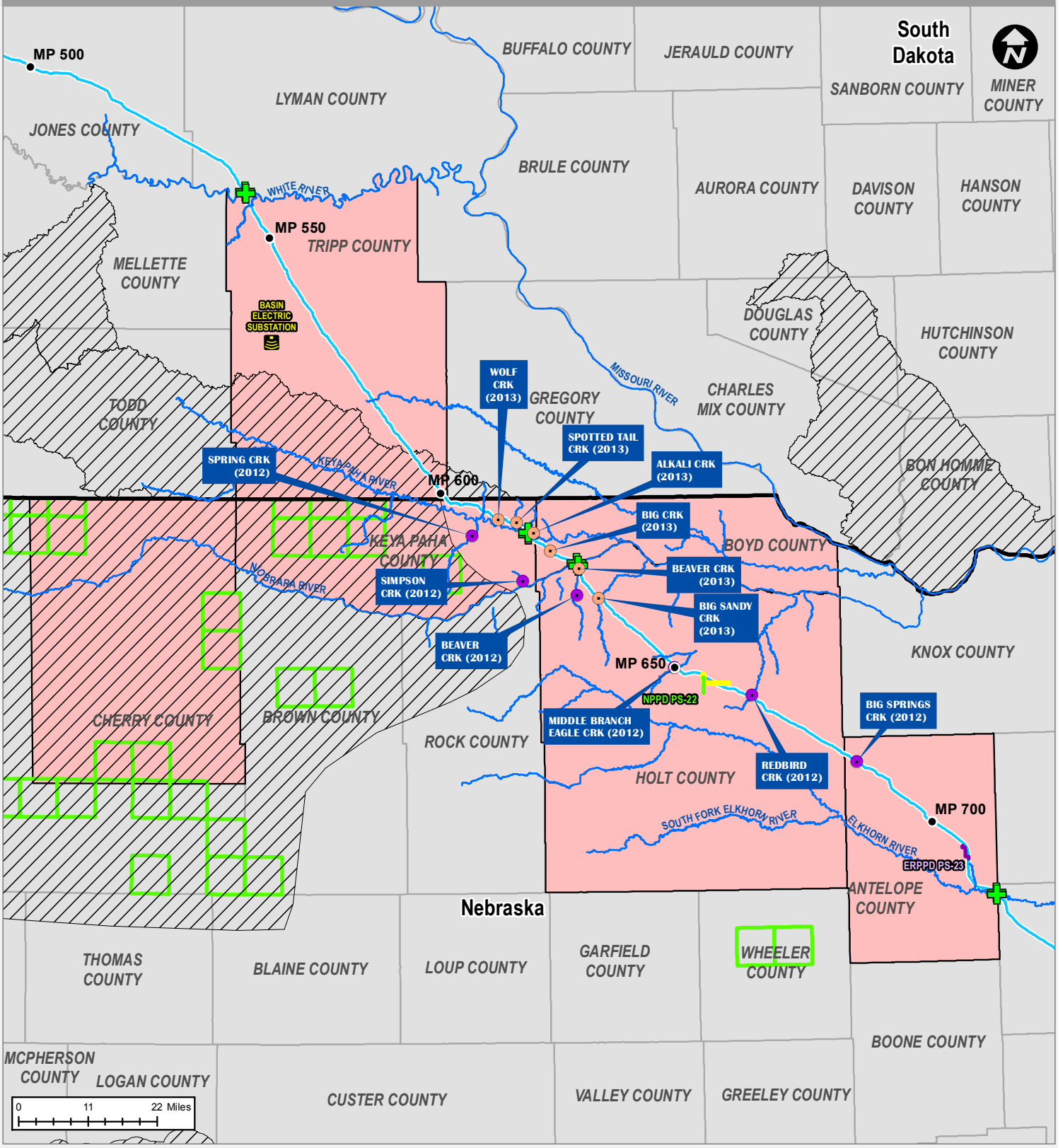
The redbelly dace is a small minnow with a length of 3 to 5 inches at adulthood. As discussed in Section 4.2.3, this species often occurs in the same streams as the finescale dace and the two species sometimes hybridize.

4.2.4.1 Status and Distribution

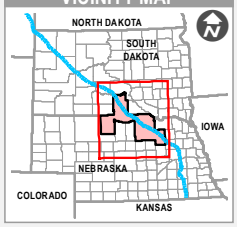
The northern redbelly dace is found across northern U.S. from Maine to Minnesota, south to New York and southern Wisconsin, and in much of Canada (USGS 2019). All of the northern redbelly dace populations in South Dakota and Nebraska are glacial relict populations that have been isolated from the main portion of the species' range in Canada and Minnesota (Cross et al. 1986, Clausen and Stasiak 1994, Stasiak 2006). In Nebraska, the northern redbelly dace was historically found throughout much of the central Nebraska and the panhandle, but the range has been reduced and is currently limited primarily to the Sand Hills and several small tributaries of the North Platte and South Loup Rivers (NDEQ 2012). In South Dakota, they are found primarily east of the Missouri River where it has been reported from tributaries of the Missouri, Big Sioux, Minnesota, White, Niobrara, and Keya Paha river drainages (Bailey and Allum 1962, McCoy and Hales 1974; Cunningham and Olson 1994, Dieterman and Berry 1994, Cunningham et al. 1995, Cunningham 1999, Heakin et al. 2003; Felts 2013). Since 2000, northern redbelly dace have been reported in low numbers from the Big Sioux, Minnesota, Keya Paha, and Lower Missouri river tributaries (Heakin et al. 2003, Felts 2013, Pasbrig 2018c).

The northern redbelly dace is considered to be secure over most of its range, with a NatureServe (2019) global rank of G5. It is not federally listed under the ESA (Table 6) but is state listed threatened in several western states with relict populations, including Nebraska (state-threatened) and South Dakota (state-endangered) where its occurrence has been markedly reduced. The extremely limited distribution is presumably due to habitat alteration, introduction of nonnative fishes, and climate change (Pasbrig 2018b).

HCP - FIGURE 20 - FINESCALE DACE RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- FISH SURVEY LOCATIONS 2013 LABEL
- FISH SURVEY LOCATIONS 2012 LABEL
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- TOWNSHIP OF SPECIES OCCURENCE
- FINESCALE DACE RANGE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-20	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
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2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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4.2.4.2 Habitat Characteristics and Use

Habitat for the northern redbelly dace includes sluggish, spring-fed streams with abundant vegetation and woody debris, small spring-fed lakes and bogs, and beaver pond complexes (Stasiak and Cunningham 2006).

4.2.4.3 Occurrence in Plan Area

Within the Plan Area, the northern redbelly dace is found in Tripp County, South Dakota, and Cherry, and Keya Paha Counties in Nebraska (Figure 21). Townships with Nebraska Natural Heritage database sightings are indicated in Figure 21. Through the consultation process, it was recommended that surveys be conducted for these species in tributaries of the Keya Paha, Niobrara, and Elkhorn Rivers. Fish surveys were conducted in 2012 at proposed crossings of such tributaries for which property access was granted, and additional crossing locations were surveyed in 2013 as the route alignment shifted and additional access was obtained. These fish surveys are discussed in Section 4.2.2. Survey locations are indicated on Figure 20, and the results are provided in Table 8. No northern redbelly dace were observed at any of the surveyed crossings. It also was determined that the existence of suitable habitat in the vicinity of the survey locations is unlikely. No Project surveys were conducted within the Conservation Area.

4.2.5 Northern Pearl Dace

4.2.5.1 Status and Distribution

Pearl dace are found across the northern United States and much of boreal Canada with populations in the U.S. sporadically distributed along the Canadian border from Montana to Maine and extending south to Nebraska (Cunningham 2006). Overall, the species is thought to be secure with a global NatureServe (2019) rating of G5. The northern pearl dace is not federally listed under the ESA. It is, however, very uncommon in the Great Plains and is listed in South Dakota as state-threatened. The northern pearl dace is not listed in Nebraska but is considered a species of concern (state ranking S2).

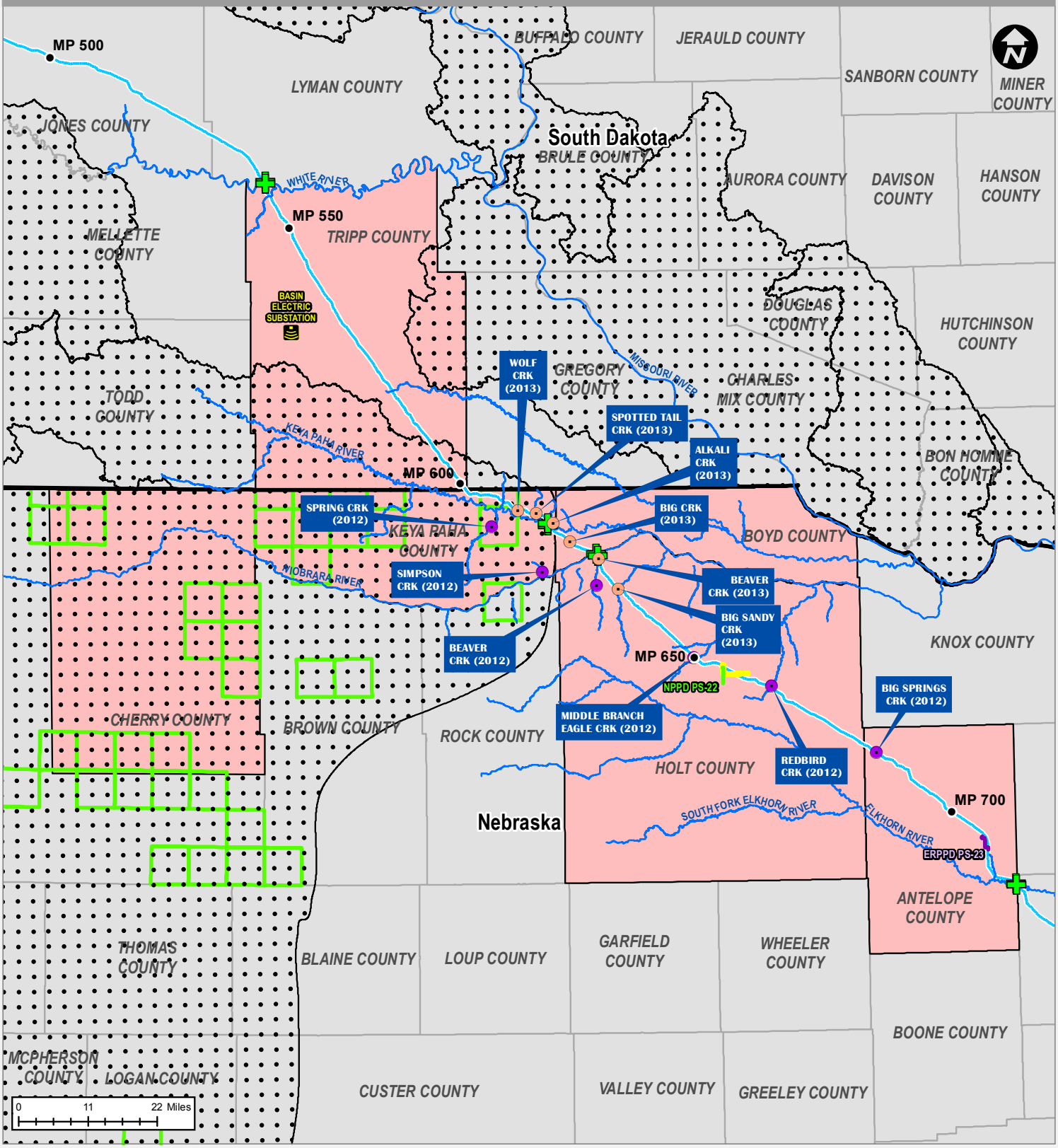
In South Dakota, the northern pearl dace is limited to tributaries of the White, Little White, Niobrara and Keya Paha river drainages (Pasbrig 2018a, Felts 2013). In Nebraska, the species is found in first order streams of the Niobrara and Platte River systems (Cunningham 2006). Populations in South Dakota and Nebraska are considered to be glacial relict populations (Cunningham 2006, Felts 2013), occurring as small, isolated subpopulations that have been declining steadily since settlement of this region over 100 years ago.

The two primary threats to pearl dace in this region include habitat alteration and introduction of non-native fishes (Cunningham 2006). Water development activities that alter natural spring flow are a concern as they often lead to habitat degradation and stream fragmentation. Reservoir construction, groundwater pumping, stream diversions and channelization, and loss of beaver dam habitat all negatively affect pearl dace populations (Pasbrig 2018a).

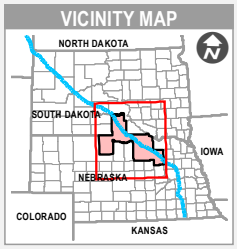
4.2.5.2 Habitat Characteristics and Use

The northern pearl dace is one species within a group species of small fishes that form a fish community that is restricted to small, cool, headwater streams, beaver ponds, and small spring-fed lakes in the Great Plains (Cunningham 2006), generally with gravel substrates (Pasbrig 2018a). In Wyoming, pearl dace have been collected at sites with clear, slow moving or stagnant water with depths greater than 1.5 feet, dense aquatic vegetation, and a predominantly silt substrate (Moan et al. 2011). Northern pearl dace are most commonly found in the absence of large predatory fish (Cunningham 2006).

HCP - FIGURE 21 - NORTHERN REDBELLY DACE RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- FISH SURVEY LOCATIONS 2013 LABEL
- FISH SURVEY LOCATIONS 2012 LABEL
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- NORTHERN REDBELLY DACE RANGE
- TOWNSHIP OF SPECIES OCCURENCE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-21	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
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2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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4.2.5.3 Occurrence in Plan Area

Within the Plan Area, the northern pearl dace is found in Tripp County, South Dakota and Keya Paha County, Nebraska (Figure 22). Pasbrig (2018a) reports numerous recent occurrences of pearl dace in the tributaries of the Keya Paha and White Rivers in Tripp County. State agencies recommended surveys for this species in tributaries of the Keya Paha River. These fish surveys are discussed in Section 4.2.2, survey locations are indicated on Figure 22, and the results are provided in Table 9. No northern pearl dace were observed at any of the surveyed crossings. It also was determined that the existence of suitable habitat in the vicinity of the survey locations is unlikely.

4.2.6 Sturgeon Chub

The Sturgeon Chub is a small minnow species reaching up to 4 inches in length, however, most individuals range between 1.5-2.5 inches in length.

4.2.6.1 Status and Distribution

The sturgeon chub is found in the Mississippi, Missouri, and Yellowstone Rivers along with several major tributaries. Its range included 13 states from Montana and North Dakota south to Arkansas and Tennessee. Because of extensive habitat loss it has been state listed by ten states, including South Dakota (state threatened) and Nebraska (state endangered). In South Dakota, the sturgeon chub's current range is limited to western South Dakota where it is found in tributaries to the Cheyenne, White, Grand, and Missouri Rivers (Cunningham et al. 1995). In Nebraska, its current reported range includes only the Missouri River mainstem and lower Elkhorn and Niobrara Rivers.

The sturgeon chub was petitioned for federal listing under the ESA in 1994, however, after review, the Service determined populations were larger than first thought and removed it from consideration in 2001. It was again petitioned in 2016 (WildEarth Guardians 2016) and the Service responded in December 2017 FR 60362), announcing plans for a status review, which is pending. This process will include gathering of scientifically accurate information from all sources and a review of this data to determine if listing of the species is warranted. Its global rating by NatureServe (2019) is G3 (vulnerable).

The most critical factor leading to the decline in sturgeon chub populations and range is anthropomorphic change in the hydrology in large river systems - primarily induced by the construction and operation of dams with resulting reservoirs. These reservoirs inundate sturgeon chub habitat with standing water, thereby reducing turbidity and isolating free-flowing habitat (Rahel and Thel 2004).

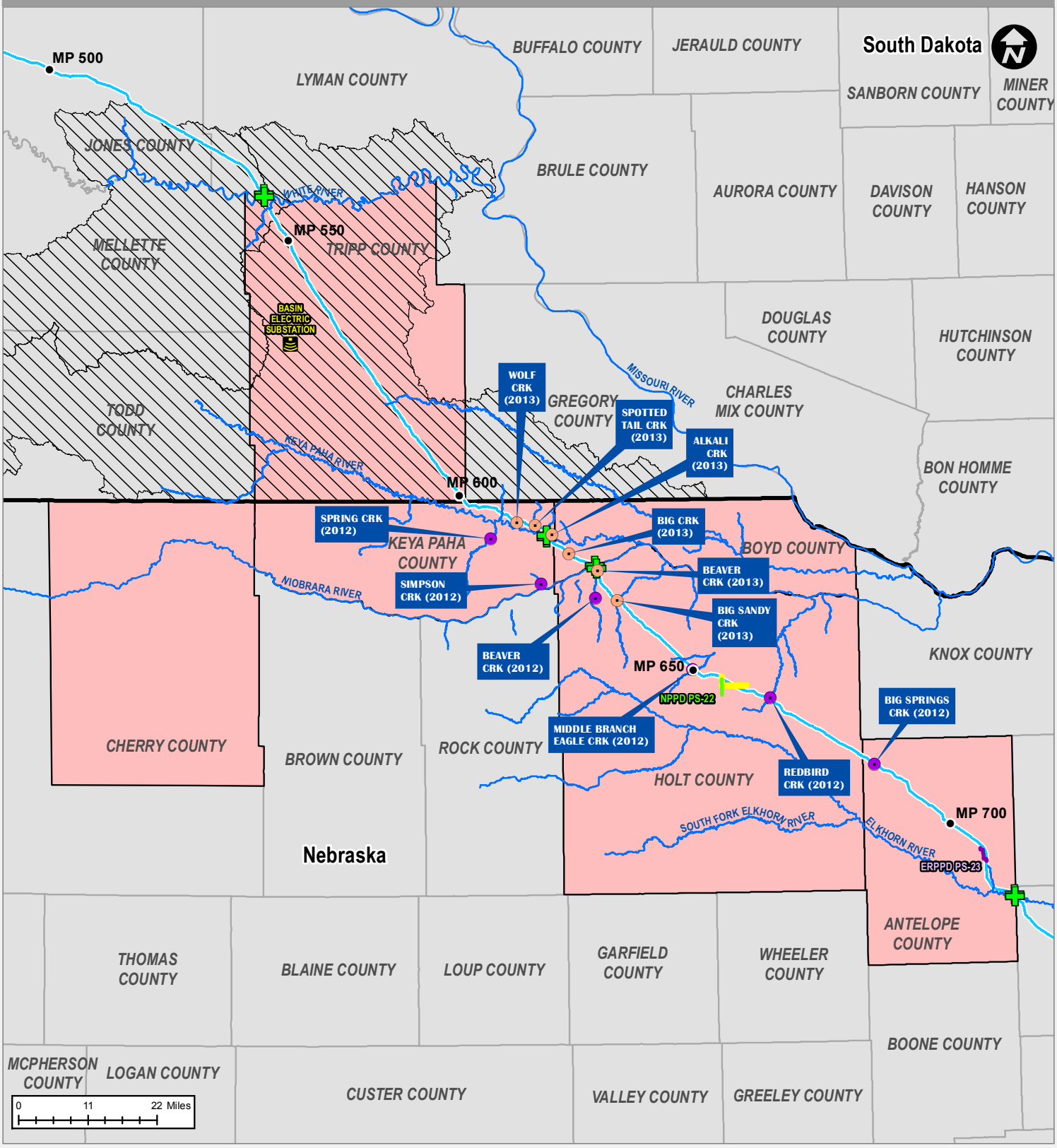
4.2.6.2 Habitat Characteristics and Use

The sturgeon chub is found in fast, free flowing rivers with high turbidity and low visibility. They prefer areas with moderate to strong current on large turbid rivers with rocks, gravel or coarse sand substrates but also occupy moderate to small tributaries directly connected to larger turbid rivers with extant populations (Pasbrig 2018d, Pflieger 1975, USFWS 2001, Rahel and Thel 2004).

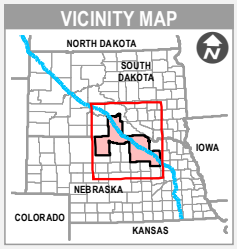
4.2.6.3 Occurrence in Plan Area

Within the Plan Area, the sturgeon chub's reported current range in Nebraska is limited to the Missouri River in Boyd County along the South Dakota border (NNHP 2013, Figure 23) where it is only found in very low numbers (Steffensen et al. 2014). In South Dakota, the sturgeon chub's current range includes the White River and its tributary the Little White River (SDGF&P 2014, Wildearth Guardians 2016). SDGF&P (2014) reports confirmed presence of the sturgeon chub in these rivers within Tripp County.

HCP - FIGURE 22 - NORTHERN PEARL DACE RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- FISH SURVEY LOCATIONS 2013 LABEL
- FISH SURVEY LOCATIONS 2012 LABEL
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- NORTHERN PEARL DACE RANGE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
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REVISIONS

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2020-04-14	UPDATED PLAN AREA	7

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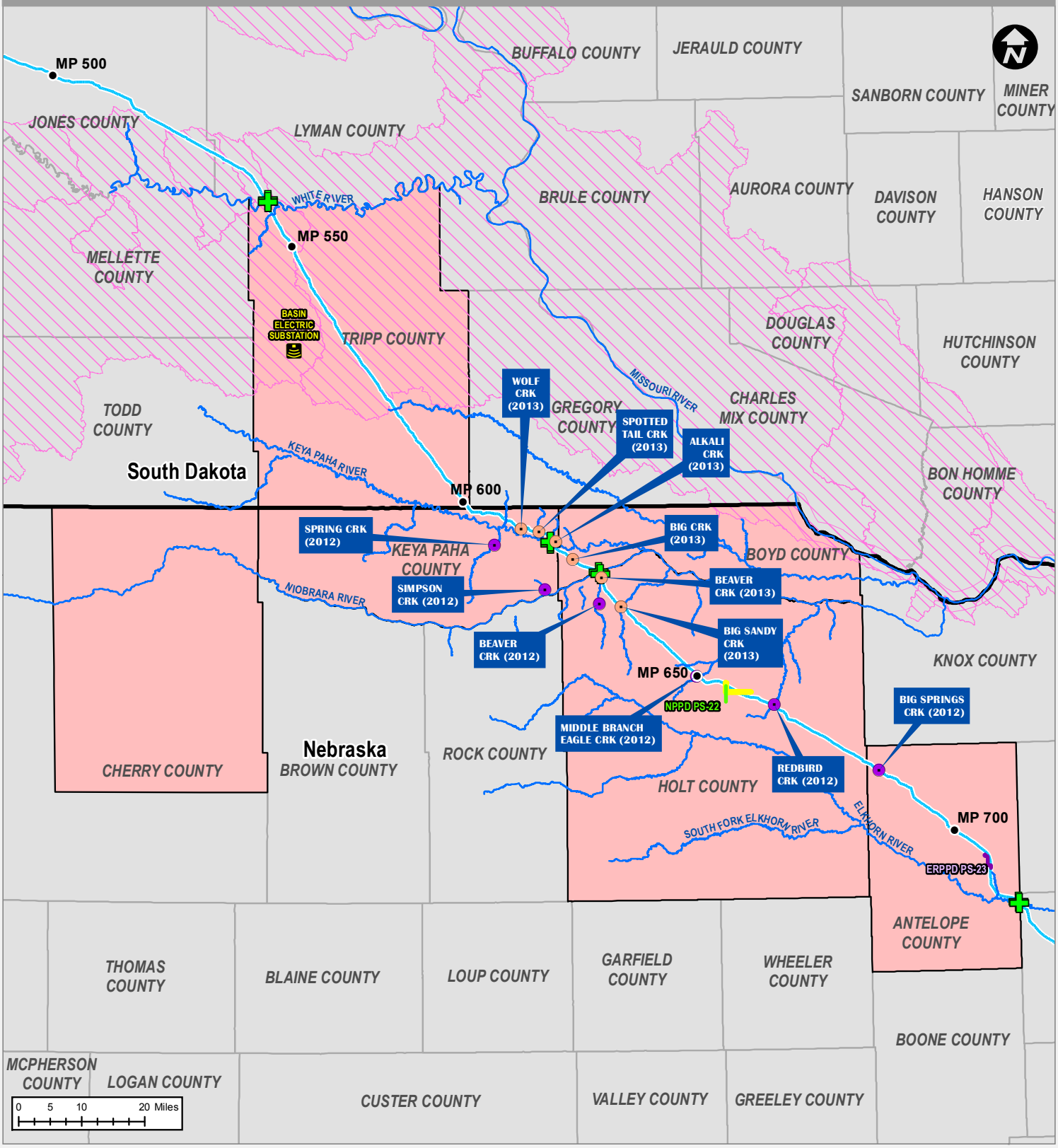
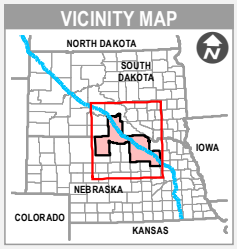
HCP - FIGURE 23 - STURGEON CHUB RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- FISH SURVEY LOCATIONS 2013 LABEL
- FISH SURVEY LOCATIONS 2012 LABEL
- HDD ENTRY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES
- DISTRIBUTION LINE WITHIN PLAN AREA
- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- STURGEON CHUB RANGE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
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DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-23	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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4.2.7 Northern River Otter

4.2.7.1 Status and Distribution

The northern river otter occurs over much of the U.S. and Canada. It is currently thought to be secure over most of its range with a NatureServe (2019) global ranking of G5; however, the river otter was decimated over much of the U.S. portion of its range by the early 1900's due to unregulated trapping in concert with habitat loss/degradation. This includes Nebraska and South Dakota where it was largely extirpated (Bischof 2003, 2006; Boyle 2006; Melquist 2018). Trapping regulations and reintroduction projects in many states have resulted in recovery over portions of its range (Raesly 2001, Boyle 2006). The river otter is not listed under the ESA, however, it is currently state-listed as threatened by both South Dakota and Nebraska (Table 6). As a state listed species, there is no designated critical habitat.

The river otter was first state-listed in Nebraska as endangered in 1980 but was subsequently (2005) down-listed to threatened after a series of successful reintroductions (Boyle 2006). NGPC released northern river otters at seven sites between 1986 and 1991, including sites along sections of the Niobrara River in Sheridan County, the Elkhorn River in Antelope County, and the South Loup River in Custer County. Recent observations suggest that northern river otters are well established in several Nebraska watersheds, with the Platte River, Elkhorn River, central and eastern Niobrara River, and southern Loup River systems being core areas (Bieber et al. 2018).

In South Dakota, the Flandreau Santee Sioux Tribe released 35 river otters (17 in May 1998 and 18 in May 1999) in the Big Sioux River near Flandreau (Melquist 2018). Success of those introductions has not been established but otters can now be found in a number of drainage systems. The current distribution in South Dakota includes much of eastern South Dakota as well as portions of the Cheyenne River, Bad River, Medicine Creek, White River, and the Keya Paha River. A 2018 status review by SDGF&P recommended continued listing as a state threatened species (Kempema 2018)

Accidental trapping (for other legal species) has been the largest known mortality factor for reintroduced animals along with vehicle collisions, dogs, and illegal trapping (Bischof 2006, Kempema 2018). Degradation of streams, loss of riparian habitat and seasonal variations in water levels also threaten long-term population stability (NGPC 2009b, Kempema 2018).

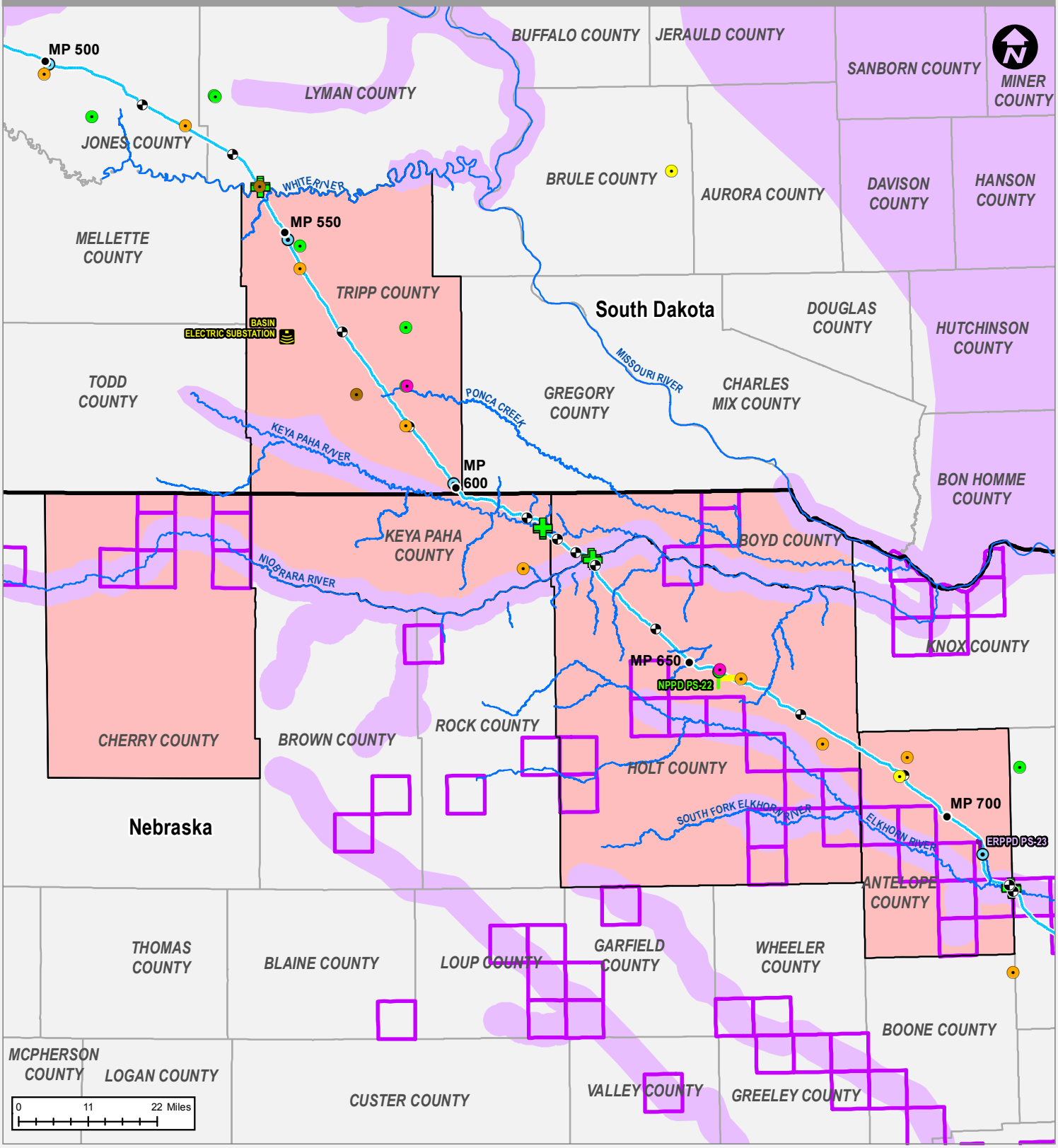
4.2.7.2 Habitat Characteristics and Use

River otters are adaptable and use a variety of habitat types but require aquatic habitats. Although they frequent lakes and ponds, river otters typically live in marshes and along wooded rivers and streams with sloughs and backwater areas (Kempema 2018). Otters use dens in the ground that were previously built by beavers or other animals. Denning occurs during March to September.

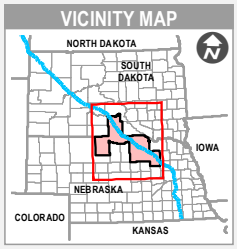
4.2.7.3 Occurrence in Plan Area

Within the Plan Area, the river otter's known range includes the riparian areas of the White River, Keya Paha River, Niobrara River, and the Elkhorn River (Figure 24, Bieber et al. 2018). Populations of northern river otter are known to exist along both the Elkhorn and Niobrara Rivers (NDEQ 2012. Bieber et al. 2018). Townships with sightings from the Nebraska Natural Heritage database are shown in Figure 24. During the consultation process, pre-construction surveys were recommended for White River in South Dakota and the Niobrara and Elkhorn Rivers in Nebraska. Surveys were conducted at the White River and the Elkhorn River. Suitable habitat was observed at the White River and the Elkhorn River in 2013 but no otters or signs of otter use were observed. However, otters have been incidentally observed at both rivers in subsequent years during other Project surveys.

HCP - FIGURE 24 - RIVER OTTER RANGE IN THE PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- CONSTRUCTION CAMP
- CONTRACTOR YARD
- PIPE YARD
- RAIL SIDING
- WATER STORAGE SITE
- PUMP STATION
- VALVE SITE
- HDD ENRTY/ EXIT
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL ROUTE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- RIVER OTTER RANGE
- TOWNSHIP OF SPECIES OCCURENCE
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
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2020-04-14	UPDATED PLAN AREA	7

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5.0 Environmental Setting and Biological Resources

For this HCP, the Plan Area is defined as the counties crossed by the Project that are located within the current ABB range in South Dakota and Nebraska and a Conservation Area within which mitigation lands will be protected in perpetuity (Figures 1 and 3). Table 1 provides the counties included in the Plan Area. General physical and vegetative characteristics of the Plan Area are described below.

5.1 Regional Geology and Topography

The Plan Area traverses western Nebraska and southern central border of South Dakota. It crosses several different Environmental Protection Agency (EPA) Level IV Ecoregions as listed and described in Table 10 and shown in (Figure 25).

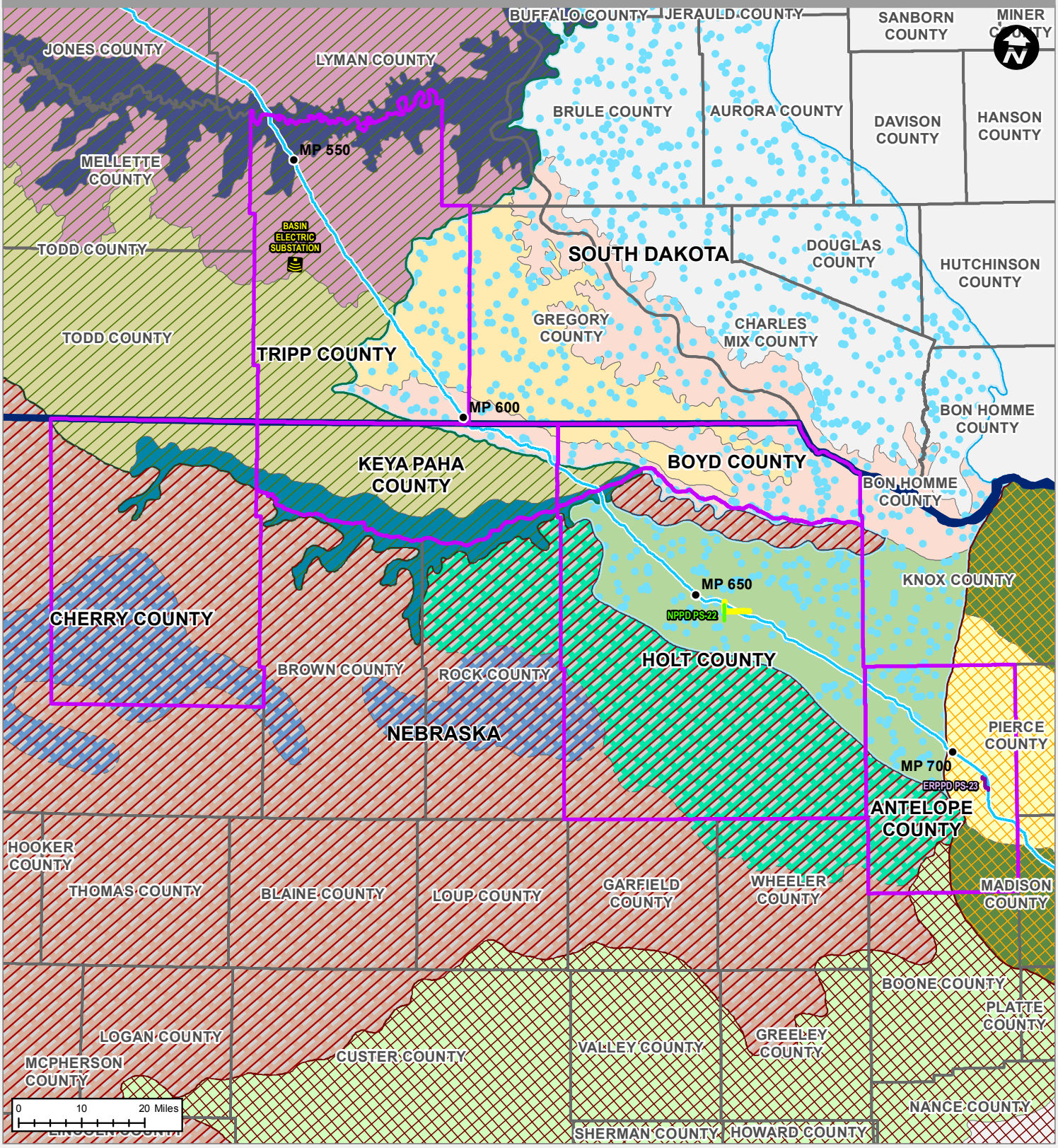
Table 10. Level IV Ecoregions Crossed by Plan Area

Level IV Ecoregion	Counties Within Plan Area with Ecoregion	Ecoregion Description*
27e - Central Nebraska Loess Plains	Antelope County, NE	The rolling dissected plains of the Central Nebraska Loess Plains have a deeper, calcareous, loess layer than adjacent regions, increasing to more than 60 feet toward the Sand Hills. These silty soils support a natural vegetation of mixedgrass prairie and areas of red-cedar savanna intrusion in the west. Land use/land cover is a mosaic of rangeland and cropland with less cropland than surrounding regions in the Central Great Plains. However, irrigated agriculture is increasing in this region
42g - Ponca Plains	Tripp County, SD Keya Paha County, NE Boyd County, NE	The unglaciated level to rolling plains of the Ponca Plains distinguish this region from the dissected topography of 42h. Row crop agriculture including soybeans, corn, and alfalfa cover the landscape. Soils are silty to loamy, tend to be sandier than 42h, and are derived from soft sandstone and Cretaceous Pierre Shale.
42h- Southern River Breaks	Tripp County, SD Keya Paha County, NE Boyd County, NE Holt County, NE	The broken topography of the Southern River Breaks in Nebraska is an extension of a larger region in South Dakota. The dissected hills and high relief canyons border major rivers and associated alluvial plains. This region is more heavily wooded than surrounding regions. A combination of riparian vegetation, mixedgrass prairie, and scattered woodlands provides excellent habitat for wildlife. Soils are clayey, derived from weathered Cretaceous shale, and are not as sandy as surrounding regions.
42p - Holt Tablelands	Holt County, NE Antelope County, NE	The Holt Tablelands ecoregion is a transitional area between the loamy, glaciated regions with loess soils to the east and the Sand Hills in the west and south. This region shares many characteristics with the Nebraska Sand Hills (44); however, climate, physiography, and land use are more similar to those of the Northwestern Glaciated Plains (42). Cropland agriculture occurs on the more level tablelands and in areas with loamy soils, whereas grassland is found in areas of greater relief.
43f - Subhumid Pierre Shale Plains	Tripp County, SD	A continuous vegetative cover is essential to keep the Subhumid Pierre Shale Plains intact. Tilling the rolling hillsides risks wind and water erosion. Stream channels are deeply incised in its soft, black shale soils and slumping is common along exposed banks.
43i - Keya Paha Tablelands	Tripp County, SD Keya Paha County, NE Boyd County, NE	The level to rolling sandy plains of the Keya Paha Tablelands contrast sharply with the adjacent steep dune topography of the Nebraska Sand Hills (44) to the south. Soils are shallow, made up of eolian and alluvial sand deposits over sandstone, and support a combination of Sand Hills prairie and gravelly mixedgrass prairie. Millet and corn are grown on the level land, but the sandy soil limits non-irrigated agriculture.

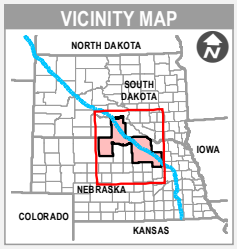
Level IV Ecoregion	Counties Within Plan Area with Ecoregion	Ecoregion Description*
43r - Niobrara River Breaks	Keya Paha County, NE Boyd County, NE Holt County, NE	The Niobrara River Breaks ecoregion encompasses a unique mixture of mixedgrass and Sand Hills prairies and woody vegetation from the central hardwoods, northern hardwoods, and the Rocky Mountain forests. This area is a convergence of Ponderosa pine woodland, eastern red-cedar, and a scattering of basswood, black walnut, and paper birch. The dissected river valley, with steep side slopes, contains soils ranging from sandy loams to fine sands formed from weathered sandstone, siltstone, and eolian sand, and is underlain with Pierre Shale. The woodland landscape and dissected alluvial topography provide excellent wildlife habitat.
44a - Sand Hills Dune Prairie	Holt County, NE Antelope County, NE Cherry County, NE	Expansive areas of sand sheets and undulating fields of grass-stabilized sand dunes cover the Sand Hills. Dune size, pattern, and alignment generally follow a west to east trending axis, with the larger dune hills in the west having local relief as great as 400 feet. Few lakes and streams are found in this area; however, ground water is accessible and is used for livestock.
44c - Wet Meadow and Marsh Plain	Holt County, NE Antelope County, NE	The flat, sandy plains of the Wet Meadow and Marsh Plain mark a transition from the dune topography and fine sandy soils of the Sand Hills in the south and west to the more gravelly and loamy regions to the east and north. Wet meadows and marsh areas blanket the region. Unlike the strictly rangeland characteristics of other Sand Hills regions, land use in 44c is a mix of rangeland, hayed meadows, and more extensive irrigated cropland.
44d - Lakes Area	Holt County, NE, Cherry County, NE	The distinct Lakes Area contains numerous lakes that have much lower alkalinity values than are found in lakes in region 44b. Lake and ground water interaction is prevalent in this region, unlike the lakes of 44b where interaction is limited. Few large streams and rivers occur; however, many small streams have their headwaters in this region. Potential natural vegetation is a combination of Sand Hills prairie and wetland communities that are not limited to the alkaline-tolerant species of 44b. Cattle grazing is common.

* U.S. Environmental Protection Agency, 2013, Level III and IV ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA, National Health and Environmental Effects Research Laboratory.

HCP - FIGURE 25 - LEVEL III AND IV EPA ECOREGIONS CROSSED BY PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL PIPELINE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- PLAN AREA
- COUNTY BOUNDARIES
- STATE

LEVEL III ECOREGIONS

- CENTRAL GREAT PLAINS
- NEBRASKA SAND HILLS
- NORTHWESTERN GLACIATED PLAINS
- NORTHWESTERN GREAT PLAINS
- WESTERN CORN BELT PLAINS

LEVEL IV ECOREGIONS

- CENTRAL NEBRASKA LOESS PLAINS
- HOLT TABLELANDS
- KEYA PAHA TABLELANDS
- LAKES AREA
- NIOBRARA RIVER BREAKS
- NORTHEASTERN NEBRASKA LOESS HILLS
- PONCA PLAINS
- RIVER BREAKS
- SAND HILLS
- SOUTHERN RIVER BREAKS
- SUBHUMID PIERRE SHALE PLAINS
- TRANSITIONAL SANDY PLAIN
- WET MEADOW AND MARSH PLAIN

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
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DATE	REVISION	REV.
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2020-04-14	UPDATED PLAN AREA	7

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5.2 Hydrology and Water Resources

The Plan Area is drained by perennial rivers, intermittent streams, and ephemeral drainages (Figure 26). Many of the rivers have been dammed to create reservoirs. Major streams that will be crossed by the Project include the White River and the Keya Paha River (Tripp County), the Niobrara River (Keya Paha, Boyd, and Holt Counties), and the Elkhorn River (Holt and Antelope Counties).

Numerous lakes, reservoirs and ponds are located within the Plan Area, but none are crossed by the Permit Area. Numerous municipal ponds and private stock ponds of varying size have also been constructed along creeks and in uplands within the Plan Area. The numbers of stream crossings are indicated in Table 11 by stream type.

Table 11. Number of Waterbodies Crossed by the Project in the Plan Area

County	Ephemeral Stream Crossings	Perennial Stream Crossings	Intermittent Stream Crossings	Total Stream Crossings
Tripp	13	4	10	**27**
Keya Paha	1	5	6	**12**
Boyd	1	0	1	**2**
Holt	4	9	7	**20**
Antelope	3	3	1	**7**
All	22	21	25	**68**

5.3 Vegetation

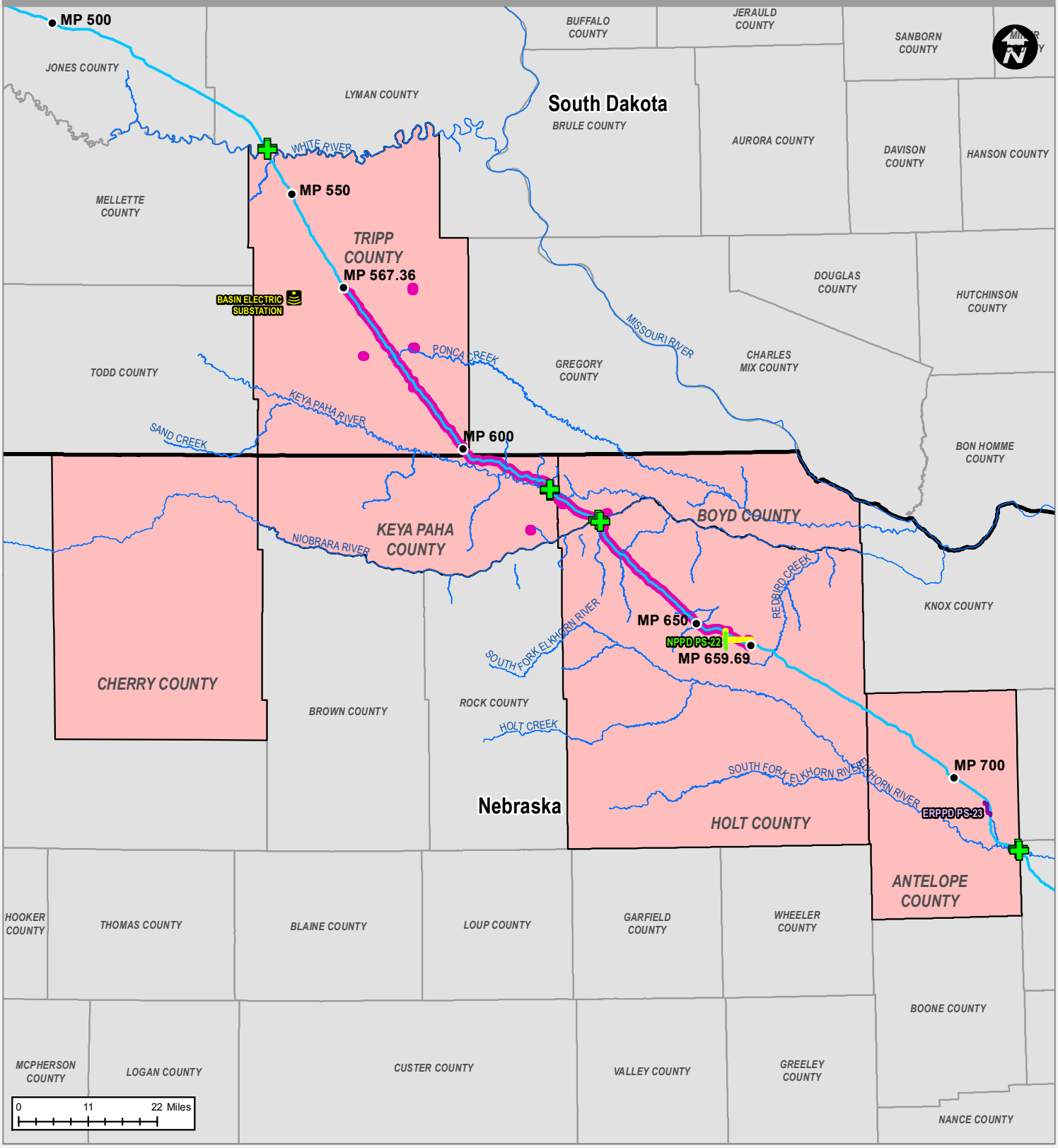
The distribution of vegetation community types in the Plan Area is controlled by a variety of factors, such as geology, soils, slope, aspect, water availability, and land use. The general land cover types as described in the National Land Cover Database (NLCD) crossed by the proposed Project route include cultivated cropland, developed land, grassland/rangeland, upland forest, and woody and herbaceous wetlands. Lands traversed by the proposed pipeline within the Plan Area are dominated (95 percent) by cultivated crops and grasslands (Table 12, Figure 27).

Table 12. Land Cover Types along the Proposed Project Centerline

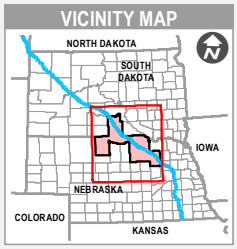
Cover Type	Centerline		Crossings [1]
	Miles	Percent	
Developed	5.45	3.1%	180
Open Water	0.33	0.2%	6
Barren Land (Rock/Sand/Clay)	0.05	0.0%	2
Grassland/Herbaceous	94.99	54.0%	152
Pasture/Hay	1.72	1.0%	14
Emergent Herbaceous Wetlands	1.56	0.9%	39
Cultivated Crops	69.50	39.5%	135
Woody Wetlands	1.43	0.8%	35
Evergreen Forest	0.02	0.0%	1
Deciduous All	0.96	0.5%	20

[1] Crossings are the number of separate (non-contiguous) blocks of a certain cover types

HCP - FIGURE 26 - MAJOR SURFACE WATERS WITHIN PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- HDD
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL PIPELINE
- MAJOR WATERBODIES

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD

- 488TH AND 879TH ROAD DITCHES
- PERMIT AREA
- PLAN AREA
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-26	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

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5.3.1 Vegetation in South Dakota

In South Dakota, the majority of the Plan Area is located in Northwestern Glaciated Plains ecoregion in the southern part of the state.

The Project crosses five vegetation types in South Dakota: agriculture, previously disturbed, grassland/rangeland, upland forest, and wetland/riparian areas. Agricultural lands are located throughout the majority of the Plan Area usually in areas with gently rolling hills and plains. The majority of the agricultural crops are either hay (i.e., areas of grasses, legumes, or grass-legume mixtures) or cultivated crop (i.e., areas used for production of annual crops such as corn, soybeans, etc.) (USGS 2004). Previously disturbed areas include residential, commercial, industrial, ROW corridors and barren areas. In previously disturbed areas, vegetation is often limited, and composed of introduced plant species. These areas are often replanted with a mixture of grasses and forbs. Barren areas include gravel quarries, sparsely vegetated areas, and rock outcrops. Grassland/Rangeland is composed of mixed grass prairie and sandy prairie community types. Typical species are big bluestem sand bluestem (*Andropogon hallii*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), and little bluestem (*Schizachium scoparium*). Upland forest communities are deciduous forest communities with typical species consisting of green ash (*Fraxinus pennsylvanica*), quaking aspen (*Populus termuloides*), burr oak (*Quercus macrocarpa*.), and hickory (*Carya* spp.).

Within the region, wetlands and riparian areas are limited in extent and usually found along shallow to deeply incised landforms associated with drainages. Riparian areas as defined by the NRCS and USDA (GM 190.411,- Part 411) as areas with unique soil and vegetation characteristics between terrestrial and aquatic ecosystems. Included in this definition are wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. The riparian areas provide critical vegetation and transportation corridors for mammals, birds, and amphibians; maintain water quality, stabilize stream banks, provide flood control and aesthetic values (USDA NRCS 2008b).

Wetlands within the Plan Area can be classified into three categories palustrine emergent wetlands (PEM), palustrine scrub-shrub wetlands (PSS), and palustrine forested wetlands (PFO). In PEM wetlands fowl blue grass (*Poa palustris*) and fox tail (*Hordeum jubatum*) dominate areas that typically contain water for several weeks after spring snowmelt. Shallow-marsh vegetation such as spikerush (*Eleocharis palustris*) and wheat sedge (*Carex antherodes*) dominate areas where water typically persists for a few months each spring and deep-marsh vegetation like cattails (*Typha latifolia*), and hardstem bulrush (*Scirpus acutus*) occupies areas where water persists throughout the year.

PSS wetlands are dominated by woody vegetation less than 5 meters in height. The species present could be true shrubs, young trees, or trees that are stunted due to environmental conditions. Typical shrubs in SD wetlands in this area would be: sandbar willow (*Salix exigua*), red osier dogwood (*Cornus sericea*), and chokecherry (*Prunus virginiana*). PFO wetlands are dominated by woody vegetation greater than or equal to 5 meters in height. Common PFO species include: boxelder (*Acer negundo*) eastern cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*) and crack willow (*Salix fragilis*). Exotic species of tamarisk species (*Tamarix* spp.) and Russian olive (*Elaeangus angustifolia*) are common within these stands (USDA NRCS 2010, USEPA 2008a, USGS 2004).

5.3.2 Vegetation in Nebraska

The vegetative community types crossed by the Project are agriculture, previously disturbed, grassland/rangeland, upland forest, and wetland/riparian areas. Agriculture and previously disturbed areas are similar to those as described above for the South Dakota portion of the Project. Grassland/Rangeland vegetative community types in the Nebraska portion of the Project are tall grass prairie, mixed grass prairie, and sandy prairie. The mixed grass prairie and sandy prairie are the same as described above for South Dakota. The tall grass prairie is composed of grass species three to five feet tall. Typical species include big bluestem, little bluestem, Indian grass, switchgrass, and Indian grass. Upland forest communities are similar to those described above for the South Dakota portions of the Plan Area. Wetland/riparian areas are similar to those described above, except for the addition of aquatic bed wetlands. Aquatic bed wetlands are dominated by plants that grow principally on or below the surface of the water for most of the growing

season in most years. For optimum growth the vegetative communities require relatively permanent water or repeated flooding. Typical species include pondweed (*Potamogeton* spp.), knotweed (*Polygonum* spp.), and algae.

6.0 Covered Species Effects and Impact Analysis

Potential impacts to the ABB from Covered Activities are discussed in the following sections. These impacts include both direct impacts to the ABBs themselves and impacts to ABB habitat such as habitat loss or alteration, and indirect effects due to habitat fragmentation.

6.1 Assessment of Take

This HCP presents a habitat-based approach to identification of potential impacts to the ABB consistent with the 2013 BO (USFWS 2013). Using habitat as a proxy for take of individual ABBs, as well as for designing mitigation measures, is consistent with longstanding Service practice with respect to insects and other organisms with a life history that makes estimates of take impracticable. This approach is appropriate given the nature of the potential impact of the Covered Activities on the species. It is possible that activities carried out in connection with the Project will have a direct effect on ABBs such as injuring or killing individuals, larvae, or eggs. This result would most likely only occur in instances where sheltering or reproducing ABBs are present within the Project footprint during land clearing and excavation activities. During the operational phase of the Project, this likelihood would be even less. A small potential for take during the response to an oil release resulting from a leak or break in the line could occur. Such an event would necessitate ground disturbance in order to uncover damaged pipe and provide for its replacement. Take from an oil release is not covered by this HCP.

Direct take is likely to occur during construction based on ABB densities (**Table 13**) derived from trapping data collected in the Permit Area over 10 years in Nebraska. FWS did not allow sampling in Tripp County until 2019 because they were confident in their own sampling and density calculations at the time of the first BA and BO.so data is limited to one year in South Dakota. ABB densities were calculated by first adjusting the trap counts (total ABB caught) from the surveys by a correction factor of 10 percent (because traps are not 100 percent efficient). Corrected trap counts were then divided by the number of acres sampled per trap to get number of ABBs per acre. Each trap, based on previous research, sampled an area of 500 acres. These numbers were then averaged within the county to get the density per acre by county. Reproduction densities were calculated by dividing the density of ABB by 2 (male/female pair). That number was then multiplied by 15 (average number of offspring/per mating pair). These reproductive densities were also averaged by county. All trapping followed USFWS (2016c) protocol including those for climatic conditions, Results of these take calculations are provided in Table 13.

Table 13. Anticipated Take For the 50-year Permit Period from Covered Activities Associated with the Pipeline Based on Measured ABB Densities

Impact Type	Area	Impacts [1] (Acres)	Without Reproduction		Reproduction	
			Density	Take Estimate	Density	Take Estimate
Disturbance [2]	South Dakota	512.87	0.0120	6.2	0.0899	46.1
	Northern Nebraska	377.28	0.0006	0.2	0.0046	1.7
	Southern Nebraska	360.64	0.0066	2.4	0.0495	17.9
	All	**1,250.79**	--	**8.8**	--	**65.7**
Heat [3]	South Dakota	82.53	0.0120	45.6	0.0899	341.3
	Northern Nebraska	65.10	0.0006	1.8	0.0046	13.8
	Southern Nebraska	57.21	0.0066	17.4	0.0495	130.3
	All	**204.84**	--	**64.7**	--	**485.3**
All	**All**	--	--	**73.5**	--	**551.0**

[1] Includes temporary and permanent impacts
[2] Includes all impacted areas with ABB habitat rating of marginal, fair, good or prime, these impacts are calculated as impact area x density.
[3] Includes only permanent impacts due to the heating of soil within 11 feet of either side of the buried pipeline during operations. Heat impacts are considered annual and therefore calculated as area x density x 46 years.

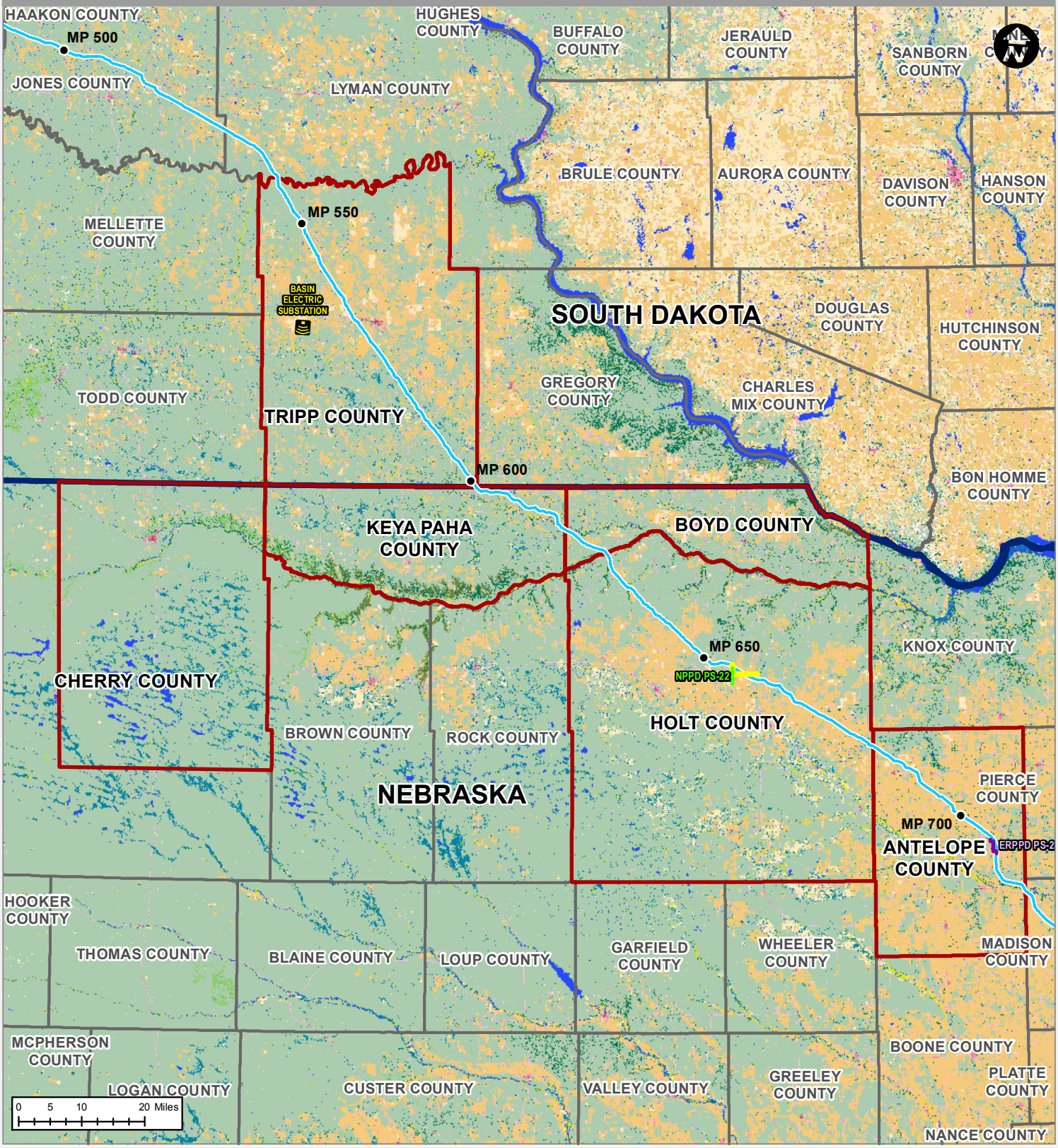
Most of the potential impacts anticipated as a result of the Project are impacts to ABB habitat. Thus, a portion of anticipated take relates to the possibility of Covered Activities eliminating or degrading the quality of ABB habitat in such a way as to significantly impair the ABB's ability to breed, feed, and/or seek shelter in the future. Habitat impacts can be expressed in acres temporarily or permanently disturbed. Following this, acres of habitat preserved, restored, or protected is an appropriate metric for prescribing mitigation requirements to offset impacts to the species. Given that it is mainly habitat impacts that would lead to take, and that it is habitat restoration or enhancement that could improve conditions, it is appropriate to use acres of habitat as the metric for both take and mitigation in this HCP. Similarly, acres of required conservation should be modified based on the condition of land used, management activities proposed, and other factors relating to the intensity of restoration efforts employed.

As has been the case for other incidental take authorizations issued for the species, quantifying take of individuals is challenging and varies in methodology from project to project. While surveys for ABBs can provide valuable information for determining the extent of occupation of a given area, they do not provide a precise mechanism for predicting the number of ABBs that may actually be present in an area at a given time. The effectiveness of ABB surveys in estimating the number of individuals in an area is limited because populations of the species vary both temporally and spatially. Similarly, catch rates are affected by weather-related factors such as rain, wind, and temperature. Presence-absence surveys are designed for that goal-determining presence, not to estimate population size.

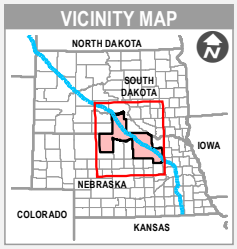
Variation in population numbers and utilization of different geographic areas within the Plan Area would likely be the result of habitat conditions and weather. Even in prime habitat, ABB populations vary greatly through time and, although habitat may be present, ABB use of habitat can vary directly as a result of a one-year life cycle and fluctuating reproductive resources (e.g., carrion). The Service has recommended surveys or efforts to estimate population size within the Project footprint using historical records and recommended recent (< 10 years) surveys as a basis to document species presence in areas known or suspected to support ABBs. This historical data includes all sampling conducted by the Project that is still relevant to the latest route.

Preference for numerical takes, where possible, was recognized in the *Arizona Cattle Growers' Association v. U.S. Fish and Wildlife Service* 273 F.3d 1229 (2001) and the more recent *Oregon Natural Resource Council v. Allen* 476 F.3d 1031 (9th Cir. 2007). Relevant caselaw holds that, where a surrogate for specific numbers of species taken is used, the Service must provide an explanation for using that surrogate.

HCP - FIGURE 27 - NLCD LAND COVER WITHIN PLAN AREA



VICINITY MAP



LEGEND

- MILE POST
- BASIN ELECTRIC SUBSTATION
- KEYSTONE XL PIPELINE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- ERPPD
- 488TH AND 879TH ROAD DITCHES
- PLAN AREA
- COUNTY BOUNDARIES
- STATE

LANDCOVER - NLCD 2011 (AMENDED 2014)

- OPEN WATER
- DEVELOPED, OPEN SPACE
- DEVELOPED, LOW INTENSITY
- DEVELOPED, MEDIUM INTENSITY
- DEVELOPED, HIGH INTENSITY
- BARREN LAND (ROCK/SAND/CLAY)
- DECIDUOUS FOREST
- EVERGREEN FOREST
- MIXED FOREST
- GRASSLAND/HERBACEOUS
- PASTURE/HAY
- CULTIVATED CROPS
- WOODY WETLANDS
- EMERGENT HERBACEOUS WETLANDS

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	NA
CHECKED BY:	DH	STATE	SD, NE
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-27	SCALE:	1 in = 22 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

TC Energy

6.2 Direct and Indirect Impacts to ABB

A discussion of Covered Activities that may result in direct and indirect impacts to ABBs is provided in the following sections.

6.2.1 Construction Phase Impacts to ABB

Mortality of adult, larvae, and eggs of ABBs is more likely to occur during the construction phase than during operations, as this phase of the Project will involve clearing ROW with heavy mechanized equipment, excavation of trenches for installation of pipe, building access roads, construction of pump stations, and various other ground disturbing activities as described in Section 2 of this document. Increased human activity and other habitat effects such as decreased soil moisture, which could impact ABB behavior are also more likely to occur during construction.

6.2.1.1 ABB Life History during Construction

Death of ABBs at various life history stages may result from Covered Activities. During the ABB active period (late May through late September), adults that are not reproducing typically spend daylight hours buried in soils or leaf litter near the surface. Adults become active during hours of darkness and seek sources of carrion for feeding and potential reproductive sites. Sources of carrion can include birds, small mammals, and snakes. When reproducing, ABB pairs bury a carcass and excavate a brood chamber several inches below the soil surface. The brood chamber houses eggs and developing larvae. The carcass provides a food source to nourish ABB offspring. Because a large part of the ABB's lifecycle takes place underground, areas suitable for burying (e.g., loose, sandy loam soils) are generally preferred over other soil types. Newly enclosed adults emerge from the brood chamber, disperse, and feed on carrion prior to overwintering buried a few inches below ground. Because of their unique life history, ABBs spend a large amount of time relatively immobile and buried a few to several inches below the soil surface.

6.2.1.2 Crushing or Exposure of Individuals or Brood Chambers by Construction Equipment

Although ABBs are robust beetles, they are susceptible to death or injury by crushing at all stages of their life cycle. This is particularly likely when vehicles and heavy equipment are operating in areas inhabited by reproducing ABBs. Adults that are not reproducing and are sheltering in soils or leaf litter during the day may be killed or injured by crushing, although data by Willemsens and Hoback (2015) suggest the risk to beetles buried approximately 10 inches below the soil surface is less than 1 percent even when a vehicle passes directly over them. Clearing of ROW, excavation of trenches and similar ground disturbing activities may destroy brood chambers and adults, eggs, and larvae contained within by crushing. Mortality for ABBs in all of these life stages is possible, although quantification of take would be almost impossible. Similarly, uncovering or digging into or near brood chambers may result in exposure of the brood chamber and/or ABBs inside resulting in mortality caused by desiccation, heat stress, and/or predation by various scavengers and small mammals.

6.2.1.3 Fuel Spills during Construction

Heavy equipment used to construct the Project will require refueling at various times. Although unlikely, death of ABBs could result from fuel spills, though take related to fuel spills is not covered by this HCP. Fuels such as diesel and gasoline could result in mortality of ABBs if the spill were to occur at a brood site or where adult (non-reproducing) ABBs were sheltering or overwintering. Construction BMPs will be used to minimize or avoid this hazard, however, the possibility of mortality resulting from fuel spills cannot be eliminated from consideration.

6.2.1.4 Behavior Disruption during Construction

ABBs may also be adversely affected by disruptions of their normal behavior resulting from increased human activity, vehicle traffic, noise, and use of artificial lighting for work taking place at night. Similarly, reductions in soil moisture and increases in soil temperature resulting from clearing and grading may cause

ABBs to alter their behavior patterns to avoid these areas. The effects of such disruption are not well-understood.

Increased Human Activity, Vehicle Traffic, and Noise

Although the behavior of ABBs is not completely understood, it is prudent to acknowledge that ABB behaviors may be (at least to some degree) adversely affected by intense human activity, elevated levels of vehicle traffic, and excessive noise. In addition, because ABB rely on appropriately sized vertebrae species for reproduction, human presence may change prey base and thus affect reproduction. It is difficult to predict whether this effect would be positive or negative. It is possible that increased human activity could lead to a decrease in direct mortality because ABBs may abandon the area. An alternative viewpoint would be that human activity would result in negative effects because displacement of individual ABBs from the Permit Area may result in an increase in interspecific competition for resources as ABBs attempt to utilize new areas and a potential increase in exposure to avian and mammalian predators. Such effects are difficult to quantify and describe. Effects from these activities are, however, expected to be minor and of short duration. These disruptions should be considered temporary effects during the construction phase and would, therefore, be unlikely to have any long-term negative effect on the species.

Decrease in Soil Moisture and Increase in Soil Temperature

Clearing of vegetation and grading ROWs exposes soils to sun and wind and thereby may result in decreased soil moisture and elevated soil temperature. ABBs are known to be sensitive to changes in soil moisture and high temperature (Bedick et al. 2006). ABBs apparently seek out areas with relatively high soil moisture and may cope with elevated air temperatures by remaining inactive and buried in soil. In some situations, mortality of ABBs could be caused by reduction of soil moisture and elevated temperature in areas near sheltering, brooding, or overwintering areas. Grading and clearing of ROWs therefore may result in mortality or temporary behavioral changes which may directly or indirectly adversely affect the ABB.

Disruption of Behavioral Patterns Caused by Artificial Lighting

ABBs, like many insects, are attracted to artificial lights (Bedick et al. 1999). This attraction may disrupt their normal feeding and reproductive behavior. In some instances, portions of the Project may be constructed at night. Construction at night would require supplemental lighting as well as use of vehicle mounted lights. Such uses of artificial light may result in temporary adverse impacts to the species by disrupting behavior. Disruption in behavior could expose the species to increased mortality by predation.

6.2.2 Operations Phase Impacts to ABB

The operations and maintenance phase of the Project will have a low likelihood of impacting ABBs at a population level. Because the ROW will be restored following construction, there is a strong likelihood that ABBs will return to the Project area after the restoration phase is complete. However, impacts to some individual ABBs may occur due to increased soil temperature during operation in a portion of the ROW that was disturbed during construction. Thermal modeling (FSEIS Section 4.8.3 and Appendix S) indicates that heat generated by operation of the proposed pipeline could warm soil surface temperatures by as much as 10°F during winter (January to April). Most of these thermal effects would occur within 3.5 feet of the pipeline but secondary effects on ABB could extend out 11 feet each side (DOS 2012, USFWS 2013). Heat from the pipeline would dry out soils, much like mowing, which would make it less suitable habitat. However, soil heating could increase ABB mortality by triggering early emergence at a time when prey are scarce and cold air temperatures cause emergent adult mortality. Elevated temperatures could also increase metabolic rates such that overwintering beetles starve prior to emergence. Elevated temperatures could also cause drying of soils, causing beetles to desiccate (Bedick et al. 1999). Of the 464.7 acres of permanent ROW footprint in marginal-prime ABB habitat, 204.8 acres are within 11 feet of the pipe where thermal effects on ABB may occur.

6.2.2.1 Mortality of Adults, Larvae, and Eggs

The likelihood for mortality caused by crushing will be very low during the operation and maintenance phase of the Project. Vehicle traffic and other human activity will be limited to routine vegetation control and routine maintenance at various above-ground facilities and emergency repairs (as needed) along other parts of the ROW except where active agricultural practices are undertaken by the landowner. Use of herbicides to control vegetation will not occur in ABB habitat, weeds will be hand pulled when necessary.

6.2.2.2 Crushing or Exposure of Individuals or Brood Chambers by Construction Equipment

Potential crushing of individual ABBs and disturbance or destruction of brood chambers would be limited to locations along the pipeline in need of repair. Because the use of heavy equipment and excavation will be limited, the possibility for mortality caused by crushing will be greatly reduced. Such events are predicted to be infrequent over the timeframe of the Permit.

6.2.2.3 Effects on Behavior

The effect of the Project on ABB behavior during the operations and maintenance phase is also difficult to quantify. While the Project may result in an increase in ABB habitat quality in portions of the Project area (ROWs will be de-compacted with suitable tools to relieve soil compaction and re-vegetated following construction), Project activities also will create increased edge habitat in certain areas. As discussed earlier, the effects of increased edge along certain portions of the ROW are difficult to estimate. Increased edge would mainly occur where the ROW crosses large forested areas (some areas the Project would be built parallel and immediately adjacent to existing pipeline ROWs or roads). Edge effects in open and semi-open habitats are likely to have fewer adverse impacts when compared to increased edge in forested habitats. Additional edge would not be created in cleared areas, areas with savanna like conditions, or areas that are immediately adjacent to other ROWs.

<u>Increased Competition for Carrion and Predation Due to Increased Edge Habitat</u>

Fragmented areas, by definition, have larger amounts of edge habitat relative to large tracts of unfragmented habitat. Areas of increased edge often support large populations of small mammal scavenger species such as skunks, raccoons, foxes, opossums, and coyotes (Wilcove et al. 1986). These mammals are thought to compete with ABBs for carrion and opportunistically prey directly on ABBs (Jurzenski et al. 2011).

<u>Disruption of Behavioral Patterns Caused by Artificial Lighting</u>

The use of artificial lights will be reduced or eliminated from the Project area during the operation and maintenance phases. Lights at above-ground facilities will be down-shielded and only installed at the two pump stations. Other artificial lights along the Project ROW would only occur in the event of emergency repairs or other unexpected maintenance activities.

6.3 Impacts on ABB Habitat

6.3.1 Temporary ABB Habitat Loss

The Project will result in temporary loss of ABB habitat. Construction activities will result in (1) increased human activity, traffic, and noise, (2) reduction in soil moisture, (3) increase in soil temperature by removal of vegetation and increased exposure to sunlight, (4) removal of topsoil, and (5) use of artificial lighting. These impacts are considered temporary because the Project ROW will be restored and meet success criteria within 4 years following construction activities and minor local increases in human development or activity are expected to result from the Project.

6.3.2 Permanent ABB Habitat Loss

The Project will also result in a limited amount of permanent habitat loss. This includes permanent conversion of habitat at above-ground facilities such as pump stations, MLVs, and new permanent access

roads. It also includes areas with thermal effects within 11 feet of the pipeline. This impact, expressed in acres, represents a relatively small percentage of the entire Project footprint.

6.3.3 ABB Habitat Fragmentation

The effects of additional habitat fragmentation resulting from pipeline construction and operation in habitats that are already fragmented are not well-understood. Evidence indicates that any effects of habitat fragmentation on ABB would be indirect, rather than direct, as ABB use diverse habitats and appear to be common in transition zones between forested and open habitats often reaching maximum densities in a mix of open and forested habitats (see Section 3.2). However, fragmentation can create more ecotone, which may result in increased populations of mammals such as skunks and foxes that could compete with the ABB for carrion and may prey directly on ABB. Because most of the Project is sited in open agricultural areas and the Project ROW and TWAs will be restored following construction, the only permanent habitat fragmentation resulting from the Covered Activities would be those associated with cleared corridors through forested areas that have not already been fragmented as agreed to with the Service. The centerline of the proposed pipeline traverses habitat identified as deciduous forest at only 10 locations within the Permit Area, for a total of approximately 0.30 miles. Any fragmentation effects would be indirect and be limited largely to these crossings. Any such effects will be reduced by the planned crossing of riparian areas associated with the Niobrara River and the Keya Paha River via HDD, and by revegetation efforts, which include reducing the portion of the permanent ROW where trees will be kept cleared to a width of 30 feet.

6.3.4 ABB Habitat Delineation Method

Based on information presented in the preceding sections, it is clear that estimates of take resulting from Covered Activities are difficult. This document presents all potential direct and indirect effects on the species. It is clear that take of the species may occur and that some habitat will be permanently lost, altered, or affected by fragmentation. We propose an approach that uses habitat impacts as a proxy for take. For the purposes of habitat delineation, ArcGIS layers were developed to quantify impacts based on impact type (temporary or permanent) and by geographical area (ABB range in South Dakota and Nebraska). A desktop analysis of habitat was conducted using the following rating scale developed by Dr. Hoback and the same methods and analysis used in the 2013 Biological Opinion (USFWS 2013). The habitat rating was based on the likelihood that the habitat could support American burying beetle using the following scale:

1. Poor. Both sides of the survey route with row crop agriculture or habitat with the potential for large amounts of light pollution and disturbance associated with town or city edge.
2. Marginal: Potential habitat restricted to one side of the survey route, with row crop agriculture on one side or dry, sandy, upland areas with exposed soil and scattered dry adapted plant such as yucca (*Yucca* spp.).
3. Fair: Grassland with exotic species such as brome grass (*Bromus* spp.). Soil moisture content is lower than for prime or good habitat. Row crop agriculture is located within one mile.
4. Good: Native grassland species (tall or mixed grass prairie) with forbs. Low wetland meadows that are grazed by cattle or used for haying. Trees (usually cottonwoods) present. Sources of water are within a mile, but the area has either some cropland or sources of light pollution including yard lights, or houses within a mile.
5. Prime: Undeveloped wet meadows with some trees, especially cottonwoods (*Populus deltoides*) or forest areas visible. Water sources are available including the presence of a river, stream or sub-irrigated soils (water is close to the surface as a result of shallow aquifer). Cropland is not visible or is at a distance greater than 2.0 miles.

Results of the habitat delineations are indicated in Figures 4-7 and in greater detail in Appendix A.

6.3.5 Summary of Permanent and Temporary Habitat Impacts

Footprint impacts within the ABB range in South Dakota and Nebraska are quantified in Table 14 by ABB habitat rating. The ABB ranges in South Dakota and Nebraska were supplied by the Service (ECOS 2019). Table 14 includes poor to prime habitats. Permanent ROW impacts are shown as those portions of the 50-foot permanent ROW where thermal impacts (within 11 feet of the pipeline) would occur. Temporary impacts would be realized over the remainder of the 110-foot construction ROW. A total of 289 acres will have permanent impacts while 1,470 acres will be temporarily impacted. These impacts include approximately 444 acres of temporary impacts to habitat with a rating of poor and 65 acres of permanent impacts to habitat rated as poor that would be expected to have no effect on ABB. It should also be noted that some (estimated at up to 5.0 percent) vegetation restoration efforts may be unsuccessful. Impacts in areas where vegetation restoration is unsuccessful would be considered a permanent impact and those acreages added to the mitigation total. Potential failure of restoration is discussed in Sections 9.3.1 and 9.3.3 and quantified in Section 9.3.4.1.

Table 14. Project Footprint Impacts in the Permit Area by ABB Habitat Rating

Project Type	Temporary Impact					Permanent Impact				
	Poor	Marginal	Fair	Good	Prime	Poor	Marginal	Fair	Good	Prime
South Dakota										
Pipeline ROW [1]	31.42	52.93	105.51	125.59	40.89	7.91	13.33	26.66	31.90	10.64
Construction Camp	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TWAs	3.35	5.98	14.40	15.92	10.86	0.00	0.00	0.00	0.00	0.00
Access Roads [2]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.27
Water Storage Site	0.00	0.00	0.00	16.07	0.00	0.00	0.00	0.00	0.00	0.00
Contractor Yard	100.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pipe yards	0.00	0.00	0.00	29.50	0.00	0.00	0.00	0.00	0.00	0.00
Pump stations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.42
Inspections [3]	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
Subtotal SD	***185.30***	***58.91***	***119.91***	***187.08***	***54.75***	***7.91***	***13.33***	***26.66***	***31.90***	***20.33***
Nebraska										
Pipeline ROW [1]	129.76	55.59	11.04	141.45	274.20	33.47	14.09	2.69	35.49	70.03
TWAs	6.50	2.55	0.00	12.63	28.39	0.00	0.00	0.00	0.00	0.00
Access Roads [2]	0.00	0.00	0.00	0.00	0.00	8.23	0.002	6.55	2.12	1.08
Pipe Yard	0.00	0.00	0.00	43.00	30.01	0.00	0.00	0.00	0.00	0.00
Contractor Yard	33.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction Camp	89.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pump Station	0.00	0.00	0.00	0.00	0.00	15.02	0.00	0.00	0.01	0.00
Inspections [3]	0.00	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00
Subtotal NE	***258.52***	***58.14***	***11.04***	***197.08***	***339.60***	***56.72***	***14.09***	***9.24***	***37.62***	***71.11***
Total	**443.82**	**117.05**	**130.95**	**384.16**	**394.35**	**64.63**	**27.42**	**35.90**	**69.52**	**91.44**

[1] Footprint impacts in this table are based on a 110-foot construction ROW reduced to a 50-foot operations ROW; however, the operations ROW will be revegetated and permanent effects on ABB are expected to be restricted to an area within 11 feet of the pipeline where thermal impacts could potentially affect ABBs.

[2] Footprint acres include only permanent access roads to be used for operations; temporary access roads are existing roads and use during construction is not considered to be an impact on ABB habitat.
[3] Assumes over the 50-year life of the permit there will be 10.0 acres of excavations; these 10 acres were apportioned between South Dakota and Nebraska based on the respective pipeline lengths within the Permit Area.

7.0 Evaluation Species Effects and Impact Analysis

The following sections provide an assessment of potential direct, indirect, and cumulative impacts to each evaluation species. Effects determinations regarding the species and critical habitat are also provided for federally listed species. Species that are only state-listed do not have critical habitat and ESA effects determinations are not included. Mitigation lands will be managed and preserved as prairie habitat. Disturbance within the mitigation lands will be limited to events (fire and grazing) that occur naturally in the prairie environment; thus, prairie species will be conserved, not impacted, and no analysis of impacts on evaluation species is warranted or provided for the planned activities on these lands. The range of the blowout penstemon includes the Conservation Area in Cherry County (and no other counties).

7.1 Federally Listed Evaluation Species

7.1.1 Western Prairies Fringed Orchid

7.1.1.1 Direct and Indirect Impacts

The estimated current range of the WPFO overlaps the Plan Area in Holt and Antelope counties in Nebraska and Tripp County in South Dakota (NGPC 2017a); however, the majority of lands crossed by the Project in the Plan Area are disturbed agricultural lands, which are not likely to support this species. Surveys conducted in 2013 and 2018 (Westech 2013, 2018) in these counties found no WPFO present, but identified approximately 253 acres of suitable habitat. Approximately 116 acres of these lands identified as suitable orchid habitat (Table 15) would be impacted during construction. If WPFOs occur in these areas, they would likely be destroyed during clearing and grading, however, these types of impacts will be minimized by implementation of conservation measures. Additional pre-construction surveys for WPFO will be conducted and if WPFO are observed, the route would be adjusted to avoid individual plants or populations of small white lady's slippers to the extent practicable and/or allowed by the landowner. Topsoil in these areas would be salvaged and segregated to preserve native seed sources in the soil for use in revegetation efforts in the ROW. Above-ground facilities will be sited to avoid wetlands that are suitable habitat for the WPFO.

Revegetation of the construction ROW could introduce or expand invasive species, especially leafy spurge, Kentucky bluegrass, and Canada thistle, potentially contributing to the decline of WPFO. However, Keystone has developed weed and vegetation monitoring plans to prevent the spread of invasive species. The Weed Management Plan would be updated prior to construction.

Impacts to the WPFO individuals or suitable habitat could be impacted if water levels are affected during construction. Effects would be minimized and avoided by implementation of Keystone's plan to withdraw the volume of water needed at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

Operation of the proposed Project is not expected to result in impacts to the WPFO. Clearing of trees/shrubs in the ROW would be required for operational monitoring, but since this species inhabits open, native prairie, no tree or shrub clearing would occur within suitable habitat. If herbicides must be used for noxious weed control, application would be conducted by spot spraying. Populations of WPFO would be identified and no herbicides would be used at those locations. Permanent impacts to WPFO habitat would be offset with a compensatory mitigation program.

Table 15. Potential Project Impacts on Orchid Habitat

Facility	Project Footprint in Poor-Excellent Orchid Habitat [1] (acres)					
	Temporary			Permanent		
	South Dakota	Nebraska	Total	South Dakota	Nebraska	Total
Pipeline ROW	32.26	10.89	43.15	27.16	9.56	36.72
Additional TWAs	6.48	1.73	8.21	0.00	0.00	0.00
Pump Stations	0.00	0.00	0.00	0.00	0.00	0.00
Rail Sidings,	0.00	0.00	0.00	0.00	0.00	0.00
Contractor Yards	0.00	0.00	0.00	0.00	0.00	0.00
Construction Camps	0.00	0.00	0.00	0.00	0.00	0.00
Pipe Yards	27.61	0.00	27.61	0.00	0.00	0.00
Main Line Valves	0.00	0.00	0.00	0.00	0.00	0.00
Access Roads	0.00	0.00	0.00	0.00	0.00	0.00
All	**66.35**	**12.62**	**78.98**	**27.16**	**9.56**	**36.72**

[1] Includes areas identified as poor, fair, good, and excellent orchid habitat. Temporary impact totals include approximately 43.8 acres of habitat rated as poor and permanent impacts include approximately 8.5 acres of habitat rated as poor.

During operations, the Project footprint within identified suitable habitat would be reduced to approximately 37 acres (permanent ROW) with other 79 acres being allowed to revert to pre-existing conditions. The center thirty feet of the permanent ROW will be maintained free of trees and shrubs, but woody plants are not a required component of orchid habitat, and the lack of trees would not negatively affect WPFO. Any application of herbicides for noxious weed control would be by spot spraying and populations of small white lady's slippers would be identified and avoided by 100 feet. Operations are therefore not expected to result in impacts to orchids.

7.1.1.2 Conservation Measures

The following conservation measures have or would be implemented:

- Pre-construction presence/probable absence surveys will be conducted within potentially suitable habitat that was not previously surveyed, including the power line route to PS-21 and the substation expansion for PS-22 and any necessary access roads. Survey results will be submitted to the USFWS for review. Species presence will be assumed in potentially suitable habitat if surveys cannot be conducted during the flowering period.
- The Project alignment will be adjusted to avoid any identified populations as practicable and/or approved by the landowner.
- To the greatest extent practicable, the width of the construction ROW will be reduced in areas where western prairie fringed orchid populations have been identified.
- Keystone will develop and implement a noxious and invasive weed control program consistent with the CMRP to reduce the potential for spread or invasion of weeds.
- Herbicide application will occur by spot spraying.
- Use of herbicides within 100 feet of documented western prairie fringed orchid occurrence will be restricted.
- Keystone will minimize the potential for altered hydrology (e.g., surface water flow, infiltration and groundwater levels) in potentially suitable habitat through best management practices outlined in the CMRP.
- Keystone will salvage and segregate topsoil appropriately where populations have been identified to preserve native seed sources in the soil for use in revegetation efforts in the ROW.

- Keystone will restore wet meadow habitat using a USFWS- and NGPC-approved seed mix.
- Potentially suitable wet meadow habitats will be restored following Project construction.
- Restoration of construction-related impacts to wet meadow habitats identified as potentially suitable for the western prairie fringed orchid will be monitored for a 5-year period, per USACE guidelines.
- Keystone has sited aboveground facilities to avoid potentially suitable western prairie fringed orchid wetland habitat.
- Keystone will prepare and implement a project-specific SPCC Plan.
- Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite.
- Refueling and lubrication of construction equipment will occur in uplands and >100 ft. from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.
- All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands.
- All equipment will be parked at least 100 feet from a watercourse or wetland overnight, if possible.
- Equipment will not be washed in streams or wetlands.
- Construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials.
- Each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials.
- Water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow.
- Keystone will avoid temporary water reductions by withdrawing only the volume of water needed for hydrotesting as outlined in their permits. Water will be returned to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source where possible.
- Pre-construction presence/probable absence surveys will be conducted in potentially suitable habitat along the power line routes to PS-22 through PS-23, during the appropriate flowering period. The NPPD will delineate and designate areas where western prairie fringed orchid habitat is present as “avoidance areas” where placement of structures and construction traffic will not occur.

Additional habitat suitability and presence/absence surveys are planned for spring and summer of 2019. Habitat suitability surveys would be done by a person who has demonstrated qualifications in completing surveys and is knowledgeable about the habitat requirements for the species. The person selected to conduct surveys would submit documentation of survey qualifications to the Service with the survey report. In addition, survey results would be submitted to the Service for review. Keystone would adjust the route around individual plants or populations to the extent practicable and/or allowed by the landowner. For impacts from water withdrawals, effects would be minimized and avoided by implementation of Keystone’s plan to withdraw the volume of water needed at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. If herbicides must be used for noxious weed control, application would be conducted by spot spraying. Populations of WPFO would be identified and no herbicides would be used at those locations.

Compensation through a Habitat Conservation Trust would be provided at ratios specified by the Service in the BO (USFWS 2013) for areas that cannot be avoided.

7.1.1.3 Effects Determination

Effect on Critical Habitat

No critical habitat has been designated for this species. Therefore, the Project would have no impact on critical habitat for the WPFO.

Effect on the Species:

The Project has potential to take WPFO due to impacts to suitable habitat during construction and operations from vegetation clearing, site grading, and trenching. The remaining activities are unlikely to impact suitable habitat thus avoiding take of individual plants. This determination is based on Keystone's commitment to implement pre-construction surveys for individuals/suitable habitat and use of the Service recommended avoidance and conservation measures. In addition, Keystone would provide compensation for impacts to the WPFO within the Plan Area footprint.

Although it is possible that a large spill event could result in an adverse effect on this species, the probability of adverse effects to the WPFO is unlikely due to the low probability of a spill, the lower probability of the spill occurring in WPFO habitat, and lower yet probability of the released product contacting the plants.

7.1.2 Whooping Crane

7.1.2.1 Direct and Indirect Impacts

The primary construction impacts would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance for construction-related spills within whooping crane roosting and foraging habitat is minimal. According to Keystone's CMRP, hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area.

No direct impacts to the whooping crane are anticipated from the construction of the Project within the Plan Area. The whooping crane occurs as a migrant throughout the proposed Plan Area (USFWS 2012b). Whooping cranes use shallow, sparsely vegetated streams and wetlands in which they feed and roost during migration. Migration periods for the whooping crane can vary widely with weather patterns. In general, spring migration extends from March through May in Nebraska and South Dakota, and fall migration extends from September through November. Whooping cranes pass through South Dakota and Nebraska where they use suitable roosting and foraging habitats in riverine and wetland systems. The Niobrara River contains suitable stopover habitat for whooping cranes within the Plan Area.

Habitats at the Niobrara River would be crossed by HDD, so potential habitat loss, alteration, or fragmentation would be negligible. Additionally, adherence to conservation measures described below would reduce or avoid impacts to whooping cranes in the vicinity of the plan area during migration. Based on the location of the Plan Area being within the migration corridor (Table 8, Figure 10), whooping cranes could occur in the Plan Area during construction and would be expected to occur in the Plan Area during operation. Telemetry data indicate that in the past, whooping cranes have used the Plan Area between April 7 and May 12 during spring migrations and between October 27 and November 23 during fall migrations. Use of the Plan Area by whooping cranes could be considered minor based on the short duration of construction, most of the Plan Area being within the 50-percent migration corridor, and the number of telemetry points and public sightings. The frequency of use based on the number of points/ sightings per unit area is lower than the average across the entire 95-percent corridor (Table 8), with most of the telemetry points within the Plan Area being located along the Niobrara River, the Elkhorn River, and waterbodies in southeastern Holt County. With the exception of large river crossings, the potential for occurrence near Project footprint is much lower based on the frequency of historical sightings (Table 8).

Indirect impacts could result from migrating individuals being disturbed and displaced due to noise and human presence during construction, if it were to occur during spring or fall migrations. Indirect impacts would be reduced to insignificant or discountable by following conservation measures described in Section 7.1.2.2 below.

For impacts from water withdrawals, effects would be minimized and avoided by implementation of Keystone's plan to withdraw the volume of water needed at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

Normal operation of the pipeline would not be expected to affect the whooping crane or habitats used during migration. Pipeline surveillance would involve routine low-level aerial flights 26 times per year or no less than every 3 weeks and/or ground based inspections once per year. Over flights during migration periods would have the potential to disturb migrant whooping cranes. Most over flights would normally be during late-morning or mid-day at an altitude of about 1,000 feet. Maintenance inspections that would require external examination of the pipeline would be unlikely to coincide with crane roosting or foraging habitats but would have the potential to disturb migrant cranes. Adherence to conservation measures, including avoidance of whooping crane migration season or implementation of the USFWS and NGPC whooping crane protocol would be adhered to, reducing to insignificant or discountable or avoiding the likelihood of take.

Inspections would be required throughout the life of the Project where excavation would be required. With use of conservation measures impacts to birds would be unlikely given the small size (0.13 acres per dig every 0.05 times per mile) of the excavation areas over a 50-year period. Keystone conservatively estimated this impact to be 10.0 acres within the Permit Area to cover for varying sizes of excavations and/or number of locations per year (Section 2.6).

Roosting habitats at rivers crossed by the HDD method would typically have 20 feet or more of overburden between the pipeline and river bottom. Therefore, heat dissipated from the pipeline would not affect riverine roosting habitats.

Direct contact with a fuel spill could result in adverse effects to whooping cranes due to oiling of plumage and ingestion of fuel from contaminated plumage and prey. While these exposure risks have the potential to cause adverse effects to individuals, the probability of adverse effects to whooping cranes are unlikely due to (1) the low probability of a spill, (2) the low probability of the spill coinciding with the presence of migrating whooping cranes or migration habitats, and (3) the very low probability of a whooping crane contacting the spilled product.

The whooping crane may experience long-term impacts associated with clearing riparian areas that may be used for roosting and feeding. The use of the HDD method at major river crossings would reduce the probability of roosting and feeding habitat loss or alteration. In other areas along the corridor, revegetation (particularly within riparian zones and in wetland habitats) would reduce habitat impacts. The regeneration of revegetated areas may be slow which may cause long-term impacts to roosting and feeding habitat.

The central flyway whooping crane migration corridor overlaps with the proposed Project in South Dakota and Nebraska and all counties within the Plan Area are within the migration corridor. Impacts from the pipeline will be restored within one to four years as vegetation becomes established.

During spring and fall whooping crane migration periods, biological monitors would complete a brief survey of any wetland or riverine habitat areas potentially used by whooping cranes. If whooping cranes are sighted the biological monitor would contact the Service to coordinate avoidance measures. The Service would notify Keystone if whooping cranes are within the construction area through information gathered from the whooping crane tracking program.

7.1.2.2 Conservation Measures

The following conservation measures are applicable to the whooping crane:

- Crossings of major rivers and riverine habitat will be completed using Horizontal Directional Drilling (HDD), resulting in a pipeline burial depth of 25 feet or greater, regardless of the season.
- Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur.
- Should HDD activities occur at night, lights will be down-shielded during the spring and fall whooping crane migration seasons in areas that provide potentially suitable habitat.
- Where practicable, vegetative screening at HDD sites will be maintained to prevent disturbance of whooping cranes.
- During spring (March--May) and fall (October--November) whooping crane migration periods, environmental monitors will complete a daily brief survey of any wetland or riverine habitat areas potentially used by whooping cranes in the morning and afternoon before starting equipment and following the Whooping Crane Survey Protocol previously developed by the USFWS and NGPC (USFWS 2016). If whooping cranes are sighted, the environmental monitor will immediately contact the USFWS and respective state agency in Nebraska, South Dakota, and/or Montana for further instruction and require that all human activity and equipment start-up be delayed. Work could proceed if whooping crane(s) leave the area. The compliance manager will record the sighting, bird departure time, and work start time on the survey form. The USFWS will notify the compliance manager of whooping crane migration locations during the spring and fall migrations through information gathered from the whooping crane tracking program.
- Keystone will re-vegetate disturbed areas (particularly within riparian zones and in wetland habitats) in accordance with the CMRP and USACE Nationwide Permit 12 requirements.
- Use of helicopters within 0.5 miles of any whooping crane(s) will be prohibited.
- Keystone will prepare and implement a project-specific SPCC Plan.
- Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite.
- Refueling and lubrication of construction equipment will occur in uplands and >100 ft. from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.
- All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands.
- All equipment will be parked at least 100 feet from a watercourse or wetland overnight, if possible.
- Equipment will not be washed in streams or wetlands.
- Construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials.
- Each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials.
- Water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow.
- Keystone will avoid temporary water reductions by withdrawing only the volume of water needed and returning the water back to its source within a 30-day period for any withdrawals from a river except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting,

the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

- During aerial surveillance, aircraft will maintain at least 1,000 feet of elevation.

7.1.2.3 Effects Determinations

Effect on Critical Habitat:

The proposed Project would not result in the destruction or adverse modification of federally designated critical habitat for the whooping crane. The area of designated critical habitat for the whooping crane in Nebraska is upstream from the Platte River crossing and other critical habitat areas are well outside the proposed Project area.

Effects on the Species

Take of whooping cranes are not anticipated during construction and operations phases of the Project. This determination is based on the rarity of the species, its status as a migrant through the Plan Area, and Keystone's commitment to follow the Service's recommended mitigation measures. As a result, no direct impacts are expected to result from construction. Indirect impacts from disturbance of migrating whooping cranes during Project construction and hydrostatic testing are expected to be negligible after/upon implementation of the Whooping Crane Survey Protocol (USFWS 2016).

7.1.3 Interior Least Tern

7.1.3.1 Direct and Indirect Impacts

The primary construction impacts would be disturbance and potential exposure to fuel spills from construction machinery. The chance of construction related spills within least tern habitat is minimal. According to Keystone's CMRP, hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area. Refueling and lubrication of construction equipment would generally be restricted to upland areas at least 100 feet away from streams and wetlands. Where this is not possible, the equipment would be fueled by designated personnel with special training in refueling, spill containment, and cleanup. Keystone would mark and maintain a 100-foot area from these river crossings free from hazardous materials, fuel storage, and vehicle fuel transfers. If interior least terns are found at these crossings, then Keystone would adhere to the 0.25-mile buffer of no construction activity until young have fledged.

The Niobrara River is the only waterway within the Plan Area that has been identified as possibly providing suitable habitat for least terns. Surveys were conducted at the Niobrara River in 2008, 2011, and 2012 and suitable habitat was found but no terns were observed. The route, including the proposed crossing of the Niobrara River, has been moved and access has not been granted for surveys at the new crossing location. The Niobrara River crossing would be constructed with an HDD, which would avoid or minimize impacts to any interior least tern habitat at this location. Minimal hand clearing of vegetation and limited human access would be required within the riparian areas. Water would be withdrawn from the Niobrara River for use in the hydrostatic tests. For impacts from water withdrawals, effects would be minimized and avoided by implementation of Keystone's plan to withdraw the volume of water needed at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

Pre-construction surveys would be conducted within 0.25-mile from suitable breeding habitat at the Niobrara River during the nesting season (from May 1 through September 1) to ensure that there are no nesting terns. In the event construction related activities occur after April 15 at these surface water features, Keystone would conduct daily presence/absence surveys to identify occupied breeding territories and/or active nest sites to avoid impacts to this species. If occupied breeding territories and/or active nest sites

are identified, the Service would be notified, and appropriate protection measures would be implemented on a site-specific basis. These measures should limit any impacts to this species resulting from construction activities, increased noise and human presence at work site locations.

Aerial surveillance would be conducted 26 times per year or no greater than once every 3 weeks and the aircraft will fly over an area at an altitude of about 1,000 feet during those aerial patrols. Aerial and ground/ surveillance are unlikely to disturb nesting terns during migration periods at stopover locations. Ground surveillance would be done on foot in areas not visible by air (forested tracts not cleared during construction like at HDD crossings) to reduce impacts to birds. Inspections would be required throughout the life of the Project where excavation would be required. With use of conservation measures impacts to birds would be unlikely given the small size (0.13 acres per dig every 0.05 times per mile) of the excavation areas over a 50-year period. Keystone conservatively estimated this impact to be 10.0 acres within the Plan Area to cover for varying sizes of excavations and/or number of locations per year (Section 2.6).

7.1.3.2 Conservation Measures

The following conservation measures are applicable to the interior least tern:

- Crossings of major rivers and riverine habitat will be completed using Horizontal Directional Drilling (HDD), resulting in a pipeline burial depth of 25 feet or greater, regardless of the season.
- Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur.
- Where practicable, vegetative screening at HDD sites will be maintained to prevent disturbance of interior least terns.
- Should HDD activities occur at night, lights will be down-shielded when the site is within 0.25 miles of potentially suitable habitat and vegetative screening is lacking.
- Pre-construction presence/probable absence surveys of pipeline crossings will occur within 0.25 mile of potentially suitable breeding habitat at the Elkhorn, and Niobrara rivers in Nebraska during the interior least tern nesting season (April 15 to September 1) to ensure that there are no nesting pairs within 0.25 mile of the construction area. If interior least tern nests are found at the crossings, Keystone will: (1) adhere to a 0.25-mile buffer of no pipeline construction activity and (2) continue to monitor nests if any are within 0.25 mile of the construction footprint until young have fledged.
- Daily surveys for nesting terns will be conducted during the nesting season when construction activities occur within 0.25 mile of potential nesting habitat.
- If nesting terns are present, Keystone will make minor adjustments to the pipeline corridor, if practicable, to avoid nesting interior least terns, in coordination with USFWS. This may involve shifting the pipeline corridor away from nests to avoid disturbances to interior least tern nests or other modifications depending on the circumstances.
- To the extent practicable, construction will occur mostly during daytime hours and will comply with any local noise regulations.
- Construction equipment will be properly equipped with mufflers to lessen noise impacts.
- Keystone will prepare and implement a project-specific SPCC Plan.
- Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite.

- Refueling and lubrication of construction equipment will occur in uplands and >100 ft. from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.
- All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands.
- All equipment will be parked at least 100 feet from a watercourse or wetland overnight, if possible.
- Equipment will not be washed in streams or wetlands.
- Construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials.
- Each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials.
- Water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow.
- Keystone will avoid temporary water reductions by withdrawing only the volume of water needed and returning water back to its source within a 30-day period for any withdrawals from a river except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.
- During aerial surveillance, aircraft will maintain at least 1,000 feet of elevation.

7.1.3.3 Effects Determination

Effect on Critical Habitat:

No critical habitat has been designated for this species. Therefore, the Project would have no impact on critical habitat for the interior least tern.

Effect on the Species:

Take of interior least terns are not anticipated during construction and operations phases of the Project. This determination is based on Keystone's plan to HDD the Niobrara River and Keystone's commitment to follow recommended conservation measures identified by the Service.

7.1.4 Piping Plover

7.1.4.1 Direct and Indirect Impacts

The piping plover is known to nest along the Niobrara River in the Plan Area. Potential construction impacts at this location and elsewhere where it may be found would be disturbance and potential exposure to small fuel spills and leaks from construction machinery. The chance of construction related spills within piping plover habitat is minimal. According to Keystone's CMRP, hazardous materials, chemicals, fuels, and lubricating oils would not be stored, staged, or transferred (other than possible refueling) within 100 feet of any surface water feature, wetland, storm drain, drop inlet, or high consequence area. Pre-construction surveys for nesting piping plovers will be conducted at the Niobrara River crossing. If nesting piping plovers are found at these crossings, Keystone would adjust the schedule or crossing location to adhere to the 0.25-mile buffer of no construction activity until young have fledged.

No direct impacts to the piping plover or its breeding habitat would be anticipated at the Niobrara River since pipeline placement across the river would be completed using the HDD method. The HDD method poses a small risk of drilling fluid spills. Drilling fluid spills are rare and are contained by the BMPs that are described within the HDD Contingency Plans required for drilling crossings. No direct impacts to the piping plover or piping plover migration habitats are anticipated from the construction and operation of the Project.

Indirect impacts could result from migrating individuals being flushed from the Plan Area during construction related activities. Since piping plovers are highly mobile, it is anticipated that individuals would move to other suitable resting and foraging habitats elsewhere in the area. Potential impacts from encountering and flushing a migrating piping plover from the Plan Area would be negligible. Habitat loss from construction would be negligible since the major rivers would be crossed using the HDD method.

Indirect impacts during aerial and ground surveillance are unlikely to occur to migrating piping plovers at stopover locations. Aerial surveillance is conducted 26 times per year at intervals no greater than 3 weeks and the aircraft will fly over an area at an altitude of about 1,000 feet during those aerial patrols.

Inspections would be required throughout the life of the Project where excavation would be required. With use of conservation measures impacts to birds would be unlikely given the small size (0.13 acres per dig every 0.05 times per mile) of the excavation areas over a 50-year period. Keystone conservatively estimated this impact to be 10.0 acres within the Plan Area to cover for varying sizes of excavations and/or number of locations per year (Section 2.6).

For impacts from water withdrawals, effects would be minimized and avoided by implementation of Keystone's plan to withdraw the volume of water needed at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

7.1.4.2 Conservation Measures

Conservation measures applicable to the piping plover include the following:

- Crossings of major rivers and riverine habitat will be completed using Horizontal Directional Drilling (HDD), resulting in a pipeline burial depth of 25 feet or greater, regardless of the season.
- Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur.
- Where practicable, vegetative screening at HDD sites will be maintained to prevent disturbance of piping plovers.
- Should HDD activities occur at night, lights will be down-shielded when the site is within 0.25 miles of potentially suitable habitat and vegetative screening is lacking.
- Pre-construction presence/probable absence surveys of pipeline crossings will occur within 0.25 mile of potentially suitable breeding habitat at the Elkhorn, and Niobrara rivers in Nebraska during the piping plover nesting season (April 15 to September 1) to ensure that there are no nesting pairs within 0.25 mile of the construction area. If piping plover nests are found at the crossings, Keystone will: (1) adhere to a 0.25-mile buffer of no pipeline construction activity and (2) continue to monitor nests if any are within 0.25 mile of the construction footprint until young have fledged.
- Daily surveys for nesting piping plovers will be conducted during the nesting season when construction activities occur within 0.25 mile of potential nesting habitat.
- If nesting piping plovers are present, Keystone will make minor adjustments to the pipeline corridor, if practicable, to avoid nesting plovers, in coordination with USFWS. This may involve shifting the pipeline corridor away from nests to avoid disturbances to piping plover nests or other modifications depending on the circumstances.
- To the extent practicable, construction, if within 0.25 miles of nest locations, will occur mostly during daytime hours and will comply with any local noise regulations.
- Construction equipment will be properly equipped with mufflers to lessen noise impacts.
- Keystone will prepare and implement a project-specific SPCC Plan.

- Keystone will mark and maintain a 100-foot buffer from river crossings, free from hazardous materials, fuel storage, and vehicle fuel transfers. These buffers will be maintained during construction except when fueling and refueling the water pump near the river edge that is required for the HDD crossing and hydrostatic test water withdrawal. Water pump fueling will be completed by trained personnel and will use secondary containment and a spill kit will be onsite.
- Refueling and lubrication of construction equipment will occur in uplands and >100 ft. from streams and wetlands. Where this is not possible, designated personnel with special training in refueling, spill containment, and cleanup will conduct these activities.
- All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands.
- All equipment will be parked at least 100 feet from a watercourse or wetland overnight, if possible.
- Equipment will not be washed in streams or wetlands.
- Construction and restoration activities will be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials.
- Each construction crew and cleanup crew will have sufficient tools and materials on hand to stop leaks, including supplies of absorbent and barrier materials that will allow for rapid containment and recovery of spilled materials.
- Water withdrawal for hydrostatic testing will be less than 10 percent of the baseline daily flow.
- Keystone will avoid temporary water reductions by withdrawing only the volume of water needed and returning the water back to its source within a 30-day period for any withdrawals from a river except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.
- During aerial surveillance, aircraft will maintain at least 1,000 feet of elevation.

7.1.4.3 Effects Determinations

Effect on Critical Habitat:

Critical habitat is not currently designated for this population. Critical habitat designated for the Northern Great Plains population of the piping plover has been vacated by the Service in Nebraska. Therefore, the Project would have no impact on critical habitat for the piping plover.

Effect on the Species:

Take of piping plovers are not anticipated during construction and operations phases of the Project This determination is based on Keystone's construction plan to HDD the Niobrara River, consultation with the Service, Keystone's commitment to follow recommended conservation measures identified by the Service, and power providers' commitment to consult with and follow recommended conservation measures of the Service.

7.1.5 Rufa Red Knot

7.1.5.1 Direct and Indirect Impacts

Construction and operation of the Project are unlikely to have any adverse direct or indirect effects on the rufa red knot. Although red knots sometimes occur in the Plan Area, albeit very infrequently and in very low numbers, there are no known traditional stopover locations within the Plan Area, and very little suitable habitat available for such infrequent use. There are constructed ponds, wetlands, farmed playa-type wetlands, and a few rainwater basins within 1 mile of the pipeline, however, these features do not generally provide stop-over habitat as they do not provide adequate mollusk foraging opportunity. Farmed playa-

type wetlands are not present from year-to-year and rainwater basin wetlands that have not been drained for agriculture are typically dominated by emergent vegetation and likewise to not support significant mollusk populations for foraging. The larger rivers, such as the Niobrara River, could possibly provide some habitat, but overall, potential inland stop-over habitat that supports adequate food sources is highly limited in the Plan Area, which likely explains the paucity of red knot observations in the Plan Area. All of the larger rivers in the Plan Area (White River, Niobrara River, Keya Paha River, and the Elkhorn River) would be crossed by HDD, thus construction and operation of the pipeline would not be expected to disturb any suitable habitat.

7.1.5.2 Conservation Measures

No conservation measures have been specified for the rufa red knot because of the infrequency of occurrence and lack of habitat in the Plan Area. Conservation measures being implemented for whooping cranes, interior least terns, and piping plovers would also minimize any potential effects on red knots.

7.1.5.3 Effects Determination

Effect on Critical Habitat

Critical habitat is not currently designated for the rufa red knot.

Effect on the Species

Take of rufa red knot are not anticipated during construction and operations phases of the Project. This determination is based on the Plan Area being partially within the published range (migration) but containing little suitable stopover habitat. There are very few and infrequent records of red knots in the Plan Area, and the Project is expected to have no impact on suitable habitat. The Service (USFWS 2015) has previously provided concurrence for the same finding for the Project.

7.1.6 Northern Long-Eared Bat

7.1.6.1 Direct and Indirect Impacts

The northern long-eared bat potentially could be impacted by the removal of roosting or maternal colony habitat during the clearing of Project footprint for construction. Much of the route has previously been converted to agricultural land and forested areas are currently largely limited to riparian habitats at the larger streams. Keystone would use the HDD method to cross riparian habitat along the White River, Keya Paha River, Niobrara River, and the Elkhorn River, thereby avoiding impacts to forested riparian vegetation at these locations. Suitable habitat occurs along some of the smaller streams such as Shingle Creek, Wolf Creek, and Spotted Tail Creek. Other such streams have not been investigated due to a lack of access and may hold suitable habitat. Keystone currently estimates that approximately 34 acres of habitat that may be suitable for the northern long-eared bat would be cleared during construction (temporary impacts). Initial clearing is planned for November-April, thereby avoiding potential injuries of bats at summer or maternal roosts. Effects on the species (disturbance, injury) and habitat will be avoided by implementing several mitigation measures. Tree removal near known maternity roosts would not occur during the pup season (June 1 through July 31). Known roosts would be protected by a prohibition on cutting or destroying trees within 150-foot radius of known, occupied maternity roost trees during the pup season. No trees would be removed within a 0.25-mile of known northern long-eared bat hibernacula. Bats flying over the pipeline route would be expected to avoid ground-based construction activities.

During operations, bats could be disturbed at small areas where maintenance and repair activities overlap with suitable habitat. Permanent impacts (operations) on habitat would be reduced to approximately 17 acres where permanent facilities are located in forested areas. The center 30 feet of the 50-foot wide permanent ROW would be maintained free of trees and represents a loss of such habitat components as roosting sites; however, this width of clearing would likely not result in avoidance on non-use by the bats who prefer to forage along forest edges. Bats flying over the pipeline route are expected to avoid any ground-based operational activities.

Table 16. Potential Project Impacts on Northern Long-eared Bat Habitat

Facility	Temporary			Permanent		
	South Dakota	Nebraska	Total	South Dakota	Nebraska	Total
Pipeline ROW	2.05	9.14	11.18	3.04	12.55	15.59
Additional Temporary Workspace Areas	0.40	3.26	3.66	0.00	0.00	0.00
Pipe Yards, Rail Sidings, Contractor Yards, Water Storage Sites	0.00	1.07	1.07	0.00	0.00	0.00
Construction Camps	0.00	1.53	1.53	0.00	0.00	0.00
Pump Stations	0.00	0.00	0.00	0.00	1.09	1.09
Permanent Access Roads	0.00	0.00	0.00	0.00	0.00	0.00
Temporary Access Roads	0.00	0.13	0.13	0.00	0.00	0.00
All	**2.45**	**15.13**	**17.57**	**3.04**	**13.64**	**16.68**

7.1.6.2 Conservation Measures

Keystone has committed to two conservation measures specifically for the northern long-eared bat per the 4(d) rule as outlined by DOS to the Service in 2017 (DOS 2017). Those two measures are:

- No tree removal will occur within 0.25 miles of a known occupied hibernaculum.
- No tree removal will occur within 150 feet of a known occupied roost tree during the pup season (June 1-July 31).

Additional measures are as follows:

- Crossings of major rivers and riverine habitat will be completed using Horizontal Directional Drilling (HDD), resulting in a pipeline burial depth of 25 feet or greater, regardless of the season.
- Keystone will implement measures identified in the HDD contingency plan, including monitoring of the HDD bore, monitoring downstream of the HDD site for evidence of drilling fluids, and mitigation measures should a frac-out occur.
- Should HDD activities occur at night, lights will be down-shielded.
- Where practicable, vegetative screening at HDD sites will be maintained to prevent disturbance of northern long-eared bats.
- Pre-construction presence/absence surveys will be completed if there is a need to remove trees during the pup season.
- During aerial surveillance, aircraft will maintain at least 1,000 feet of elevation.
- Keystone will prepare and implement a project-specific SPCC Plan.

7.1.6.3 Effects Determination

<u>Effect on Critical Habitat:</u>

Critical habitat is not currently designated for northern long-eared bat.

<u>Effect on the Species:</u>

Take of NLEBs are not anticipated during construction and operations phases of the Project based on adherence to the 4(d) rule and the following:

- The Plan Area is partially within the published range;

- A lack of records of northern long-eared bats near the Project;
- There are no known hibernacula within 0.25-mile of the proposed Project;
- No known maternity roost trees within 150 feet of the proposed Project;
- The Project is expected to have limited impact on suitable habitat; and
- Keystone's commitment to follow recommended conservation measures identified by the Service.

The Service has previously concurred with this finding (Appendix D).

7.2 State Listed Evaluation Species

7.2.1 Small White Lady's Slipper

7.2.1.1 Direct and Indirect Impacts

Approximately 253 acres of suitable habitat (91 acres of poor, 47 acres of fair, and 115 acres of good) were identified within the survey area in the Plan Area during Project orchid surveys (Figure 18, Table 7). No small white lady's slippers were observed during surveys, so these habitats may not be occupied by the small white lady's slipper. Approximately 116 acres of land identified as suitable (poor to excellent) orchid habitat (Table 15) would be impacted during construction. If small white lady's slippers do occur in these areas, they could be destroyed during clearing and grading. Potential indirect impacts include possible introductions of invasive plant species such as leafy spurge, Kentucky bluegrass, and Canada thistle (*Cirsium arvense*) during disturbance and revegetation, and modification of adjacent habitat through Project water withdrawals. These types of impacts could occur outside the Project footprint. The potential for these types of indirect impacts would be reduced by a number of measures including implementation of the Project Weed Management Plan, Keystone's plan to remove water at rates prescribed in water withdrawal permits and return water back to its source within a 30-day period, except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up.

During operations, the Project footprint within identified suitable habitat would be reduced to approximately 37 acres (Table 15, permanent pipeline ROW), with the remaining 79 acres being allowed to revert to its pre-existing condition. The center thirty feet of the permanent ROW will be maintained free of trees and shrubs, but woody plants are not a required component of orchid habitat, and the lack of trees would not negatively affect small white lady's slipper. Any application of herbicides for noxious weed control would be by spot spraying and populations of small white lady's slippers would be identified and avoided by 100 feet. Operations are therefore not expected to result in impacts to small white lady's slippers.

7.2.1.2 Conservation Measures

Above-ground facilities are sited to avoid wetlands that are suitable orchid habitat, and topsoil will be segregated and salvaged to preserve native seed sources for revegetating the ROW. Additional surveys would be conducted prior to construction, and the route would be adjusted to avoid individual plants or populations of small white lady's slippers to the extent practicable and/or allowed by the landowner. Additional conservation measures include:

- Limiting Project water withdrawals for hydrostatic tests and other uses to less than 10 percent of the baseline daily flow and returned to the source within 30 days to minimize any hydrologic effects on riparian habitats.
- Restricting equipment refueling to uplands more than 100 feet from streams and wetlands to avoid impacts to habitat in riparian areas from accidental releases.
- Applying any needed herbicides for noxious weed control by spot spraying and prohibiting such spraying within 100 feet of identified small white lady's slippers.

7.2.2 Blacknose Shiner

7.2.2.1 Direct and Indirect Impacts

Blacknose shiners may occur in suitable habitat in tributaries of the Keya Paha and Niobrara Rivers in Keya Paha County, Nebraska and Tripp County, South Dakota (Figure 19), and could, therefore, potentially be impacted by proposed crossings of the streams and other Project construction activities that could affect the hydrology, water quality, stream banks, or riparian vegetation. The Project crosses 23 tributaries in these watersheds within the Plan Area, 11 of which were identified in consultation with SDGF&P and NG&PC as possibly containing suitable habitat for blacknose shiners.

Open cut stream crossings would result in increased suspended sediment loads in the water column and subsequent sediment deposition. Increased sediment loads would increase turbidity, decreasing fish feeding efficiencies, and can clog gills and suffocate fish with resulting mortalities; however temporary displacement of fish would be more likely. Any water quality impacts associated with the stream crossings would be ephemeral as construction in these small streams would be completed quickly. Re-deposition of disturbed sediments could, however, result in alteration of the types of sediment found on the stream bottom, and could degrade the habitat for blacknose shiners for a longer period of time. Alteration of the bank and removal of aquatic and riparian vegetation would degrade the value of the habitat for blacknose shiners.

Construction of open cut stream crossings during the spawning period (June to July) could disrupt spawning and result in the loss of eggs and young. Water withdrawals for use in the HDD crossings and hydrostatic tests could entrain fish, larvae, and eggs, with resulting mortalities, however, all planned water sources in the Plan Area are major streams (Figure 26, White River, Keya Paha River, Niobrara River, and Elkhorn River) and generally unsuitable as habitat for blacknose shiners.

Fish surveys have been conducted at the crossings of 7 of the 11 streams identified as potentially containing suitable habitat, with no blacknose shiners and no suitable habitat observed at any of the crossings. Thus, it appears at this time, that construction and operation of the Project would likely not result in impacts to blacknose shiners or their habitat. Surveys would be conducted at all identified streams prior to construction, and SDGF&P and NG&PC would be consulted if any blacknose shiners are observed.

7.2.2.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. All water withdrawals would be conducted consistent with permit requirements and intake hoses would be screened to prevent entrainment of fish. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing would be implemented for all proposed water sources. Project water withdrawals will be limited to less than 10 percent of the baseline daily flow and returned to the source within 30 days except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. Construction timing considerations and best management practices for maintaining water quality and flow would reduce potential impacts on state-protected minnows.

In South Dakota, the following conservation measures have been applied where access was granted and would be applied in unsurveyed waterbody crossings prior to construction:

- Suitable habitat determinations have been made along the route by SDGF&P.
- Conduct presence/absence surveys if suitable habitat is present.
- If survey results are negative for these minnows, no further conservation measures would be required.
- If survey results are positive for these minnows, exclude construction activities during the spawning period (to be provided by SDGF&P) and/or salvage and relocate the minnows; use alternative crossing methods if site conditions warrant.

In Nebraska, the following conservation measures have been applied where access was granted and would be applied in previously unsurveyed waterbody crossings prior to construction:

- Conduct presence/absence surveys if suitable habitat is present.
- Re-consult to identify additional conservation measures if any of these species are found within any streams surveyed for the proposed Project.

The use of HDD stream crossing technology would avoid impacts to these minnows and their habitats should either be identified. Within the Plan Area, the White River, the Keya Paha River, the Niobrara River, and the Elkhorn River would be crossed with HDDs, however, the blacknose shiner is generally found in much smaller tributaries. In Nebraska, NGPC has recommended HDD methods for any stream crossings occupied by the blacknose shiner, as open-cut crossings typically cause effects from increased turbidity and suspended sediment (such as avoidance and gill irritation). However, following completion of field surveys, Keystone would continue to coordinate with SDGF&P and NGPC and may use alternative crossing methods if site conditions warrant.

7.2.3 Finescale Dace

7.2.3.1 Direct and Indirect Impacts

The finescale dace is state listed as endangered in South Dakota with reported Plan Area occurrences In in Spring Creek, a Little White River tributary, and Sand Creek, a Keya Paha River tributary, and is state listed as threatened in Nebraska and in several tributaries of the Keya Paha River in Keya Paha County. The Project crosses 6 tributaries in these drainages within Tripp County and 17 tributaries in the Nebraska portion of the Plan Area. None of these streams have recent reported occurrences of finescale dace. A total of 11 streams were identified by the respective state agencies as possibly holding habitat for the finescale dace; 9 of these are crossed by the current route and fish surveys were conducted at 6 of them. No finescale dace were observed at any of the 6 streams and it was concluded that there was no suitable habitat.

Open cut stream crossings in these streams would result in increased suspended sediment loads in the water column and subsequent sediment deposition. Increased sediment loads would increase turbidity, decreasing fish feeding efficiencies, and can clog gills and suffocate fish with resulting mortalities, however temporary displacement of fish would be more likely. Construction of open cut stream crossings during the spawning period (April – early June) could disrupt spawning and result in the loss of eggs and young. Any water quality impacts associated with the stream crossings would be ephemeral as construction in these small streams would be completed quickly. Re-deposition of disturbed sediments could, however, result in alteration of the types of sediment found on the stream bottom and could degrade the habitat for northern pearl dace for a longer period of time. Alteration of the bank and removal of aquatic and riparian vegetation would degrade the value of the habitat for northern pearl dace.

Water withdrawals for use in the HDD crossings and hydrostatic tests could entrain fish, larvae, and eggs. However, all planned water sources in the Plan Area are major streams and generally unsuitable as habitat for northern pearl dace, so Project water use would not be expected to impact this species.

7.2.3.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing would be implemented for all proposed water sources.

- All water withdrawals would be conducted consistent with permit requirements, and intake hoses would be screened to prevent entrainment of fish.
- Construction timing considerations and best management practices for maintaining water quality and flow would reduce potential impacts on state-protected minnows.

In South Dakota, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Suitable habitat determinations along the route would be made by SDGF&P.
- Conduct presence/absence surveys if suitable habitat is present.
- If survey results are negative for these minnows, no further conservation measures would be required.
- If survey results are positive for these minnows, exclude construction activities during the spawning period (to be provided by SDGF&P), and/or salvage and relocate the minnows, or use alternative crossing methods if site conditions warrant.

In Nebraska, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Conduct presence/absence surveys if suitable habitat is present.
- Re-consult to identify additional conservation measures if any of these species are found within any streams surveyed for the proposed Project

The use of HDD stream crossing technology would avoid impacts to these minnows and their habitats should either be identified. Within the Plan Area, the White River, the Keya Paha River, the Niobrara River, and the Elkhorn River would be crossed with HDDs, however, the finescale dace is generally found in much smaller tributaries. In Nebraska, NGPC has recommended HDD methods for any stream crossings occupied by the finescale dace, as open-cut crossings typically cause effects from increased turbidity and suspended sediment (such as avoidance and gill irritation). However, following completion of field surveys, Keystone would continue to coordinate with SDGFP and NGPC and may use alternative crossing methods if site conditions warrant.

7.2.4 Northern Redbelly Dace

7.2.4.1 Direct and Indirect Impacts

The northern redbelly dace is not federally listed but is state-listed as threatened in both South Dakota and Nebraska, where within the Plan Area it is found in tributaries of the White River, Niobrara River, and Keya Paha River. The Project crosses 6 tributaries in these drainages within Tripp County. None of these streams are known to have recent occurrences of northern redbelly dace, A total of 11 streams were identified by the respective state agencies as possibly holding habitat for the northern redbelly dace; 9 of these are crossed by the current route and fish surveys were conducted at 6 of them. No northern redbelly dace were observed at any of the 6 streams and it was concluded that there was no suitable habitat.

Open cut stream crossings in these streams would result in increased suspended sediment loads in the water column and subsequent sediment deposition. As with other state listed fish species, increased sediment loads would increase turbidity, decreasing dace feeding efficiencies. It can also clog gills and suffocate fish with resulting mortalities, however temporary displacement of fish would be more likely. Construction of open cut stream crossings during the spawning period (April – early June) could disrupt spawning and result in the loss of eggs and young. Any water quality impacts associated with the stream crossings would be ephemeral as construction in these small streams would be completed quickly. Re-deposition of disturbed sediments could, however, result in alteration of the types of sediment found on the stream bottom, and could degrade the habitat for northern redbelly dace for a longer period of time. Alteration of the bank and removal of aquatic and riparian vegetation would degrade the value of the habitat for northern pearl dace.

Water withdrawals for use in the HDD crossings and hydrostatic tests could entrain fish, larvae, and eggs. However, all planned water sources in the Plan Area are major streams and generally unsuitable as habitat for northern redbelly dace, so Project water use would not be expected to impact this species.

7.2.4.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing would be implemented for all proposed water sources. Project water withdrawals for hydrostatic tests and other uses would be limited to less than 10 percent of the baseline daily flow and returned to the source within 30 days except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. Also:

- All water withdrawals would be conducted consistent with permit requirements and intake hoses would be screened to prevent entrainment of fish.
- Construction timing considerations and best management practices for maintaining water quality and flow would reduce potential impacts on state-protected minnows.

In South Dakota, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Suitable habitat determinations along the route would be made by SDGF&P.
- Conduct presence/absence surveys if suitable habitat is present.
- If survey results are negative for these minnows, no further conservation measures would be required.
- If survey results are positive for these minnows, exclude construction activities during the spawning period (to be provided by SDGF&P) and/or salvage and relocate the minnows, use alternative crossing methods if site conditions warrant.

In Nebraska, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Conduct presence/absence surveys if suitable habitat is present.
- Re-consult to identify additional conservation measures if any of these species are found within any streams surveyed for the proposed Project.

The use of HDD stream crossing technology would avoid impacts to these minnows and their habitats if either are identified. Within the Plan Area, the White River, the Keya Paha River, the Niobrara River, and the Elkhorn River would be crossed with HDDs, however, the northern redbelly dace is generally found in much smaller tributaries In Nebraska. NGPC has recommended HDD methods for any stream crossings occupied by the northern redbelly dace, as open-cut crossings typically cause effects from increased turbidity and suspended sediment (such as avoidance and gill irritation). However, following completion of field surveys, Keystone would continue to coordinate with SDGF&P and NGPC and may use alternative crossing methods if site conditions warrant.

7.2.5 Northern Pearl Dace

7.2.5.1 Direct and Indirect Impacts

The northern pearl dace is not federally listed or state-listed in Nebraska but is state-listed as threatened in South Dakota, where within the Plan Area it is found in tributaries of the White River, Niobrara River, and Keya Paha River. The Project crosses 10 tributaries in these drainages within Tripp County. None of these streams are known to have recent occurrences of northern pearl dace and none of them were among the streams identified for survey by SDFG&P as potentially holding habitat.

Open cut stream crossings in these streams would result in increased suspended sediment loads in the water column and subsequent sediment deposition. Increased sediment loads would increase turbidity, decreasing fish feeding efficiencies and can clog gills and suffocate fish with resulting mortalities, however temporary displacement of fish would be more likely. Construction of open cut stream crossings during the

spawning period (April – early June) could disrupt spawning and result in the loss of eggs and young. Any water quality impacts associated with the stream crossings would be ephemeral as construction in these small streams would be completed quickly. Re-deposition of disturbed sediments could, however, result in alteration of the types of sediment found on the stream bottom and could degrade the habitat for northern pearl dace for a longer period of time. Alteration of the bank and removal of aquatic and riparian vegetation would degrade the value of the habitat for northern pearl dace.

Water withdrawals for use in the HDD crossings and hydrostatic tests could entrain fish, larvae, and eggs. However, all planned water sources in the Plan Area are major streams and generally unsuitable as habitat for northern pearl dace, so Project water use would not be expected to impact this species.

7.2.5.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing would be implemented for all proposed water sources. Project water withdrawals for hydrostatic tests and other uses would be limited to less than 10 percent of the baseline daily flow and returned to the source within 30 days except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. Also:

- All water withdrawals would be conducted consistent with permit requirements, and intake hoses would be screened to prevent entrainment of fish.
- Construction timing considerations and best management practices for maintaining water quality and flow would reduce potential impacts on state-protected minnows.

In South Dakota, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Suitable habitat determinations along the route would be made by SDGF&P.
- Conduct presence/absence surveys if suitable habitat is present.
- If survey results are negative for these minnows, no further conservation measures would be required.
- If survey results are positive for these minnows, exclude construction activities during the spawning period (to be provided by SDGF&P), and/or salvage and relocate the minnows, or use alternative crossing methods if site conditions warrant.

In Nebraska, the following conservation measures have been applied and would apply in unsurveyed waterbody crossings:

- Conduct presence/absence surveys if suitable habitat is present.
- Re-consult to identify additional conservation measures if any of these species are found within any streams surveyed for the proposed Project.

The use of HDD stream crossing technology would avoid impacts to these minnows and their habitats should either be identified. Within the Plan Area, the White River, the Keya Paha River, the Niobrara River, and the Elkhorn River would be crossed with HDDs, however, the northern pearl dace is generally found in much smaller tributaries. In Nebraska, NGPC has recommended HDD methods for any stream crossings occupied by the northern pearl dace, as open-cut crossings typically cause effects from increased turbidity and suspended sediment (such as avoidance and gill irritation). However, following completion of field surveys, Keystone would continue to coordinate with SDGFP and NGPC and may use alternative crossing methods if site conditions warrant.

7.2.6 Sturgeon Chub

7.2.6.1 Direct and Indirect Impacts

The range of the sturgeon chub is very restricted within the Plan Area in Nebraska, being largely limited to the mainstem of the Missouri River. The Project has no footprint in or near the Missouri River, thus impacts from Project construction and operation in Nebraska are extremely unlikely. Within the South Dakota portion of the Plan Area, the sturgeon chub is known to occur in the White River and possibly some of its tributaries. The Project crossing of the White River is planned as an HDD with the entry and exit points of the HDD set back more than 100 feet from the water's edge. Direct impacts to sturgeon chub habitat are therefore unlikely barring an inadvertent release of HDD drilling fluids via frac-out. In the event of a frac-out, drilling fluids would be deposited on the river bottom, changing the structure of the surficial sediments and possibly burying and suffocating benthic fauna. Some of the drilling fluids would likely be suspended in the water column and travel some distance downstream. Any such effects would be limited to a relatively small area. Water quality impacts would last only as long as the HDD process is on-going. Benthic impacts would last longer but would be temporary. Any direct and indirect effects on sturgeon chub would be minor, especially because the sturgeon chub inhabits highly turbid waters with low visibility.

The White River would be a Project water source for both HDD and hydrostatic tests. Water withdrawals can entrain fish, larvae, and eggs, with resulting mortalities, and can lower stream flows with effects on water and habitat quality. However, all Project water withdrawals will be screened to minimize entrainment and will be designed and implemented in compliance with state agency permit requirements. Keystone's plan is to withdraw water at a rate of less than 10 percent of the baseline daily flow in river systems and to return water back to its source within a 30-day period except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. With these measures in place water withdrawals would be expected to have no effect on sturgeon chubs.

7.2.6.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. Protections for aquatic life during water withdrawal for HDD and hydrostatic testing would be implemented for all proposed water sources. Project water withdrawals for hydrostatic tests and other uses would be limited to less than 10 percent of the baseline daily flow and returned to the source within 30 days except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. Additionally:

- All water withdrawals would be conducted consistent with permit requirements, and intake hoses would be screened to prevent entrainment of fish.
- Construction timing considerations and best management practices for maintaining water quality and flow would reduce potential impacts on state-protected minnows.

The use of HDD stream crossing technology would avoid impacts to sturgeon chub. Within the Plan Area, the White River, the Keya Paha River, the Niobrara River, and the Elkhorn River will be directionally drilled. In South Dakota, the sturgeon chub is thought to occur in the White River, so HDDs would avoid any potential effects on sturgeon chub associated with that crossing. In Nebraska, the sturgeon chub is known only from the Missouri River mainstem which is avoided by the current Project route/footprint. Following completion of field surveys, Keystone would continue to coordinate with SDGFP and may use alternative crossing methods if site conditions warrant.

7.2.7 River Otter

7.2.7.1 Direct and Indirect Impacts

The Project crosses northern otter range as indicated by published range maps (Figure 24, NNHP 2013, SDFG&P 2019) at three locations, once along the Elkhorn River in Antelope County, Nebraska, once along

Niobrara River in Boyd and Holt Counties, Nebraska, and another ostensibly along the Keya Paha River in Tripp County, South Dakota and Keya Paha County, Nebraska. However, the northern river otter is a very mobile animal and may occur in other portions of the Plan Area traversed by the Project. River otter have been incidentally observed at the White River and Elkhorn River during surveys for bald eagle winter roosts.

River otters are semi-aquatic and any effects from Project construction or operation on otters or their habitat would likely occur at waterbody crossings. Construction of waterbody crossings could temporarily displace river otters; however, otters have large home ranges and such displacement would likely be only a brief behavioral disturbance unless denning at or very near the crossing location. River otters would be expected to avoid the human activity at construction sites such that the potential for physical injuries is remote. Pre-construction surveys for signs of otter use would be conducted at the crossings of the White River, Niobrara River, and Elkhorn Rivers and construction activities would be restricted from the area within 0.25 mile of any observed natal dens during the denning season (March to September).

Waterbody crossings could temporarily degrade the quality of otter habitat. Otters are most likely to use the larger waterbodies being crossed by the Project, and these waterbodies would be crossed using HDD thereby avoiding impacts to instream habitats barring releases of HDD drilling fluids via frac-out. Use of HDD would also avoid impacts to adjacent wetland and riparian habitats, with setbacks of at least 100 ft from entry and exit points to the shoreline. Drilling fluid releases could occur but the probability of such an occurrence is relatively low. Drilling fluids are generally nontoxic but would have physical impacts on the stream bottom and its benthic community. Any effects on fish and aquatic invertebrates that are otter prey items (e.g. mollusks and crustaceans) could also result in indirect impacts on the otters.

Increased vehicle traffic associated with Project construction could potentially increase northern river otter mortalities from vehicle collisions. Along with accidental trapping, vehicular traffic is thought to be the largest source of otter mortalities.

7.2.7.2 Conservation Measures

Equipment refueling will be restricted to uplands more than 100 feet from streams and wetlands to avoid potential accidental releases from reaching aquatic habitats. Project water withdrawals will be limited to less than 10 percent of the baseline daily flow and returned to the source within 30 days except where hydrotest water is used to test multiple spreads. At the conclusion of hydrotesting, the remaining water will then be returned to the source except for consumptive uses, such as dust control and HDD mud make-up. The following measures have been implemented in the past and would be continued:

- Conduct river otter surveys prior to proposed Project construction along the White River in South Dakota and along the Niobrara River and main stem of the Elkhorn River in Nebraska (if suitable den habitat occurs near river crossings and if construction would occur during the denning period).
- Restrict construction activities within one-quarter mile of any observed active natal dens.
- Use the HDD method to cross all rivers identified as potentially supporting river otters, thereby avoiding impacts to shoreline habitats that could potentially be used by denning river otters.
- Limit the amount of traffic and vehicle usage to the extent practicable.
- Use existing two-track roads instead of developing new access roads.

7.3 Summary of Evaluation Species Impact Avoidance and Minimization Measures

Avoidance and minimization measures implemented for the Evaluation Species are described in detail in Sections 7.1 and 7.2 and summarized in Table 17.

Table 17. Impact Avoidance and Minimization Measures for Evaluation Species

AVOIDANCE OR MINIMIZATION MEASURE	Small White Ladys Slipper	Western Prairie Fringed Orchid	Blacknose Shiner	Finescale Dace	Northern Redbelly Dace	Northern Pearl Dace	Sturgeon Chub	Whooping Crane	Interior Least Tern	Piping Plover	Rufa Red Knot	Northern Long-Eared Bat	River Otter
Maintain 1,000 ft elevation during flyovers								x	x	x	x	x	x
HDD large stream crossings with ≥ 100-foot riparian buffer							x	x	x	x	x	x	x
Erosion and sediment controls		x	x	x	x	x		X					
Mowing November to April (outside nesting period), where feasible									x	x			
Pre-construction surveys	x	x	x	x	x	x	x	x	x	x	x	x	x
Spot spray herbicides; avoid spraying <100 feet of listed plants	x	x											
Selected water sources at large streams			x	x	x	x	x	x	x	x	x	x	x
No construction within 0.25 m of an occupied nest/den site									x	x			x
Withdraw water at <10 % of the baseline daily flow	x	x	x	x	x	x	x	X	x	x	x		
Water intake screened to prevent entrainment or entrapment			x	x	x	x	x	x					
Route adjustment as practicable		x	x	x	x	x			x	x			
Compensation through Habitat Conservation Trust		x											
Transplant individuals outside disturbance in coordination with USFWS			x	x	x	x							
Restore construction impacted wetlands suitable for orchids	x	x											
Reduce ROW width where species is identified if feasible		x								x			
Segregate topsoil to preserve native seed sources	x	x											
Daily monitoring of nest sites									x	x			
Downshield lights during nighttime hours								x	x	x	x	x	
Construction timing & BMPs to maintain water quality & flow			x	x	x	x	x			x	x		
Prohibit tree removal near known hibernacula & maternity roosts during maternity roosting season												x	
Store fuel and hazardous materials > 100 feet from wetlands/streams, follow Project SPCC Plan	x	x	x	x	x	x	x	x	x	x	x	x	x
Implementation of a noxious and invasive weed control program consistent with the CMRP and Con/Rec units	x	x											
Minimize the potential for altered hydrology in suitable habitat	x	x	x	x	x				x	x	x		
Monitor restoration of construction-related impacts to wet meadow habitats identified as suitable habitats	x	x											

AVOIDANCE OR MINIMIZATION MEASURE	Small White Ladys Slipper	Western Prairie Fringed Orchid	Blacknose Shiner	Finescale Dace	Northern Redbelly Dace	Northern Pearl Dace	Sturgeon Chub	Whooping Crane	Interior Least Tern	Piping Plover	Rufa Red Knot	Northern Long-Eared Bat	River Otter
To the extent practicable, construction would occur mostly during daytime hours and would comply with any local noise regulations.									x		x		
Construction equipment would be properly equipped with mufflers to lessen noise impacts.									x		x		x
Use vegetative buffers where practicable								x	x	x	x	x	
Work would cease if whooping crane is observed within 0.5 miles of construction until whooping crane leaves area.								x					

8.0 Power Lines and Power Line Infrastructure

Construction of three electrical transmission lines (115 kV) and one distribution line (69kV) along with construction or expansion of corresponding substations would be required to support Keystone XL pump stations in the Plan Area. Two of the four power lines and one of the substations have a separate Federal nexus and are therefore not evaluated in this HCP. One substation expansion would be constructed in the Permit Area (Figure 28) One of the remaining transmission lines (to PS 22) would be constructed within the Permit Area (Figure 28); the other (to PS-23) would be constructed within the Plan Area but outside the Permit Area (Figure 1).

8.1 Rural Utilities Service

U.S. Department of Agriculture's Rural Utilities Service (RUS) provides infrastructure and infrastructure improvements to rural communities. Transmission lines to PS-20 and PS-21 would be funded through RUS thus these transmission lines would fall under a separate Federal Nexus. Impacts and mitigation for these two transmission lines are therefore not provided in this HCP.

8.2 Western Area Power Administration

Western Area Power Administration (WAPA's) mission is to provide open access to the Federal power transmission system. Any entity requesting interconnection to the federal transmission system submits a request to interconnect. Local power cooperatives have submitted requests to interconnect with the WAPA transmission system. WAPA will rebuild an existing substation for the transmission line to PS-21, which would fall under a separate Federal nexus. Gregory substation impacts and mitigation are therefore not provided in this HCP.

8.3 Basin Electric Power Cooperative

Basin Electric Power Cooperative (Basin Electric) would expand the existing Whitten substation and construct and maintain a SVC at the existing Witten substation in Tripp County, that will supply power to PS-20. An SVC is an electrical device that provides fast-acting reactive power to the transmission system. The Witten Substation would likely need to be expanded to accommodate both the SVC and the new 115-kV transmission line from PS-20. The expansion area totals approximately 7.7 acres. Basin Electric would

be responsible for obtaining the necessary permits, approvals, or authorizations from federal, state, and local governments for any impacts from the substation expansion on ABBs. Potential impacts to evaluation species from the construction and operation of the expanded substation and SVC are addressed in this HCP and the 2019 Supplemental EIS prepared by the DOS and BLM. This HCP may be used to support Basin Electric's application for a Section 10 Permit for ABB.

8.4 Nebraska Public Power District

Nebraska Public Power District (NPPD) would construct the necessary power line and power infrastructure to deliver electrical power to the Project's PS-22 (Figure 28) within Holt County, Nebraska. A switching station would be installed at the southern end of the transmission line, within the new 115-kV transmission line ROW. The switching station footprint has not been finalized but the location is known and it is assumed to total 3.5 acres. NPPD would be responsible for obtaining the necessary permits, approvals, or authorizations from federal, state, and local governments. Potential impacts to evaluation species from the construction and operation of this transmission line and switching station are addressed in this HCP and the Supplemental EIS prepared by the DOS and BLM. This HCP may be used to support NPPD's application for a Section 10 Permit for ABB.

8.5 Elkhorn Rural Public Power District

Elkhorn Rural Public Power District (ERPPD) would construct the necessary substations, transformers, and power lines to deliver electrical power to PS-23 (Figure 1) in Antelope County, Nebraska. The new distribution line serving PS-23 will be located entirely outside the ABB Permit Area (Figure 1). ERPPD will be responsible for obtaining any necessary permits, approvals, or authorizations from federal, state, and local governments. Potential impacts to evaluation species from the construction and operation of the distribution line are addressed in this HCP and the Supplemental EIS prepared by the DOS and BLM.

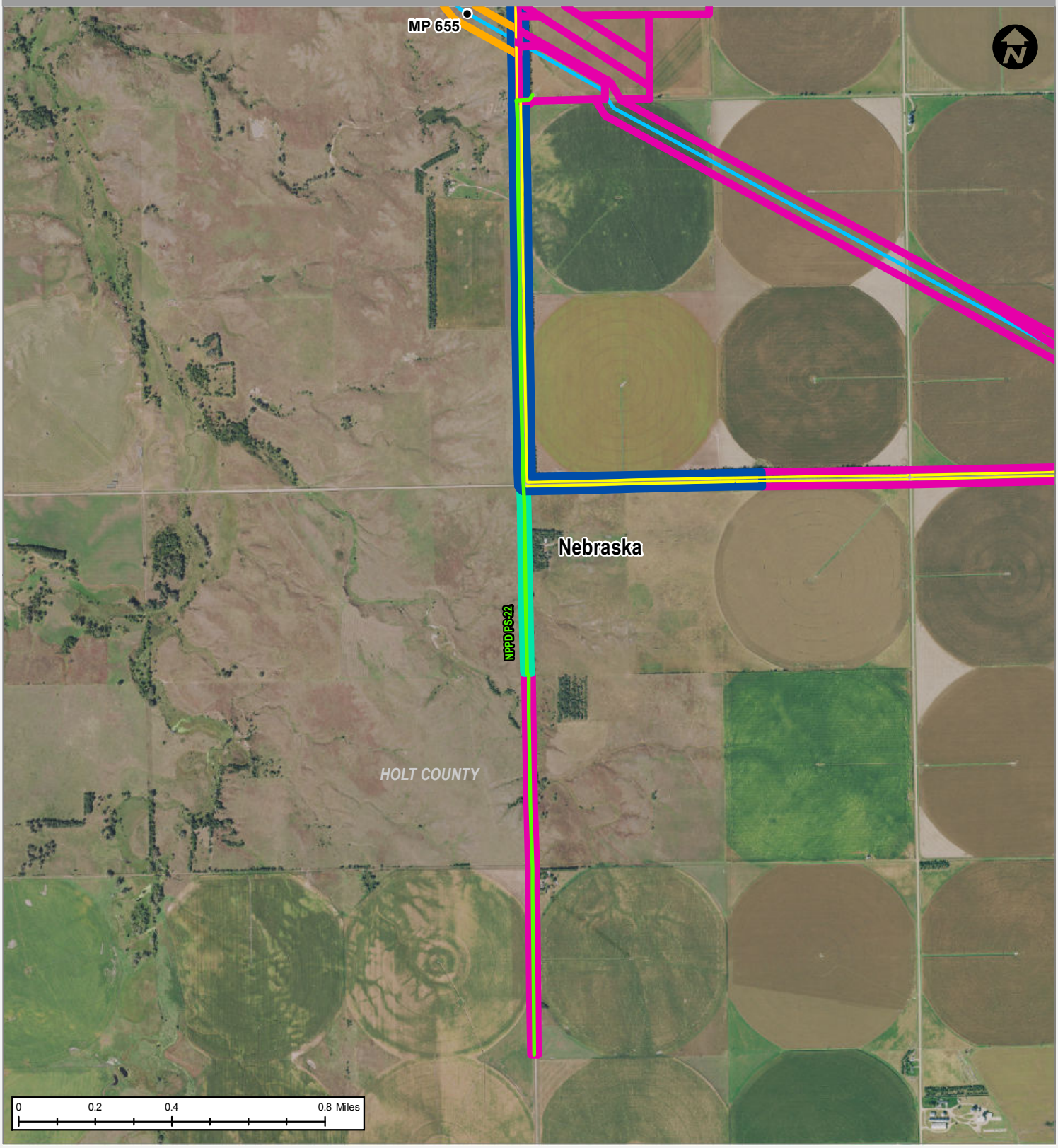
8.6 Power Line Construction and Operation Overview

Power lines and infrastructure covered in this HCP are listed in Table 18.

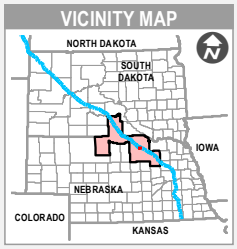
Table 18. Electrical Power Lines and Infrastructure to be Constructed in the Plan Area

Owner/ Operator	Type of Infrastructure	State	Counties	Length (miles)	ROW (acres
Basin Electric	Substation expansion for PS-20	South Dakota	Tripp	N/A	7.77
Subtotal South Dakota		*South Dakota*	*Tripp*	*N/A*	*7.77*
NPPD	Transmission Line to PS-22	Nebraska	Holt	2.55	15.43
NPPD	Switching Station for PS-22	Nebraska	Holt	N/A	3.50
ERPPD	Distribution Line to PS-23	Nebraska	Antelope	3.06	37.03
Subtotal Nebraska		*Nebraska*	*Holt, Antelope*	*5.61*	*55.96*
Total	**All**	**All**	**All**	**5.61**	**63.73**

HCP - FIGURE 28 - PS-22 TRANSMISSION LINE AND SVC



VICINITY MAP



LEGEND

- MILE POST
- KEYSTONE XL ROUTE

DISTRIBUTION LINE WITHIN PLAN AREA

- NPPD
- 488TH AND 879TH ROAD DITCHES

ABB HABITAT

- FAIR
- GOOD
- MARGINAL
- POOR
- COUNTY LINE
- STATE LINE

DRAWING INFORMATION

DRAWN BY:	ES	COUNTY:	HOLT
CHECKED BY:	DH	STATE	NEBRASKA
DATE:	2020-11-16	SHEET:	N/A
DWG #:	0802-03-047-28	SCALE:	1 in = 0.4 miles

REVISIONS

DATE	REVISION	REV.
2020-11-16	ADDED ELECTRIC SUBSTATION AND ROAD DITCHES	10
2020-10-13	UPDATED TARGET MITIGATION LAND AREA	9
2020-04-14	UPDATED PLAN AREA	7

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KEYSTONE XL PROJECT

TC Energy

8.6.1 Power Line Construction

The construction phase for each power line will consist of ROW acquisition, ROW clearing, construction, and site restoration and cleanup. The following is a brief summary of the typical steps associated with distribution line construction. Actual power line construction procedures will be developed by each power provider to address site specific conditions.

- ROW easements: The electric power provider will obtain any necessary easements.
- ROW clearing: Limited clearing will be required along existing roads in native and improved grasslands and croplands. Some trees may require removal to provide adequate clearance between the conductors and underlying vegetation. Trimming to avoid tree removal may be employed in some locations.
- Power line construction: The structures will be delivered on flatbed trucks. A mobile crane or picker truck may be needed to install the poles. Holes will be excavated for structure placement, typically with radial arm diggers. The wooden or steel poles will be directly embedded into the ground and anchors may be required at angles and dead ends. Pulling or reeling areas will be needed for installation of the conductor wires. Conductors (wires) will be attached to the structure using porcelain or fiberglass insulators. No additional access roads are need for construction.
- Restoration: After the power line structures are in place and the conductors are strung between the structures, the disturbed areas will be restored. The soil in the disturbed areas will be reshaped and contoured to its original condition. Reseeding of native vegetation will occur, unless specifically directed otherwise by the landowner. All litter and other remaining materials will be removed from the construction areas and properly disposed.

Construction of transmission lines require single poles spaced 300-400 feet apart whereas distribution lines are often spaced 250-300 feet apart. The typical height ranges from 50 to 65 feet high. All land use and vegetation cover types within the construction ROW (with the exception of the power pole structure locations and operational access roads) will be reclaimed pursuant to each power providers' requirements. However, each power provider will maintain a ROW free of woody vegetation where identified as a "forested" land use and vegetation cover type.

8.6.2 Power Line Operation

Operations would be limited to inspections where inspection frequency will depend on the power provider and would most likely be on foot or vehicle. The vegetation is made up of crops and tall grasses thus vegetation removal would be minimal, only required in areas with woody vegetation. No herbicides would be sprayed along the ROW, although applications to tree stumps may be required for large trees.

8.6.3 Substation Construction

Power lines would originate at existing substations when practicable. For some substations, additional transformers, acreage, and equipment may be required in order to meet the demands of new power lines. The power line to PS-20 would require expansion of the existing substation and the power line to PS-22 would require construction of a new switching station within the power line ROW as well as work in an existing road ROW for access road improvements. Additional substation construction will also occur within the footprint of the proposed pump stations. Construction of the SVC and the switching station will require the land to be cleared, graded, and graveled. These construction impacts are considered permanent impacts.

8.7 Power Line and Power Line Infrastructure Impacts on Covered Species

A discussion of Covered Activities that may result in direct and indirect impacts to ABBs is provided in the following sections.

8.7.1 Direct and Indirect Impacts on ABB from Construction and Operation of Power Lines and Power Line Infrastructure

Impacts to ABB and ABB habitat would be largely limited to permanent impacts at the cross section of the power poles, as installation of the poles is the only associated ground-disturbing activity associated with the construction. Impacts from pole installation would be reduced by implementation of the conservation measures (Section 9.2.9).

The operations and maintenance phase for distribution and transmission lines will have a low likelihood of directly impacting individual ABBs. Because the ROW will be restored following construction, except in woody areas, there is a strong likelihood that ABBs will return to the Project area after the restoration phase is complete.

The expansion of the existing substation at power line PS-20 will permanently eliminate approximately 7.77 acres of marginal ABB habitat. The transmission line for PS-22 will permanently eliminate approximately 0.01 acres of marginal ABB habitat. Using the South Dakota ABB density estimates of 0.0120 ABBs/acre without reproduction and 0.090 ABBs/acre with reproduction, this may result in the take of approximately 0.093 ABBs and 0.7 ABBs respectively.

8.7.2 Power Line and Power Line Infrastructure Construction Impacts to ABB Habitat

Construction of the power lines is unlikely to have direct effects on ABB habitat given the length of the lines within suitable habitat and anticipated minimal disturbance associated with the proposed power line projects. Effects on ABB habitat are expected to be minimal as ROW vegetation management would be limited to areas with woody vegetation. Given that the majority of footprint of the proposed lines are located along existing ROWs and in agricultural or grazed pasture lands, impacts to ABB would be low. Impacts from construction of transmission lines are shown in Table 19. Impacts to ABB and ABB habitat would be largely limited to the cross section of the power poles as installation of the poles is the only associated ground-disturbing activity associated with the construction. Impacts from pole installation would be reduced by implementation of the conservation measures (Section 9.2.9).

Table 19. Transmission Line Impacts on ABB Habitat

Power Line Infrastructure	ABB Habitat Impacts from Power Lines and Power Line Infrastructure [1,2] (acres)			
	Poor	Marginal	Fair	Total
Substation expansion to support transmission line to PS-20	0.00	7.77	0.00	7.77
Transmission Line PS-22	0.00	0.01	0.00	0.01
Switching Station PS-22	3.50	0.00	0.00	3.50
All	3.50	7.78	0.00	11.28

[1] Poles estimated at 1 pole/250 feet for PS-22, 12 square feet per pole, permanent impact.
[2] Impacts will be minimized by mowing in the October ahead of winter construction to make the habitat unsuitable for ABB use prior to construction of the lines in the winter, avoiding take.

8.8 Power Line Impacts on Evaluation Species

The occurrence and potential effects of power line construction and operation on federally listed evaluation species are discussed below. State listed species either do not occur where power lines would be constructed (river otter) or they are not anticipated to be impacted by their construction (dace, shiner, and chub species). Power lines are sited within agricultural land or are within existing ROWs so impacts to small white lady's slipper is not anticipated.

8.8.1 Western Prairie Fringed Orchid

8.8.1.1 Occurrence in the Plan Area

As discussed in section 4.1.1.3, there are no known populations of this species in South Dakota (USFWS 2009) however, there is potential that they could occur where suitable habitat exists (USFWS 2016). This species is now extirpated from a number of counties in Nebraska where it occurred historically (USFWS 2009) and it has experienced a 60 percent decrease in its range (NGPC 2018a). The transmission line for PS-22 and distribution line to PS-23 are within the current State range of the WPFO (Figure 8). Where power lines would be constructed, Antelope County is the only county where suitable habitat was found during Project field surveys in 2013, and 2018. No WPFOs were found during these surveys.

8.8.1.2 Direct and Indirect Effects

Easements for the two power lines and substations would encompass 60 acres in the Plan Area. Impact to and loss of orchid habitat would be much less, largely the cross-sectional area of the structures. Powerlines for PS-22 and PS-23 have not yet been surveyed. ROWs for these lines and required access roads will be surveyed prior to construction and impacts to any WPFO would be avoided by adjusting the placement of structures or rerouting the line where practicable. Herbicides will not be used during construction or operation with the possible exception of application directly to tree stumps. The construction and operation of new electrical power lines could affect WPFO if power line ROWs were to disturb potential habitat for this species or trample/disturb individual WPFO during construction; however, it is highly unlikely that WPFO or suitable habitat is present in any of the ROW corridors. With implementation of the conservation measures, and lack of suitable habitat, it is unlikely that construction and operation of the power lines would result in any impact to this species, therefor no mitigation is offered in this HCP for power line impacts.

8.8.1.3 Conservation Measures

The following conservation measures have or would be implemented:

- Complete presence/absence surveys prior to construction within areas identified with potentially suitable habitat that were not previously surveyed. Submit survey results to the USFWS for review. If surveys cannot be conducted during the blooming period and suitable habitat is present, it would be assumed the species is present.
- For the power line routes to PS-22 and PS-23, substation expansion for PS-22, and required access roads, pre-construction field surveys for the western prairie fringed orchid would be conducted during the appropriate bloom periods in areas of potentially suitable habitat. Areas where western prairie fringed orchid habitat is present would be delineated and marked as “avoidance areas” where placement of structures and construction traffic will not occur.

8.8.2 Whooping Crane

8.8.2.1 Occurrence in Plan Area

The entire Plan Area, including the two power lines, is within the overall range and the 95 percent migratory corridor of the whooping crane; however, there are no recorded telemetry sightings of whooping cranes within 5.0 miles of the power lines (Figures 14-15). PS-22 is entirely within the 75-percent corridor while PS-23 lies outside the 75-percent corridor but within the 95-percent portion of the corridor (Table 20).

Suitable migration stopover habitats include sandy shorelines of lakes and rivers as well as large palustrine wetlands and row crop agricultural fields within Antelope, Holt, Boyd, Keya Paha, and Tripp counties. Whooping cranes pass through South Dakota and Nebraska where they use suitable roosting and foraging habitats in riverine and wetland systems. Wetlands within 1.0 mile of the power lines are classified and enumerated in Table 20. Most for these wetlands are likely not suitable for stopover. Small, isolated wetlands may sometimes be used but larger (>2.5 acres) wetlands and shallow broad rivers seem to be preferred (Armbruster 1990, Watershed Institute, Inc. 2013). USFWS defines potentially suitable migratory stopover habitat as wetlands with areas of shallow water without visual obstructions (i.e., high or dense

vegetation) and submerged sandbars in wide, unobstructed river channels that are isolated from human disturbance. More than 92 percent of the wetlands within 1.0 mile of the distribution lines are less than 2.5 acres in size. A review of sightings data (observations report for 1961-2019) and telemetry data (155,051 locations from 2009 to 2017) revealed no reported use by whooping cranes of the area within 5.0 miles of the power line routes.

Table 20. Power Lines within the Whooping Crane Migration Corridor

Line	Number of NWI Wetlands within 1.0 Mile of Line					Length of Line in Whooping Crane Migration Corridor (miles)		
	Emergent	Woody	Pond	Riverine	Total	50 Percent	75 Percent	95 Percent
PS-22	72	8	52	160	292	2.55	--	--
PS-23	4	--	18	16	38	--	--	3.16

Riverine habitat is commonly used by whooping cranes. Austin and Richert (2005) reported that riverine habitats represent makes up 59% of all observed roost sites. These habitats occurred along and within rivers with average river widths of 179 to 227 meters, with the narrowest river corridor having a width of 36 meters (Austin and Richert 2005, Pearse 2016). Named streams spanned by the distribution lines are listed in Table 21.

Table 21. Power Line Crossings of Named Streams within the Plan Area

Line	Stream Name	Number of Crossings
PS-22	--	0
PS-23	Al Hopkins Creek	1

8.8.2.2 Direct and Indirect Effects on the Whooping Crane

Surface disturbance due to the construction of the transmission line routes is minimal after reclamation. Because many sensitive habitats can be avoided during construction and operation by spanning, relatively few permanent disturbances to terrestrial or aquatic wildlife will occur. During construction, issues will be similar to those addressed in Sections 3.6 and 4.2.6.

Configurations less than one kV or greater than 69 kV typically do not present an electrocution potential, based on conductor placement and orientation (APLIC 1996); however, these overhead lines could incrementally increase the collision hazard for the whooping crane. Bird flight diverters (BFDs) would be installed on all electrical transmission lines at locations designated by USFWS to reduce the likelihood of collision (USFWS 2010). A risk analysis was conducted using the USFWS (2019c) Reasonably Certain Knowledge Method, which used whooping crane mortalities reported by Stehn and Haralson-Strobel (2014). The analysis assumed a whooping crane annual population growth rate of 1.046 percent (Wilson et al. 2016). While limited recent information has become available indicating an additional whooping crane power line strike occurred during migration (Rabbe personal communication), a complete record of all mortality for whooping cranes since the Stehn and Haralson-Strobel (2014) publication is not available. For this reason, updating the calculation is not warranted as it requires data for any documented whooping crane power line collisions and their proportion of the total mortality for whooping cranes in migration. It follows then that the calculation still relies on the best available scientific and commercially available data. Using this modified approach, the risks of whooping crane collisions with the power lines were calculated as follow:

A x B x C x D = Potential Increase in Collisions, where

A = Post-fledging whooping crane mortalities/year from all causes based on 1.04% post fledging mortality (USFWS 2019) and a 2019 population of 506 (USFWS, 2020) increasing annually at 4.6% (Wilson et al., 2016)
B = 0.6 (percent of mortalities ascribed to lines and trauma, Brown and Drewien 1995, Gil de Wier 2006)
C = 0.25 = 25% of power line strikes in US occur in Nebraska (Stehn and Haarlson-Strobel 2014)
D = percent of line miles represented by Project

Results of the risk analysis indicate that construction and operation of the distribution lines is unlikely to result in additional whooping crane mortalities due to collisions with power lines annually or over a 50-year project life (Table 22). These results are underscored by the facts that no sightings have been reported within 5.0 miles of the distribution lines over a 48-year (1961-2019) observation period and nine years (2009-2017) of telemetry tracking data, and the lack of important stopover habitat in the area. Brown et al. (1987) and Shaw et al. (2010) show birds that originate flight more than one mile from a power line are at little to no risk of collision. Whooping cranes do not nest or winter in Nebraska or South Dakota, they only pass through the area in migration. Although whooping cranes may spend several days at a stop over site making short (generally less than 0.6 miles) flights between roosting and foraging areas, generally less than 0.62 mile apart (Howe 1987), migration through the states of Nebraska and South Dakota occurs over a short period of time lasting 2-4 weeks in the spring and 1-2 weeks in the fall (CWS and USFWS 2007).

Table 22. Potential Increase in Whooping Crane/Power Line Collisions

Power Line	County	Length [1] (miles)	Existing Power Lines [2] (miles)	Percent of Existing Power Lines [3]	Additional Collisions [4]		
					Year 1	Year 50	Years 1-50
PS-22	Holt	2.55	90,205	0.0028 %	0.00002	0.00022	0.00449
PS-23	Antelope	3.06	90,205	0.0034 %	0.00003	0.00027	0.00540
Total	--	5.61	90,205	0.0062 %	0.00005	0.00049	0.00989

[1] Length of the proposed power line within the Plan Area.
[2] Miles of existing power lines within the whooping crane migration corridor in Nebraska and South Dakota.
[3] Percent of existing transmission lines and distribution lines that the proposed power lines represent.
[4] Potential whooping crane collisions with the subject power lines based on current miles of lines and current mortalities (see formula above) given a population growth rate of 4.6 percent / year over 50 years for Year 1 (2021), Year 50 (2070) and all years of the ITP.

These overhead lines could incrementally increase the collision hazard for the whooping crane; however, either routing changes or bird flight diverters would be installed on all electrical transmission lines at locations designated by the Service to reduce the likelihood of collision.

8.8.2.3 Conservation Measures

The following conservation measures have or would be implemented:

- Power providers will mark (BFDs) new lines within 1 mile of potentially suitable habitat within the 95-percent migration corridor.
- Power providers will mark (BFDs) new lines near potentially suitable habitat outside the 95-percent migration corridor at the discretion of the local USFWS Ecological Services Field Office, based on the biological needs of the whooping crane.
- Keystone will develop a compliance monitoring plan that requires written confirmation that the power lines have been marked and that the markers are maintained in working condition.
- Power providers will complete daily presence/probable absence surveys in potentially suitable habitat according to the Project's protocol described above if construction occurs during the spring and fall migration periods. Should a whooping crane be sighted within 0.5 mile of a work area, all work will cease until the whooping crane leaves that immediate area. USFWS and NGPC will be contacted immediately and notified of the presence of whooping crane.

8.8.3 Interior Least Tern

8.8.3.1 Occurrence in the Plan Area

As discussed in Section 4.1.1.3 occurrence of interior least terns in the Plan Area is limited to river crossings of the Niobrara and Elkhorn Rivers in Nebraska. Distribution lines would not cross these major rivers or other suitable habitat for interior least terns, therefore impacts to interior least terns by new distribution lines are not further discussed. Conservation measures identified in the Supplemental EIS for other listed bird species would be implemented by power providers and are provided in those corresponding sections above.

8.8.4 Rufa Red Knot

8.8.4.1 Occurrence in the Plan Area

As discussed in Section 4.1.5.3 rufa red knots occur rarely within the Plan Area. They typically make non-stop migratory flights and only stopping where suitable habitat is found. Given that there is very little suitable habitat where distribution lines are being constructed, it is unlikely that rufa red knots would be encountered. If stopovers are required due to adverse weather conditions during migration, potential injury or mortality could occur due to power line collisions; however, red knot stopover habitat proximal to the proposed distribution lines is very scarce. In the unlikely event that migrating red knots encounter a project distribution line, BFDs would be installed to deter collisions with lines. Conservation measures for other listed bird species would be implemented by power providers and are provided in those corresponding sections above.

8.8.5 Northern Long-eared Bat

8.8.5.1 Occurrence of the Northern Long-eared Bat Near the Distribution Lines

As described in Section 4.1.6.3, the entire Plan Area including the distribution lines is within the range of the northern long-eared bat, within the White-Nose Syndrome Zone, however, the syndrome has not been documented in hibernacula within the Plan Area (USFWS 2018b). However, suitable habitat is limited and generally restricted to extant forested riparian corridors along the major rivers or streams. No known maternity roost trees or hibernacula have been documented in the Plan Area.

8.8.5.2 Direct and Indirect Effects on the Northern Long-eared Bat

The primary potential effect of distribution line construction and operation would be the clearing of wooded areas that represent potential roosting habitat; however, such potential for effects is very small as forested areas have been avoided and clearing would occur over very small areas. The potential for impacts would be further reduced by implementation of the conservation measures. Tree removal near known maternity roosts would not occur during the pup season (June 1 through July 31). Known roosts would be protected by a prohibition on cutting or destroying trees within 150-foot radius of known, occupied maternity roost trees during the pup season. No trees would be removed within a 0.25-mile of known northern long-eared bat hibernacula. With these measures in place construction and operation of the distribution lines would be expected to have no direct effects on the bats and negligible effects on available habitat.

9.0 Conservation Program

9.1 Biological Goals and Objectives

As defined by the Service, biological goals should be commensurate with the scope of the proposed action to ensure that they are consistent with conservation actions needed. Biological goals are the broad guiding principles for the operating conservation program and provide the rationale behind the minimization and mitigation strategies. Specific biological objectives are the measurable targets for achieving the biological goals. Two primary goals have been identified and established for the HCP. These goals and their specific biological objectives are discussed below.

Goal 1: Avoid or Minimize Potential Impacts to the ABB during Performance of the Covered Activities

- Objective 1a: During Project construction, ensure permanent loss of ABB habitat does not exceed 232 acres and temporary disturbance of ABB habitat does not exceed 1,027 acres from the Covered Activities.
- Objective 1b: Within four years from commencement of construction, establish vegetation on disturbed areas such that 70 percent of the dominant species on the ROW are the same as those that occur on adjacent off-ROW lands.

Goal 2: Provide Permanent Compensatory Mitigation of ABB Impacts not Avoided by other Conservation Measures

- Objective 2a: Prior to the impacts of Project, Keystone will protect, in perpetuity, a minimum of 1,082.36 acres of ABB habitat in Nebraska and/or South Dakota, based on the mitigation ratios described in Section 9.3.5.2 via a Service-approved conservation easement.

This mitigation approach would satisfy the objectives of this HCP, which is to facilitate the conservation and management of ABB habitat in perpetuity in order to compensate for any Project-related impacts to the species. As described below, measures will be implemented to minimize adverse effects from the Covered Activities which may result in impacts to the ABB.

9.2 ABB Impact Avoidance and Minimization Measures

Keystone has identified several general and ABB-specific measures intended to minimize impacts to the proposed taking of the Covered Species as well as impacts to the Evaluation Species as a result of the Covered Activities.

9.2.1 Mowing ROW

The purpose of mowing construction areas is to ensure that ABBs are not attracted to the active construction site. Mowing occurs when ABBs are active, so depending on the ground disturbance timeframe, the period when these procedures will be implemented is March 15 through October 31, based on NGPC Guidance (NGPC 2019). NGPC recommends mowing construction areas two weeks prior to the commencement of ground disturbing activities between these dates. For winter construction activities (October 31 to March 31) mowing would occur by October 15th.

Mowing and raking away grass clippings allows the ground to dry out. Willemssens (2015) conducted numerous experimental tests and found ABB significantly less likely to bury in construction zones and concluded that mowing as a pre-work conservation measure should reduce the number of ABB present.

In accordance with NGPC Guidance (NGPC 2019), construction areas will be mowed such that the vegetation is as low as possible without causing erosion (< 8 inches). Hand clearing or mechanical mowing will be used to mow uplands. Forested uplands will not be cleared ahead of mainline construction and wetlands/streams will also be avoided. This short vegetation height shall be maintained for the duration of the active construction project during the ABB overall active period (until October 31 or until construction is completed, whichever is earlier). Mowing will be completed every 2 weeks, if necessary, to ensure vegetation is kept less than 8 inches tall until grading commences. Once mowed, clippings will be removed. Possible methods include raking, windrowing, or bailing. Note: if the grass has stopped growing, or grading commences, mowing can stop. All construction, work vehicles and personal vehicles will be staged in mowed areas. If it is not possible to maintain vegetation under 8 inches in height construction will avoid these areas until the vegetation can be mowed less than 8 inches in height. For power line construction, mowing will be done only in construction areas with soil disturbance (pole installation) as recommended by the Service and NGPC.

Reporting:

Once mowing procedures have been initiated, weekly reports would be kept and submitted to USFWS, NGPC, and SDGFP. These reports demonstrate that the ABB conservation measures are being implemented for the project and become part of the project records. Weekly reports are only required during ABB active period (April 1 – October 31) while construction on the project is active. Photos documenting grass heights would be provided and kept as Project records.

9.2.2 Removal of Carrion from ROWs Prior to Disturbance

Removing carrion (the source of ABB food and reproduction) makes the Project area less attractive to ABB. By removing carrion in areas where construction would occur, this ensures that ABB would not be feeding or burying carcasses in an area where they could be impacted by construction equipment.

In accordance with NGPC Guidance (NGPC 2019), the area would be prepared by removing any and all carcasses prior to construction. Carcasses as small as songbirds, snakes, and rodents are ideal food for the ABB; therefore, this removal activity must be thorough. Carcass removal must occur between March 15 until October 31 or until construction is completed, whichever is earlier. Personnel would survey the ROW daily to remove carrion. Carcass removal can be done at any time throughout the day; however, the preferred timing is in the late afternoon, since ABB are active at night. This will ensure that ABB are not drawn to the area by roadkill caused by daytime traffic. Disposal of carcasses should be at least 0.5-miles away from the project site.

For power line construction, carrion removal will be done only in construction areas with soil disturbance (pole installation) and areas with repetitive travel as temporary access roads, as recommended by the Service and NGPC.

Reporting:

Carrion removal reports would be submitted in accordance with the mowing reports. Once carrion removal procedures have been initiated, weekly reports must be kept and submitted to USFWS, NGPC, and SDGFP, as well as the designated Environmental Inspector for filing. These reports demonstrate that the ABB conservation measures are being implemented for the project and become part of the project records. Weekly reports are only required during ABB active period (April 1 – October 31) while construction on the project is active. If number and carrion species can be identified (ex: deer carcass, bull snake, mouse, etc.), include this information in the report.

Photo documentation of carrion removed would be provided and kept as Project records.

9.2.3 Limited Clearing in Temporary Work Areas

To the degree possible, clearing of TWAs will be limited to decrease temporary habitat loss. Estimates of impacts for TWAs presented in this HCP likely represent the maximum area which will be disturbed by the Covered Activities.

9.2.4 Limited Use of Artificial Lighting

During the construction phase, most construction activity will take place in daylight hours. Construction activities taking place at night would require artificial lighting and could thereby have an impact on ABBs by disruption of normal behavior patterns. Construction at night and the use of lights would be limited to specific situations requiring this activity such as critical tie-ins, HDDs, and during certain weather conditions. Where such activities require lighting, the lights will be down shielded. Lighting required for contractor yards and pump stations would also be down shielded, except where required for safety and security, and utilize warm, amber colored lights with a color temperature of 3000K or less and no greater than 70,000 lumens. LEDs that fall within these specifications closely mimic high-pressure sodium vapor bulbs, which have been approved for use in ABB range historically.

9.2.5 Educational Program for Construction Personnel

Keystone will implement an education program for construction personnel engaged in the Project. This will include a presentation focused on identifying the ABB, explaining its life history, its current range, and its habitat requirements. Construction personnel will be instructed to report any sightings of ABBs or brood chambers if encountered. Education cards will be provided to all construction personnel. Signs will be placed at construction entrances identifying the area as potential ABB habitat.

9.2.6 Re-establishment of Vegetation

Immediately following construction (which is scheduled to commence during the dormant season), disturbed areas will be temporarily stabilized by broadcasting cool season species such as annual rye grass or wheat seed. Where necessary, clean, weed-free wheat straw will be used as mulch to protect seed and increase soil moisture. These grasses are annual species that senesce when temperatures warm during summer; they will not become permanently established. During the spring, a mixture of native warm season

grasses will be planted within the ROW. This will include species such as little bluestem, big bluestem, Indiangrass, and switchgrass. Natural recruitment of other native grasses and forbs will also occur. It should be noted that some portions of the ROW, in response to landowner requirements, will be re-vegetated using non-native species such as smooth brome. This type of re-vegetation will likely be restricted to areas that are currently dominated by improved grass pastures and will therefore not lead to a reduction of habitat dominated by native species. In the limited circumstance where landowners request re-vegetation of previously native vegetation to non-native vegetation, Keystone will consider this as a permanent impact and provide appropriate mitigation for those impacts (Section 9.3.2) at that time. Keystone's CMRP provides further details with regard to restoration of ROWs following construction.

9.2.7 Relief of Soil Compaction

Immediately following construction, disturbed areas will be ripped to a depth of 24 inches to relieve soil compaction existing at the site from the use of heavy equipment while conducting the Covered Activities. This effort will improve or enhance ABB habitat by making soils easier for beetles to bury in. Keystone's CMRP provides further details with regard to relief of soil compaction within ROWs following construction.

9.2.8 Erosion Control

Erosion control techniques such as silt fencing, hay bales, water bars, and other efforts will be used to prevent washing away of topsoil, formation of gullies, or other effects which would negatively impact ABB habitat through the action of surface water. Keystone's CMRP provides further details with regard to erosion control following construction.

9.2.9 Power Line Construction during Inactive Season

Construction activities associated with power lines will occur during the American burying beetle inactive time (October 31 to March 31). The NPPD and Rosebud Electric will coordinate with USFWS and NGPC to determine appropriate measures to minimize potential effects if such scheduling cannot be accomplished due to unexpected circumstances, including weather delays. This conservation measure does not apply to Basin Electric's activities.

9.3 ABB Mitigation Approaches

9.3.1 ABB Mitigation Strategy

Keystone agrees to mitigate impacts of the taking of ABB by acquiring and protecting suitable habitat lands in perpetuity prior to start of construction. Keystone retained The Conservation Fund and Wildwood Environmental Credit Company (Wildwood) to work with the Service and Keystone to identify potential ABB conservation lands.

The Conservation Fund is a 501c3 non-profit organization head-quartered in Arlington, Virginia. The Conservation Fund works with agencies at the federal, state, and local level to implement their conservation priorities. In addition, The Conservation Fund's Mitigation Solutions program works with resource management agencies and industry to develop mitigation solutions of high-conservation value to offset impacts to listed species and other resources. Since 1985, The Conservation Fund has protected over 8 million acres of land across the U.S. and over 285,000 acres in 30 states through its Mitigation Solutions program.

A parcel of land in Nebraska with suitable ABB habitat of the requisite size has been identified and a conservation easement is being placed on the property. Keystone has contracted Wildwood Environmental Credit Company, LLC (Wildwood) to develop and manage this ABB permittee-responsible mitigation site, named the E.L Spencer Jr. Conservation Area (ELSJ). A third party (a 501c3 non-profit entity), will hold and manage the permanent endowment fund (funded by Keystone) in perpetuity. The funds will be used for all site management requirements and monitoring required by the USFWS and state agencies. The easement acquisition for the benefit of the ABB will be approved in coordination with the Service offices in South Dakota and Nebraska as well as state wildlife agencies in each state.

Keystone has assumed that all habitats within the documented range of the ABB are suitable except for those rated poor, with ABB having an assumed presence in areas rated marginal to prime. Mitigation ratios applied to these habitats are discussed in Section 9.3.2. Both temporary and permanent impacts will be mitigated in this manner. Mitigation for temporary impacts includes offsets for the time period of restoring the habitat at the impact site. Additional mitigation is also provided to cover the unlikely event of unsuccessful restoration as described in Sections 9.3.4 and 9.3.5.1.

Although the Service has defined impacts of removing occupied ABB habitat for less than five years as a "temporary impact," these impacts cause take of ABBs that may negatively affect the ABB population in the area long-term. Loss of individuals and their potential offspring, even during a 5-year or less time frame, reduces the number of ABBs in the area and may decrease genetic diversity of the population. Because the ABB is an annual species, and the offspring of one year overwinter to become the reproductive adults the following year, ABBs that are removed from the reproductive population will cause a temporary decrease in the overall population. Additionally, temporary impacts may reduce habitat for carrion species and their habitat during the five years of restoration. Finally, even with minimization measures to reduce compaction and erosion of soil, soil productivity may be reduced long-term from construction, from loss of topsoil and the mixing of sub soil used when back filling the pipeline trench and erosion that may occur prior to vegetation restoration. Thus, the Service has recommended that mitigation for temporary impacts be 25% of mitigation for permanent impacts (FWS email 9/26/2019).

9.3.2 Restoration of Temporary Impacts

Keystone is committed to habitat restoration in the Plan Area following construction, as well as to landowners over which the easements are acquired. The combination of the ABB monitoring program (Section 9.4) and the incorporation of additional mitigation for poor reclamation provide assurances that the acres disturbed by the Project would be mitigated appropriately.

Lands administered by the BLM in Native Grasslands of Montana and Wyoming have a six percent failure rate after 5 years (WESTECH, 2017). Because Nebraska has better soil quality and higher precipitation than in Montana and Wyoming, Keystone has offered an additional mitigation of five percent of the impacted acreage that would be added to account for areas of failed restoration after five years. Mitigation acres have been adjusted to include this factor for potential reclamation failure in Section 9.3.5.1. Restoration failure is unlikely due to Keystone’s commitment to re-seed in subsequent years if unsuccessful after the first growing season and requirements in landowner agreements to restore the property after construction. Criteria for successful reclamation are:

- Reclamation will be measured four years after the commencement of construction.
- For reclamation to be deemed successful, native grasslands restored on the right-of-way (ROW) must be comparable to those on adjacent undisturbed lands.
- Eighty percent of the dominant species on the ROW must be the same as those that occur on adjacent off-ROW lands.

9.3.3 ABB Mitigation Ratios

Keystone agrees to provide mitigation lands for temporary and permanent habitat loss due to Keystone XL pipeline construction and operations in areas identified as marginal, fair, good, and prime ABB habitat at the ratios identified in Table 23.

Table 23. Mitigation Ratios for ABB Habitat Impacts

	Mitigation Ratios by Habitat Quality			
Impact Duration	**Prime Habitat**	**Good Habitat**	**Fair Habitat**	**Marginal Habitat**
Temporary Impacts	0.75:1	0.5:1	0.25:1	0.125:1
Permanent Impacts	3:1	2:1	1:1	0.5:1

* Ratios are conserved acres: affected acres (i.e., for each acre of prime habitat temporarily affected, 0.75 acres will be conserved).

No mitigation will be provided for poor habitat as these lands are either already graded, graveled, or actively cultivated. These mitigation ratios are consistent with mitigation ratios used for other projects impacting ABB habitat in Nebraska and South Dakota and exceed the mitigation ratios provided for in the ABB species status assessment (SSA, USFWS 2019b) and for two existing mitigation banks in Oklahoma. The SSA (USFWS 2019b) assesses the availability of protected areas with regards to ABB, and rates the Niobrara River analysis area as poor, with 90,000 acres of protected lands, none of which are specifically managed for ABB. Additionally, these mitigation ratios are also consistent with recovery actions 1.23 and 5.3 in the ABB recovery plan (USFWS 1991).

9.3.4 Mitigation for Potential Restoration Failure

As discussed above, Keystone is committed to habitat restoration in the Plan Area following construction. Assessment of restoration efforts is discussed in Section 9.3.1. Restoration failure is very unlikely (< 5 percent per discussions in Section 9.3.1); however, Keystone is providing additional compensatory mitigation to offset any such future occurrence. This additional mitigation is provided at a rate of 5 percent of the current estimated temporary impacts. Restoration failure that exceeds 5 percent is discussed in Section 10.0.

9.3.5 Mitigation Calculations

9.3.5.1 Mitigation Calculations for Keystone XL

Acres of mitigation lands calculated by applying the ratios in Table 23 to the Keystone XL Project footprint in the Permit Area are provided in Table 24.

Table 24. Mitigation for ABB Habitat Impacts for All Activities Other than Power Lines

Permanent Impacts[1]						
Habitat Rating		**Marginal**	**Fair**	**Good**	**Prime**	**Total**
Ratio		**0.5**	**1**	**2**	**3**	**NA**
South Dakota	Impacts	13.33	26.66	31.90	20.33	**92.22**
South Dakota	Mitigation	6.67	26.66	63.80	60.98	**158.10**
Nebraska	Impacts	14.10	9.24	37.61	71.12	**132.07**
Nebraska	Mitigation	7.05	9.24	75.22	213.35	**304.86**
Both States	Impacts	**27.43**	**35.90**	**69.51**	**91.44**	**224.28**
Both States	Mitigation	**13.71**	**35.90**	**139.02**	**274.33**	**462.97**
Temporary Impacts [2]						
Habitat Rating		**Marginal**	**Fair**	**Good**	**Prime**	**Total**
Ratio		**0.125**	**0.25**	**0.5**	**0.75**	**NA**
South Dakota	Impacts	58.91	119.91	187.08	54.76	**420.66**
South Dakota	Mitigation	7.36	29.98	93.54	41.07	**171.95**
Nebraska	Impacts	58.14	11.04	197.08	339.60	**605.86**
Nebraska	Mitigation	7.27	2.76	98.54	254.70	**363.27**
Both States	Impacts	**117.05**	**130.95**	**384.16**	**394.36**	**1,026.52**
Both States	Mitigation	**14.63**	**32.74**	**192.08**	**295.77**	**535.22**
Potential Restoration Failure [3]						
Habitat Rating		**Marginal**	**Fair**	**Good**	**Prime**	**Total**
Failure Rate		**5%**	**5%**	**5%**	**5%**	**NA**
Ratio		**0.5**	**1**	**2**	**3**	**NA**
South Dakota	Impacts	2.95	6.00	9.35	2.74	**21.03**
South Dakota	Mitigation [4]	1.10	4.50	14.03	6.16	**25.79**
Nebraska	Impacts	2.91	0.55	9.85	16.98	**30.29**
Nebraska	Mitigation [4]	1.09	0.41	14.78	38.20	**54.49**
Both States	Impacts	**5.85**	**6.55**	**19.21**	**19.72**	**51.33**
Both States	Mitigation [4]	**2.19**	**4.91**	**28.81**	**44.36**	**80.28**
Total Mitigation Acreages [4]						
South Dakota	Mitigation	15.13	61.14	171.37	108.21	**355.85**
Nebraska	Mitigation	15.41	12.41	188.54	506.25	**722.62**
Both States	Mitigation	**30.54**	**73.55**	**359.91**	**614.46**	**1,078.47**

[1] Includes pump stations, permanent access roads and the portion of the permanent ROW within 11 feet of the pipeline, which is considered to be heat-impacted.
[2] Includes ATWS, temporary ROW, portions of the permanent ROW outside the heat-affected portion, construction camps, contractor yards, pipe and water storage areas, and predicted maintenance excavations (does not include temporary access roads)
[3] Impact acres are 5% of the total temporary impacts.
[4] Acres already provided as mitigation for the 5% of temporary impact (prior to restoration failure) were removed from the mitigation total.

9.3.5.2 Mitigation Calculation for Power Lines

Mitigation lands to be provided to offset impacts to ABB habitat from construction and operation of the power lines are provided in Table 25. These mitigation requirements are based on the mitigation ratios in Table 23 and the footprint impacts associated with the power lines as provided in Section 8.7 and Table 19.

Table 25. Mitigation Lands for Power Line Impacts to ABB Habitat

Mitigation for ABB Habitat Impacts for Impacts from Power Infrastructure (acres)						
Habitat Rating		**Marginal**	**Fair**	**Good**	**Prime**	**Total**
Mitigation Ratio		**0.5**	**1.0**	**2.0**	**3.0**	**NA**
Substation for PS20 Transmission Line	Impacts [1]	7.77	0.00	0.00	0.00	7.77
	Mitigation	3.89	0.00	0.00	0.00	3.89
PS-22 Transmission Line	Impacts [1,2]	0.01	0.00	0.00	0.00	0.01
	Mitigation	0.00 [3]	0.00	0.00	0.00	0.00
PS22 Switching Station	Impacts [1]	0.00	0.00	0.00	0.00	0.00
	Mitigation	0.00	0.00	0.00	0.00	0.00
All Permanent	Impacts [1]	7.78	0.00	0.00	0.00	7.78
	Mitigation	3.89	0.00	0.00	0.00	3.89

[1] All impacts associated with power lines are considered permanent; there are no temporary impacts that cause take to the ABB.
[2] Impacts are calculated as 12 square feet per pole with a pole spacing of one pole every 250 feet.
[3] Impact for the PS-22 transmission line calculated to 0.003 acres.

9.3.5.3 Mitigation Totals for All Impacts

Calculated mitigation requirements for ABB habitat impacts include 3.89 acres (Table 25) for power infrastructure impacts and 1,078.47 acres (Table 24) for impacts associated with construction and operation of the Project, for a total of 1,082.36 acres.

9.3.6 Mitigation Lands

Keystone has identified a parcel within Cherry County as the Conservation Area (Figure 1) to be known as the EJSJ Conservation Area. The parcel encompasses 1,200 acres and therefore exceeds the required acreages identified in Section 9.3.5. The lands consist of unaltered prairie with a combination of wet meadows, sandhills, and riparian habitat. The current owner owns the lands in title, with no known easements or other pre-existing rights that would affect use of the property. The parcel has no active management or protections that would interfere with the conservation of ABB and would meet Objective 2 of this HCP. ABB presence has been documented on the parcel. The parcel has been managed with cattle grazing and preservation of native prairie and according to records has never been plowed. USFWS has reviewed and tentatively approved the parcel as satisfying Keystone's ABB mitigation obligations for take of ABB. Wildwood will place a conservation easement on the 1,200 acres of mitigation lands to be held by Nebraska Land Trust prior to construction. Wildwood will manage the lands under a USFWS-approved Conservation Plan. Funding for the management activities will come from a permanent stewardship endowment established by Keystone and held by a third party non-profit entity for the ESLJ Conservation Area prior to construction.

9.4 Monitoring Plan

Keystone will retain and fund a third-party contractor to develop and implement an ABB monitoring program to assure that the provisions of Section 10 of the ESA and this HCP are met through habitat reclamation activities. The program will include compliance monitoring during construction and effectiveness monitoring as described below. This monitoring program will be reviewed by the Service. Keystone will fund the monitoring program prior to construction of the proposed Project in the Permit Area as described above ABB habitats in South Dakota and Nebraska. The monitoring program is for construction, restoration, operations, and maintenance. The operations and maintenance phase of the Project will have a lower

likelihood of directly impacting individual ABBs resulting in mortality, injury, or changes in behavioral patterns. If Keystone undertakes any maintenance activity that results in potential impact to ABB (not mowing the ROW, but excavations during the active season), then a report will be filed with the USFWS on the extent of the impacts and whether the impacts fall within the calculated acreage impacts that make up the mitigation for this HCP and if the estimated take falls within the numbers provided in this HCP. If an unanticipated event, such as a significant release of petroleum or hazardous materials or required excavation, were to occur during operations and maintenance that results in disturbance to ABB habitat, Keystone will consult with USFWS and apply the same monitoring procedures as described below.

Monitoring will not replace the environmental quality control plan or the actions that Keystone will put in place but is in addition to those tasks and will serve as a quality control monitor on behalf of the Service. The monitoring program will include, but is not limited to, a combination of site visits and aerial surveillance to provide a reasonable level of confidence that avoidance, minimization, and mitigation measures are being followed during construction of the Project. Monitoring will include, but not be limited to, implementation of conservation measures and reasonable and prudent measures and associated terms and conditions as identified in this HCP, including ensuring that construction impacts match permitted footprint and habitat restoration for the ABB. Monitoring will not include surveys for the ABB that are recommended to be conducted to monitor incidental take expected during the course of Project construction.

The compliance monitoring program will identify the number of acres disturbed by the Project in those portions of the counties described above and the number of acres restored. Effectiveness monitoring will be conducted to evaluate the success of post-construction restoration and monitoring of ongoing management of mitigation lands. Restoration success will be determined by inspection of the defined areas selected by the third-party contractor. Vegetation plots will be established at randomly selected intervals along the ROW within restored ROW previously mapped as ABB habitat. A reference plot will be randomly located at an undisturbed area within the lands immediately adjacent to the disturbance plot with similar vegetation. At each plot a meter tape will be laid out from the selected location as a transect extending 50 feet using a randomly selected azimuth. Species within 1.0 feet of the tape will be identified. Hydrology will be visually assessed. Restoration success will then be determined per success criteria identified in Section 9.3.1.

The third-party contractor will monitor the project for four years commencing on the date construction of the proposed Project commences in the habitat described above in South Dakota and Nebraska. With concurrence of the Service, the monitoring program may be continued for another four years in the event of failure of habitat reclamation or delays in completing construction of the Project and/or reclamation activities. Additionally, monitoring will be done through the life of the permit for any commitments related to operations and maintenance.

The third-party contractor will undertake the following:

1. By October 1 of each year submit an annual monitoring plan for the following fiscal year in a letter to the USFWS Nebraska Field Office, Grand Island and/or USFWS South Dakota Field Office, Pierre (USFWS Field Offices). This plan will include the anticipated work effort and schedule, subject to the variability of weather, construction season, etc.
2. Maintain monitoring logs, photographs, and documents and provide to the USFWS Field Offices.
3. Provide USFWS Field Offices with a summarized monthly report during construction and an annual report in the years after construction. At the end of this Agreement, all original files and documents will be provided to the Service with copies retained by the Service.
4. Contact the Service designated point of contact when listed conservation measures set forth in the HCP are not being met and work with the Service to remedy the situation(s).
5. Be available to the Service for meetings or phone calls concerning the proposed Project, as the agencies deem appropriate.

6. Have designated inspector(s) attend safety training or meet other requirements Keystone may have for inspector(s) to access construction job sites.
7. Recognize that the Service will have final determination of appropriate remedies for any failures by Keystone to comply with the requirements of the Service's ITP.

Monitoring of the mitigation lands would be done by the third-party manager (Wildwood) of the mitigation lands. The USFWS will approve management and monitoring plans as part of their review and approval of the Conservation Plan developed by Wildwood for the ESLJ Conservation Area. Management and monitoring plans will go into effect once lands are placed under the conservation easement.

9.5 "No Surprises" Assurances

In the case of changed or unforeseen circumstances, the Service provides assurances under the "No Surprises" rule (63 FR 8859, codified at 50 CFR 17.22, 17.32) to the permittee that the Service will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level otherwise agreed to in the HCP without the consent of the permittee. Unforeseen circumstances mean changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by the Applicant and the Service at the time of HCP development and Permit issuance, and that result in a substantial and adverse change in the status of the Covered Species. These assurances apply only when the HCP is being properly implemented and only to adequately covered species.

The No Surprises rule also recognizes that the Applicant and the Service can reasonably anticipate that some circumstances affecting a species or geographic area covered by an HCP may change and such change can be planned for (e.g., the listing of new species or a fire or natural catastrophic events). To the extent such changed circumstances are provided for in the HCP, an applicant must implement the appropriate measures in response to the changed circumstances.

10.0 Changed and Unforeseen Circumstances

10.1 Changed Circumstances

It is recognized by the Service and Keystone that many changes in human conditions and attitudes, development pressures, environmental conditions, and scientific understanding of ecological systems, among many other circumstances, could and very likely will occur over a 50-year Permit period. To address this situation, an HCP should contain procedures by which the parties will deal with the identified changes in circumstances affecting a species or geographic area covered by the Permit that can be reasonably anticipated by Keystone and the Service.

10.2 Restoration Failure Above Estimated Rate

As discussed above, Keystone is committed to habitat restoration in the Plan Area following construction. Assessment of restoration efforts is discussed in Section 9.3.3. Because of landowner agreement requirements and the Company's commitment to reclamation of disturbed areas, restoration failure is very unlikely; however, Keystone is providing additional compensatory mitigation to offset any such future occurrence. This additional mitigation is provided at a rate of 5 percent of the current estimated temporary impacts. If more restoration failure occurs on more than 5 percent of temporarily impacted areas, additional mitigation will be provided to offset these areas as the same as those for permanent impacts.

10.3 Construction Timing

The Service recommends mowing and removal of cut vegetation as well as patrolling the construction ROW prior to disturbance to remove carrion to reduce the likelihood take in accordance with measures in Section 9.2. If construction delays result in activity within the ABB range during the active season, Keystone will

mow two weeks prior to ground disturbing activities. If construction occurs over winter months, mowing will occur by October 15th, prior to the inactive period.

10.4 Delisting During Permit Tenure

If the Covered Species is delisted during the tenure of the Permit, Keystone would not seek any mitigation funding refund and operation and maintenance of any established preserves would continue into perpetuity. However, when a species is delisted prohibitions for incidental take no longer exist. Therefore, any further injury or mortality previously in the form of take from operations and maintenance would no longer necessitate permit coverage.

10.5 Listing During Permit Tenure

If the bald eagle is relisted or any other species is newly listed, Keystone will continue to operate the HCP in the manner established in this document. In the event that any species not addressed in this HCP is listed pursuant to the ESA, Keystone will evaluate the degree to which the species has potential to be taken by the Covered Activities and the degree to which the HCP, as it is being implemented, is providing conservation benefits to the species and what additional measures, if any, Keystone could implement through the HCP to provide conservation benefits for the species. Depending on this evaluation, Keystone will decide whether to seek coverage of the species under an amendment to the HCP.

10.6 Emergency Repairs Requiring Habitat Clearing

An emergency situation could arise that requires Keystone to clear Covered Species habitat from its ROW during the active season. The location and aerial extent of any such clearing cannot be known prior to the occurrence of an emergency. The Service will be notified of any such emergency repairs. For those emergency repairs, where time permits, a qualified biologist will inspect the area for carrion and remove it. Other methods, as recommended by the Service, to reduce direct take will also be implemented. For emergencies that demand the immediate removal of Covered Species habitat, Keystone will submit a report to the Service regarding the clearing of habitat within 48 hours of performance of the activity. The report will identify, for Service concurrence, the number of acres of habitat that were cleared directly and the number of acres of habitat expected to be indirectly impacted by the clearing activity. The quantification would follow the methods used by the Service and presented in Section 5 of this plan.

The only types of emergencies considered herein for which the clearing of Covered Species habitat by Keystone that would be considered a Changed Circumstance are those that create immediate risk to the safety and reliability of the pipeline or to the safety of humans and their property.

It is possible that a maintenance vehicle travelling the ROW could ignite a wildfire through contact between the catalytic converter or other hot metal parts and underlying grass. This would have a greater likelihood of occurrence during prolonged drought conditions. Such a wildfire could temporarily destroy habitat outside the Permit Area. Keystone is not seeking to cover such habitat fire damage under its Permit. Keystone will to the extent allowed by its control of land damaged by fire, allow habitat for the ABB that is damaged by fire to re-generate in burned areas. It is assumed that these fires, if they occur, would occur randomly and infrequently. Such a pattern would be similar to natural fire regimes (pre-European colonization) and would therefore not likely lead to permanent habitat degradation. Keystone would report to the Service any such fires generated by performance of the Covered Activities.

Addressing any changes in circumstance that might occur on lands preserved in response to the conservation measures provided by Keystone will be the responsibility of bank operators or the third-party conservation entity entrusted with purchase and management of lands funded by Keystone. It is expected that changed circumstances in the Conservation Area will be addressed through conservation bank instruments or management plans for non-bank areas managed by a third-party conservation entity.

10.7 Natural and Anthropogenic Disasters

Natural and anthropogenic disasters have potential to alter the status of listed species. Consequently, this could alter the relative importance of the incidental take of individuals. Such disasters could result in loss of habitat or in decreased suitability of available habitat.

10.7.1 Wildfire

In the event of a wildfire occurring after habitat restoration has met the necessary success criteria, Keystone will monitor area and allow vegetation to naturally regenerate. In the event of a wildfire occurring before restoration efforts have met the necessary success criteria, Keystone will continue efforts under the CMRP (Appendix C) to successfully restore vegetation within 4 years of the impact. If the wildfire event occurs after habitat restoration, and Keystone is found at-fault, vegetation restoration efforts would occur in accordance with the CMRP, and additional mitigation for the number of years it takes to restore the area affected by the fire would be acquired.

10.7.2 Severe Storms and Flooding

Severe thunderstorms that produce flooding are common in Nebraska and South Dakota during the spring and early summer and are not expected to largely influence ABB populations; however, they can cause erosion and sediment runoff from areas undergoing restoration efforts. In the event of severe storms and flooding occurring before restoration success criteria have been met, Keystone will continue restoration efforts under the CMRP (Appendix C). Restoration areas that suffer damaging erosion as an effect of severe storms and flooding will be treated with erosion control measures as described in the CMRP (Appendix C) to successfully restore vegetation within 4 years of the initial impact. If the event of severe storms and flooding occur after restoration Keystone would monitor but not revegetate for a natural occurring event.

Heavy flooding can occur as a result of spring snow melt or heavy precipitation during storm events. Flooding can cause localized crashes in ABB populations in the inundated areas. Permanent, long-term effects are not expected due to the geographical nature of these disasters being associated with floodplains. Individual ABBs outside the flooded areas can re-populate the floodplain after flood waters recede.

10.7.3 Drought

One area of concern is the effect of drought during restoration efforts following construction. Prolonged drought can lead to localized decreases in ABB populations where soil moisture declines. Prolonged drought can also slow the establishment of vegetation following restoration efforts. In the event that drought decreases the success rate of restoration efforts, Keystone will continue those efforts under the CMRP (Appendix C) to successfully restore vegetation within 4 years of the initial impact. If drought event occurs after successful restoration of vegetation Keystone would monitor area but not revegetate.

10.7.4 Response to Spills and Releases

If an oil spill occurs as a result of a pipeline rupture or breakage, clean-up efforts will be designed to avoid or minimize additional take associated with these activities. If an unanticipated event, such as a release of petroleum, were to occur during operations, and the cleanup activities result in disturbance to ABB habitat, Keystone would consult with the Service and apply the same monitoring procedures as described in Section 9 and additional mitigation will be calculated based on the extent of soil disturbance outside the permanent impact area. For impacts occurring within areas previously impacted by the project, but fully restored to ABB habitat, Keystone would provide additional mitigation and restoration.

In case of an inadvertent spill during construction, Keystone has prepared a project-specific SPCC Plan. In case of an inadvertent spill during operations, Keystone has prepared a project-specific ERP (Appendix B) Additional information regarding spill prevention and containment can be found in Section 3.0 of the CMRP. Any injury to natural resources, including the ABB, associated with a release of oil or hazardous substances or the response to a release of oil or hazardous substances is not covered under the HCP and may constitute a violation of Section 9 of the ESA. Such injury(s) would be addressed under the Natural

Resource Damage provisions in the CWA (33 USC §§ 1251, et seq.), Oil Pollution Act (33 USC §§ 2701, et seq.), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 USC §§ 9601, et seq.), National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300), and/or other appropriate laws and regulations.

10.8 Unforeseen Circumstances

Unforeseen circumstances mean changes in circumstances affecting a species or geographic area covered by an HCP that could not reasonably have been anticipated by Keystone and the Service at the time of HCP development and Permit issuance and that result in a substantial and adverse change in the status of the Covered Species. Changes in circumstances not provided for in this document are considered unforeseen circumstances for purposes of this HCP. In the event that unforeseen circumstances occur during the life of the ITP and the Service concludes that ABB are adversely affected as a result, the USFWS may require additional measures of Keystone where the HCP is being properly implemented only if such measures are limited to modifications of the operating HCP program for ABB and maintain the original terms of the HCP to the maximum extent possible.

If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in this HCP, the Service will not require any conservation or mitigation measures in addition to those provided for in the HCP without consent of Keystone, provided the HCP is being properly implemented.

10.8.1 Effects of Unforeseen Circumstances on Permit

Except as provided above, notwithstanding the occurrence of unforeseen circumstances, as long as Keystone continues to properly implement the provisions of the HCP and any additional measures required by the Service in accordance with Section 12 hereof, the Permit will remain in full force and effect.

10.8.2 Notice of Unforeseen Circumstances

The Service will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available. The Service shall notify Keystone in writing of any unforeseen circumstances the Service believes to exist.

11.0 Funding Assurances

Keystone agrees to mitigate impacts of the taking of ABB by protecting suitable habitat lands (mitigation lands) in perpetuity. Keystone has contracted with Wildwood, who working with the USFWS has developed a Conservation Plan for the easement. Wildwood is also working to secure a conservation easement on the ESLJ Conservation Area. Once the USFWS formally approves the conservation plan, Keystone will place the funds necessary for the implementation of the entire conservation plan as well as pay for the easement. The funds for management of the easement in perpetuity will be held by the a non-profit entity in perpetuity.

11.1 Implementation Costs

Keystone has also provided funding assurances (See Appendix E) to ensure that the necessary financial resources are available to implement the HCP. It is estimated that land acquisition or a conservation will cost between $2 and $3 million, with an estimated cost of Wildwood's management falling between $650,000 and $1.2 million, over the 50-year permit duration, depending on Nebraska Land Trust costs and final USFWS management requirements. Monitoring of lands would be approximately $500,000 ($10,000 per year over 50 years). To provide assurance with respect to this commitment, Keystone will fund a non-wasting endowment with an independent trustee that will be used by Wildwood to implement the HCP. The non-wasting endowment commitment provided in Appendix E aligns with the conservation easement option currently in negotiations.

As further explained below, Keystone is financially capable of ensuring that all Implementation Costs will be funded through the Project's operating budget and Keystone's access to capital. It is not anticipated that Keystone's operating budget for the Project and available capital are insufficient to cover the Implementation Costs, but if necessary, funding will be assured through corporate credit facilities.

11.2 Operating Budget

Prior to issuance of an ITP, Keystone has estimated the Implementation Costs and will use funds within the Project's operating budget to pay for the Implementation Costs. Keystone's parent company, TC Energy Corporation ("TC Energy"), for the year ended December 31, 2019, reported net income attributable to common shares of $4 billion and net cash provided by operations of $7.1 billion. TC Energy holds assets valued at over $100 billion. Additional information about TC Energy's financial position is available on SEDAR at www.sedar.com, with the U.S. Securities and Exchange Commission on EDGAR at www.sec.gov/info/edgar.shtml and on the TC Energy website at www.tcenergy.com. Keystone and TC Energy are ready, willing, and able to fund the Implementation Costs.

11.3 Corporate Credit Facility

TC Energy has the capacity to fund the Project through internally generated cash flow, access to capital markets (e.g., through the sale of stock or the issuance of bonds), and the ability to borrow funds through committed credit facilities that currently total more than $4 billion. Should Keystone's cash from operations somehow become insufficient to fund the Implementation Costs, TC Energy expects to maintain access to credit facilities sufficient to assure funding of the Implementation Costs.

12.0 Amendment Procedures

It is necessary to establish a procedure whereby the Permit can be amended. However, it is important that the cumulative effect of any amendments will not jeopardize any endangered or threatened species or other rare species. Amendments must be evaluated based on their effect on the habitat as a whole. The Service must be consulted on all proposed amendments to operational plans for the Project that may affect any federally listed species. The types of proposed amendments and the applicable amendment procedures are described below.

12.1 Minor Amendments

Minor amendments are changes to the HCP whose effects on Covered Species, the conservation strategy, and Keystone's ability to achieve the biological goals and objectives of the HCP are either beneficial or not significantly different than those described in this HCP. Such amendments also will not increase or change impacts to species, their habitats, and the environment beyond those analyzed in the HCP, EIS, and the Biological Opinion or increase the levels of take beyond that authorized by the ITP. Minor amendments may require an amendment to the ITP. A proposed minor amendment must be approved in writing by the USFWS and Keystone before it may be implemented. A proposed minor amendment will become effective on the date of the joint written approval. If a minor amendment requires amending the ITP, the minor amendment would become effective on the date of approval of the amended ITP.

Keystone or the USFWS may propose minor amendments by providing written notice to the other party. The party responding to the proposed minor amendment shall respond within 30 days of receiving notices of such a proposed modification, unless the other party agrees to an extension of that period. Such notice shall satisfy the provisions of 50 CFR Part 13.23 as well as include a description of the proposed minor amendment; the reasons for the proposed amendment; an analysis of the environmental effects, if any, from the proposed amendment, including the effects on Covered Species and an assessment of the amount of take of the species; an explanation of the reason(s) the effects of the proposed amendment conform to and are not different from those described in this HCP; and any other information required by law.

When Keystone proposes a minor amendment to the HCP, the USFWS may approve or disapprove such amendment or recommend that the amendment be processed as a major amendment as provided below. The USFWS will provide Keystone with a written explanation for its decision. When the USFWS proposes a minor amendment to the HCP, Keystone may agree to adopt such amendment or choose not to adopt the amendment. Keystone will provide the USFWS with a written explanation for its decision. The USFWS retains its authority to amend the ITP, however, consistent with 50 CFR Part 13.2.

12.2 All Other Amendments

Other amendments may be considered major amendments to the Section 10(a)(1)(B) Permit, which would require additional steps be taken under both NEPA and the ESA.

A major amendment is any proposed change or modification that does not satisfy the criteria for a minor amendment. Major amendments to the HCP and ITP are required if Keystone desires, among other things, to modify the Covered Activities described in the HCP such that they may affect the impact analysis or conservation strategy of the HCP, affect other environmental resources or other aspects of the human environment in a manner not already analyzed, or result in a change for which public review is required. Major amendments must undergo the same formal review process as the original HCP and ITP, including appropriate NEPA analysis, a Federal Register notice, and an intra-Service Section 7 consultation. For example, a major amendment would be required if the documented level of take exceeds that covered by the ITP. A major amendment may also be required if take of another ESA-listed species not adequately covered by the ITP becomes likely.

The HCP and ITP may be formally amended upon written notification to USFWS with the supporting information similar to that provided with the original ITP application. The specific document requirements for the application may vary, however, based on the substance of the amendment. For instance, if the amendment involves an action that was not addressed in the original HCP or NEPA analysis, the documents may need to be revised or new versions prepared addressing the proposed amendment. If circumstances necessitating the amendment were adequately addressed in the original documents, an amendment of the ITP might be all that would be required. If possible, the need for a major amendment should be determined at least one year before ITP expiration to allow for development of the amendment application and subsequent processing prior to expiration of the original ITP. A major amendment may require additional or modified minimization and/or mitigation measures, and/or additional or modified monitoring protocols.

12.3 Permit Renewal

The expected life of the Keystone XL Pipeline is 50 years. Accordingly, this HCP has been written in anticipation of issuance of an ITP with a 50-year duration. Keystone may seek a permit renewal for continued operations and maintenance of the Keystone Project if it exceeds its expected 50-year life span.

A Section 10(a)(1)(B) permit may be renewed without the issuance of a new permit, provided that the USFWS has indicated that the permit is renewable and that biological circumstances and other pertinent factors affecting Covered Species are not significantly different than those described in the original HCP.

To renew the permit, Keystone shall submit to the USFWS, in writing:

- A request to renew the permit, referencing the original permit number.
- Certification that all statements and information provided in the original HCP and permit
- application, together with any approved HCP amendments, are still true and correct; or, if such
- information is no longer current or correct, a list of the corrected information.
- A description of any take that has occurred under the existing permit.
- A description of any portions of the project still to be completed, if applicable, or what activities under the original permit the renewal is intended to cover.

If the USFWS concurs with the information provided in the request, it shall renew the ITP consistent with renewal procedures required by Federal regulation (50 CFR § 13.22). The provisions of 50 CFR § 13.22 govern how the existing ITP can remain in effect during the processing of a new permit or permit extension. However, Keystone may not take Covered Species beyond the quantity authorized by the original ITP, nor may Keystone change the scope of the HCP during this time. If Keystone fails to file a renewal request within 30 days prior to ITP expiration, the ITP shall become invalid upon expiration. Keystone must have complied with all annual reporting requirements to qualify for a permit renewal.

13.0 Such Other Measures That the Service May Require

If a dead, injured, or sick ABB, bald eagle, or any other endangered or threatened species is discovered, Keystone is required to contact the Service's Law Enforcement Office in Lakewood, Colorado, for care and disposition instructions. Extreme care will be taken when handling sick or injured individuals to ensure effective and proper treatment. Care will also be taken when handling dead specimens to preserve biological materials in the best possible state for analysis for cause of death. In conjunction with the care of sick or injured endangered or threatened species or preservation of biological materials from a dead specimen, Keystone and its contractor/subcontractor have the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

If, during the tenure of this Permit, the Covered Activities are altered such that there may be an increase in the anticipated take of the Covered Species, Keystone is required to contact the Service and obtain authorization and/or amendment of the Permit before commencing any construction or other activities that might result in take beyond that described in the HCP.

The authorization granted by the Permit will be subject to full and complete compliance with, and implementation of, the HCP and all specific conditions contained in the Permit. The Permit terms and conditions shall supersede and take precedence over any inconsistent provisions in the HCP or other Permit documents.

Acceptance of the Permit serves as evidence that Keystone understands and agrees to abide by the terms of the Permit and all applicable Sections of Title 50 Code of Federal Regulations Parts 13 and 17 pertinent to issued permits.

14.0 Conclusion

Keystone looks forward to working with the Service throughout the approval and long-term implementation of the HCP for the Project. Keystone is committed to minimizing and mitigating the impacts of the taking to the Covered Species to the maximum extent practicable and to avoid and minimize impacts to Evaluation Species as evaluated and determined through the HCP process.

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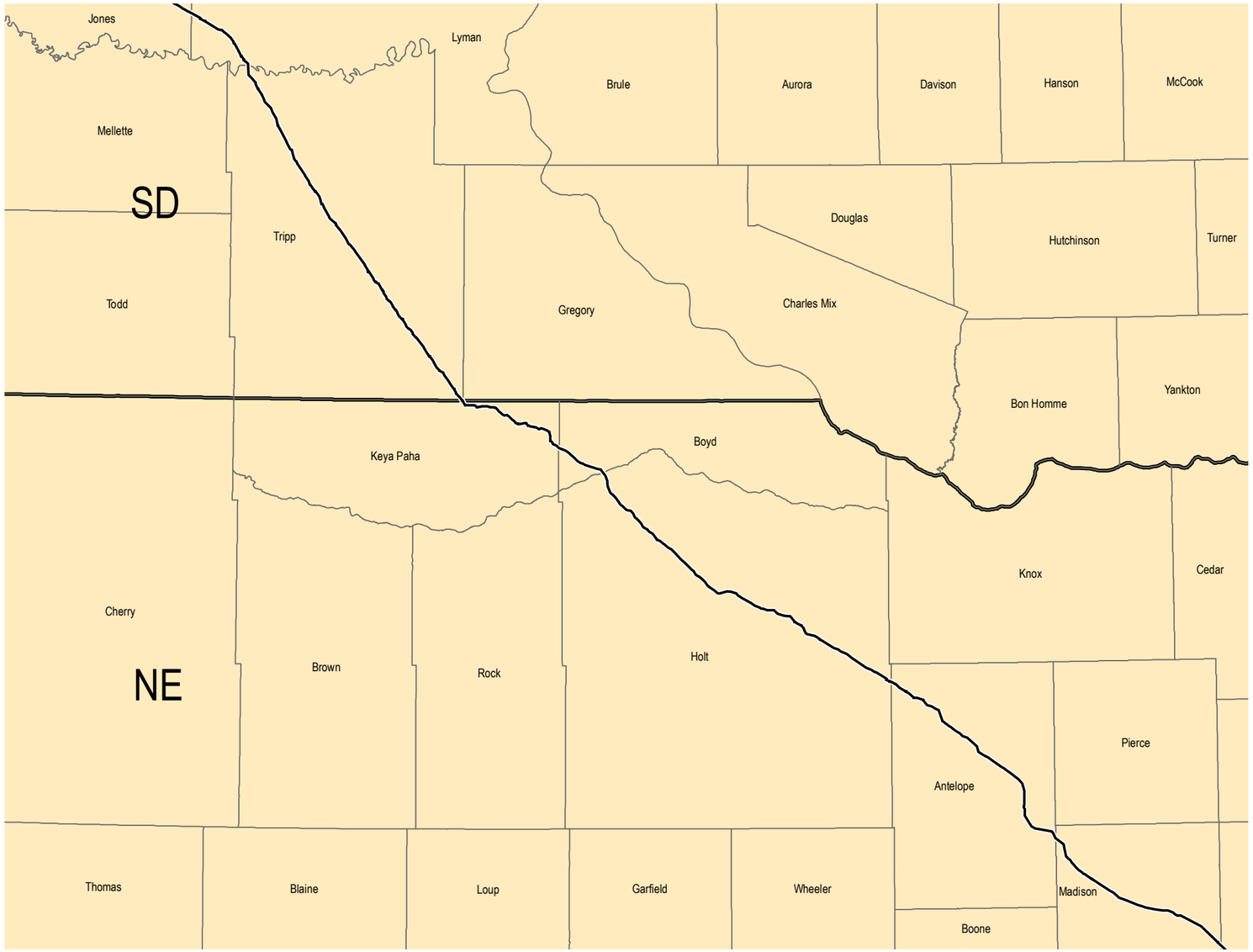
Appendix A –
ABB Habitat Within Permit Area Map Book

Keystone XL Project

ABB Habitat Rating Map Book
Access Roads



KEYSTONE XL PROJECT
ABB HABITAT RATING MAP BOOK
ACCESS ROADS

COUNTY:	-	**DRAWN BY:**	ES
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ABB HABITAT RATING - ACCESS ROAD INDEX

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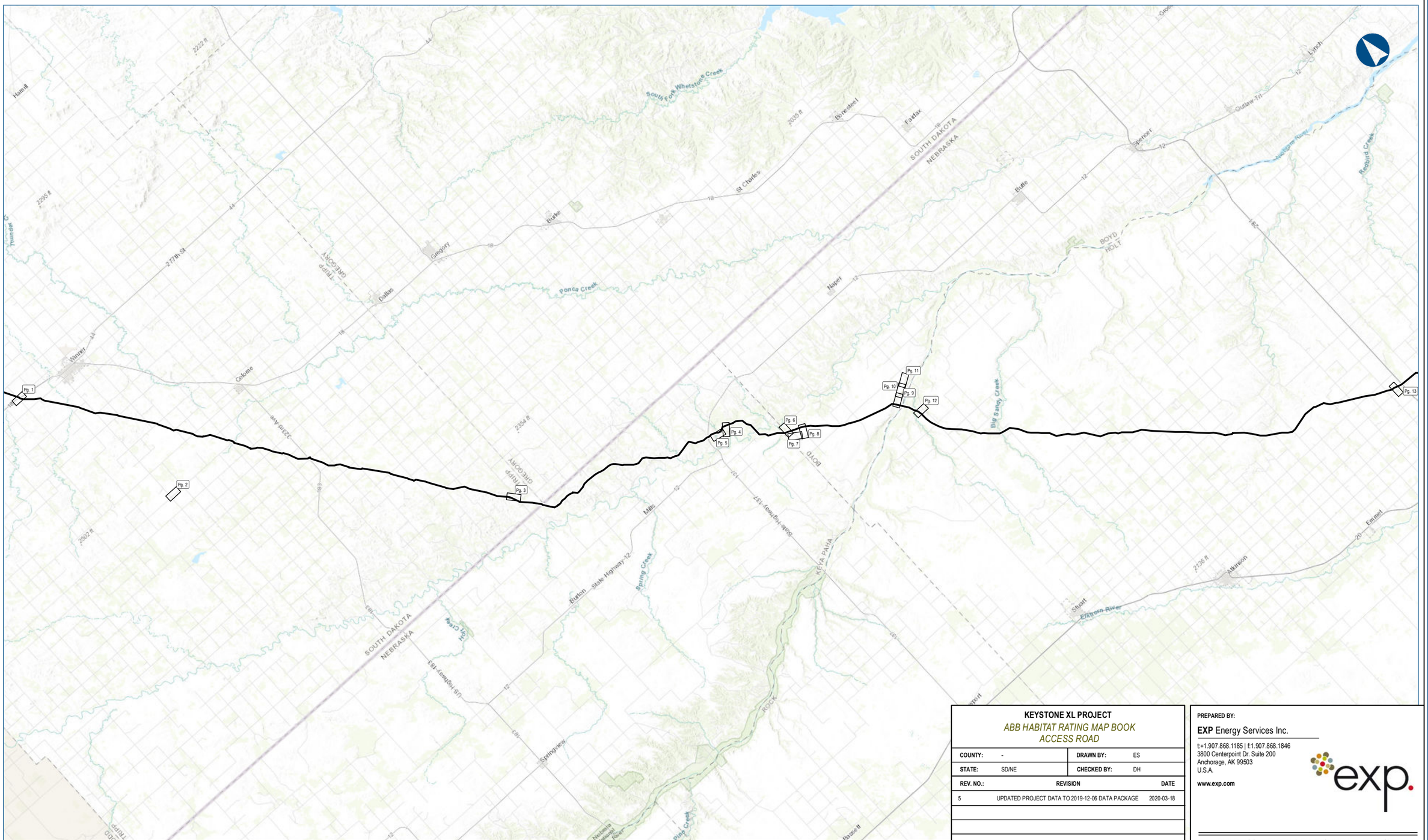

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ABB HABITAT RATING MAP BOOK
ACCESS ROAD

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Keystone XL Project

KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy

277th St

CAR-199

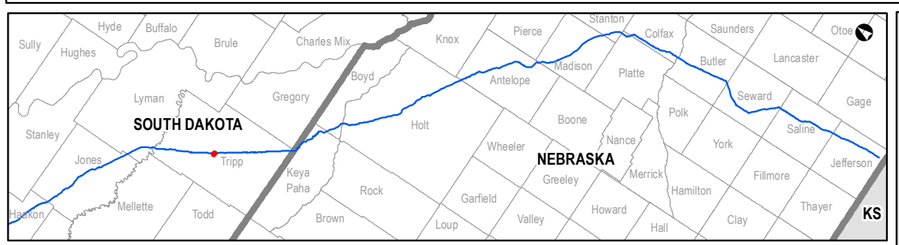
US Hwy 183

Tripp County

312th Ave

0 150 300 600 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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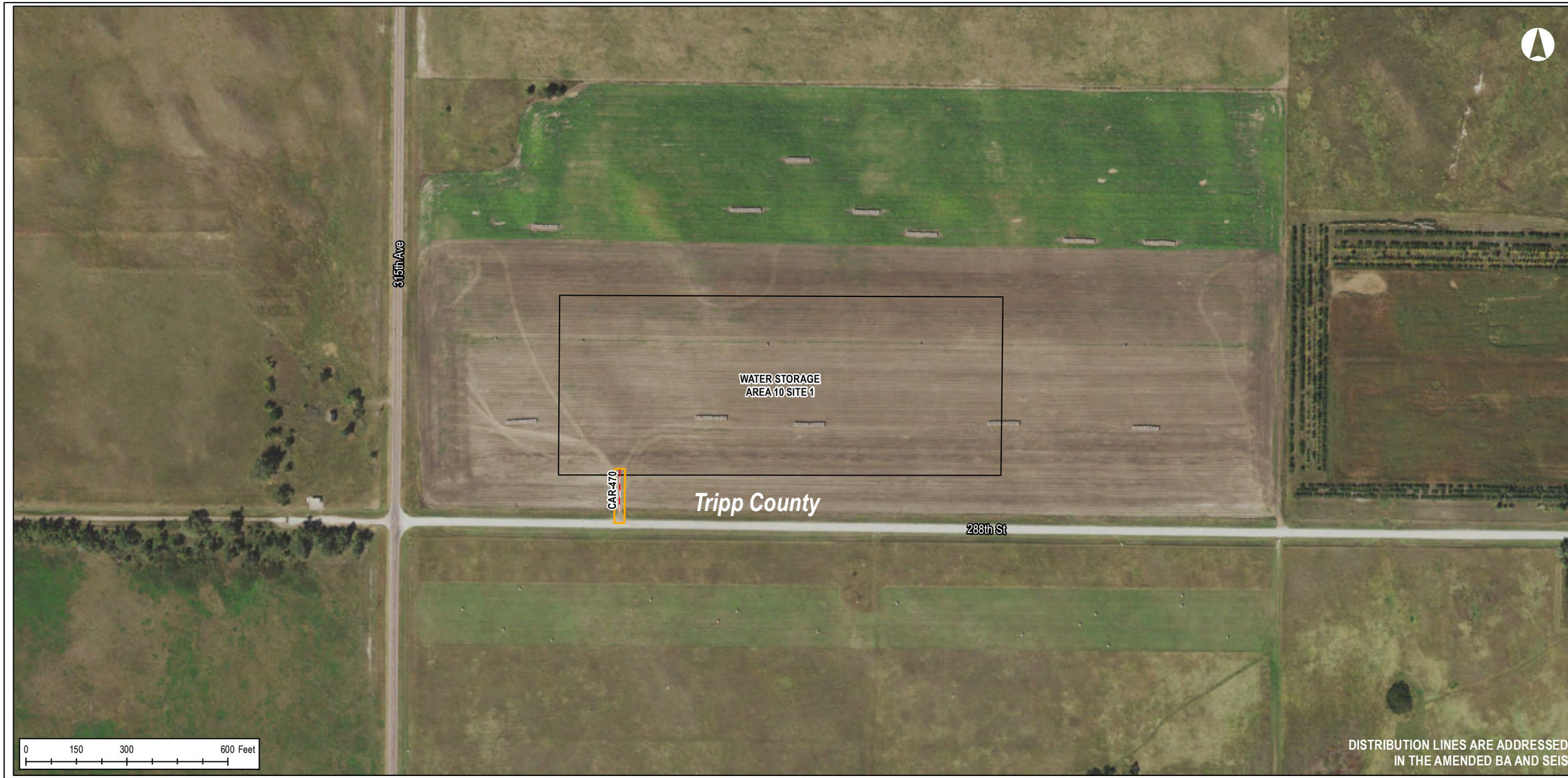
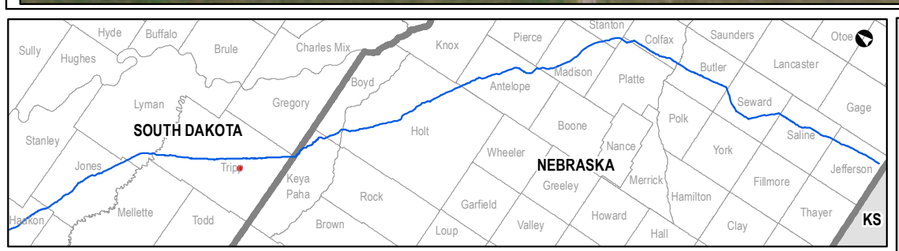
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

TEMPORARY ACCESS ROAD

ABB HABITAT RATING

GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

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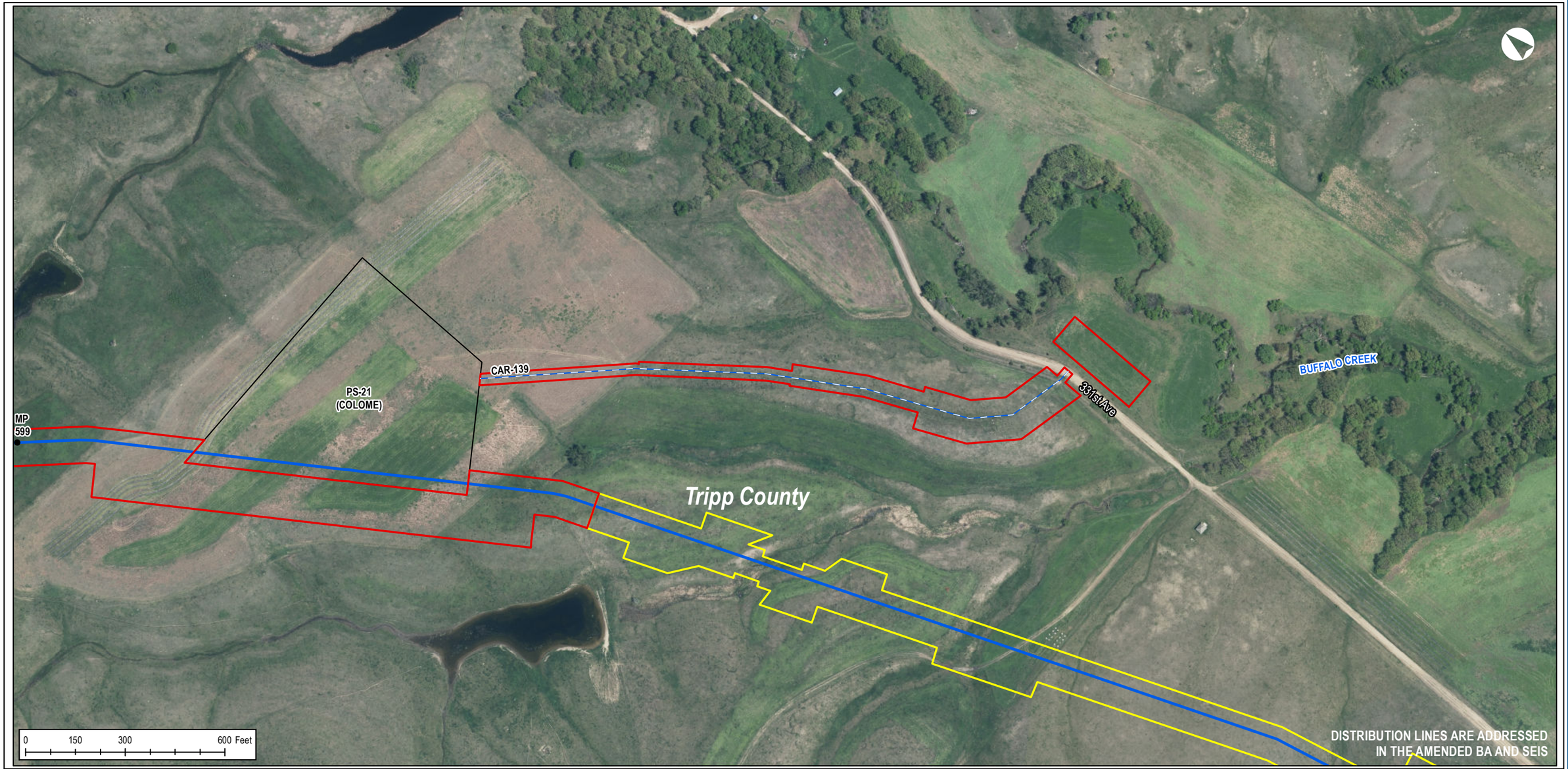

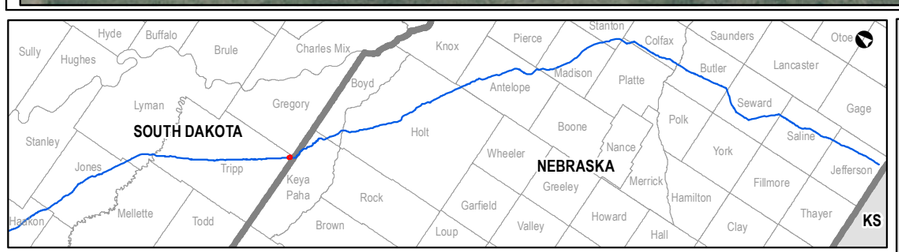

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- PERMANENT ACCESS ROAD

ABB HABITAT RATING

- PRIME
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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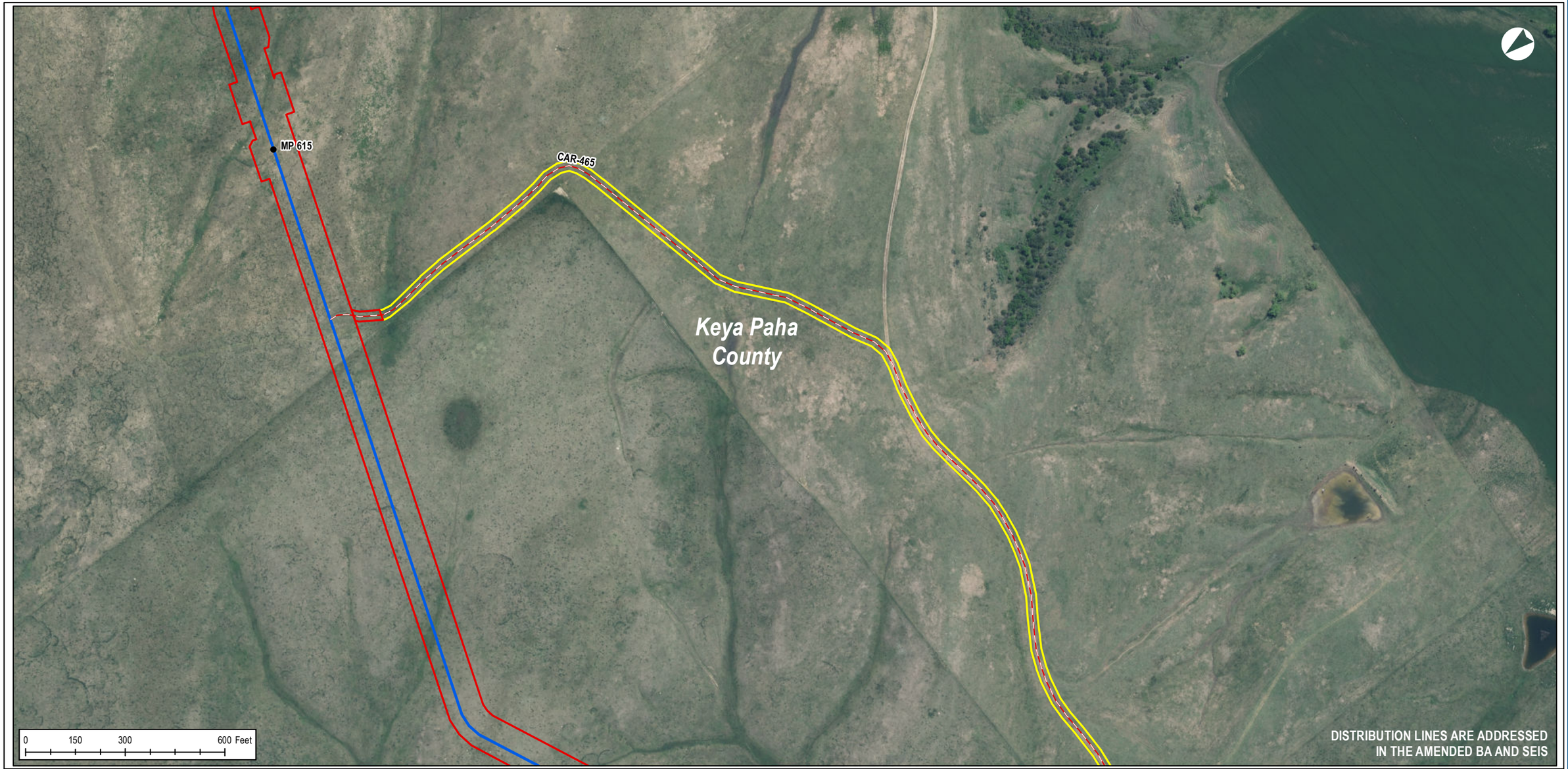
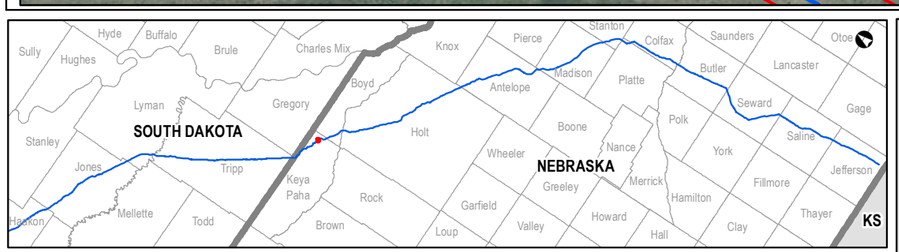
KEYSTONE XL PROJECT - VICINITY MAP

KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- PRIME
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
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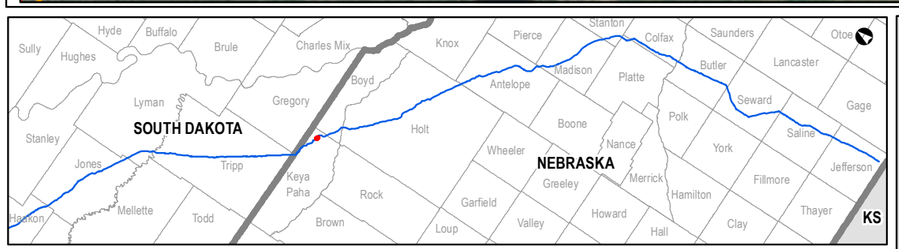
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- PRIME
- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
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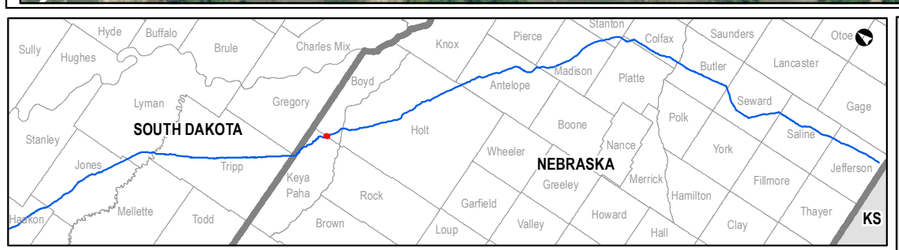
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- PRIME
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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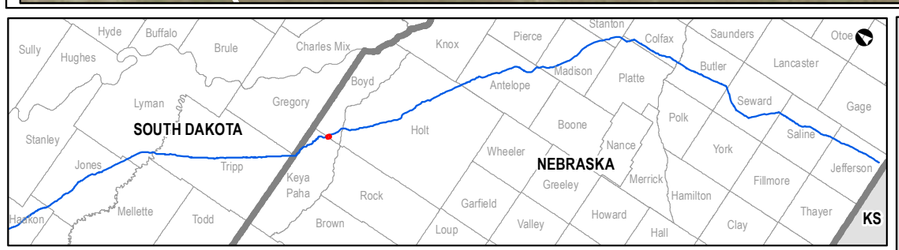
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

TEMPORARY ACCESS ROAD

ABB HABITAT RATING

MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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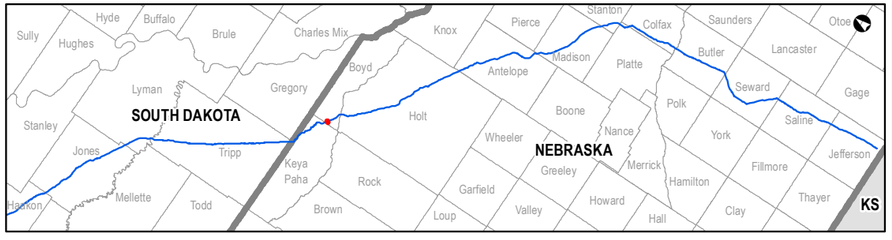
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- GOOD
- FAIR
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
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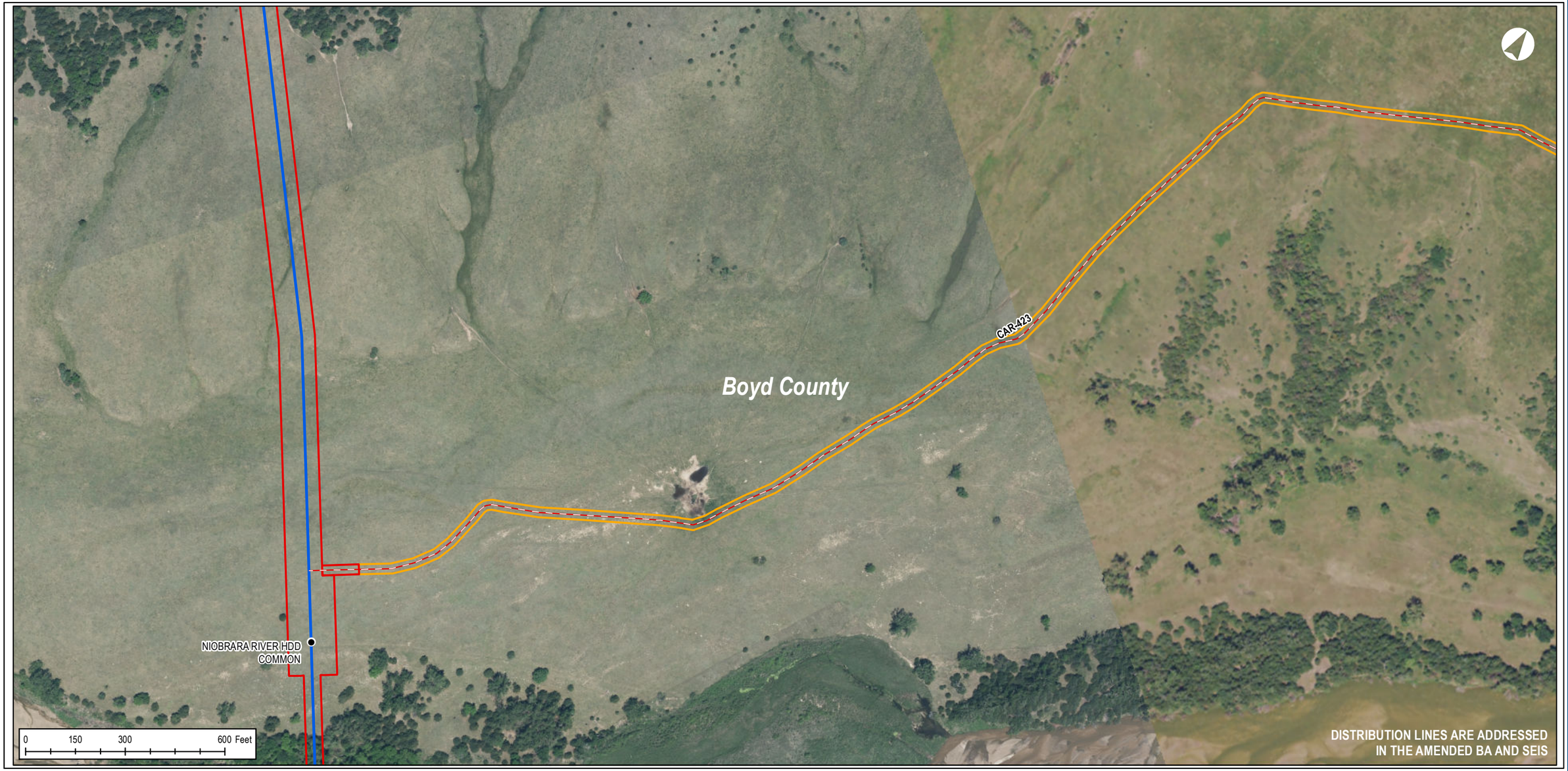
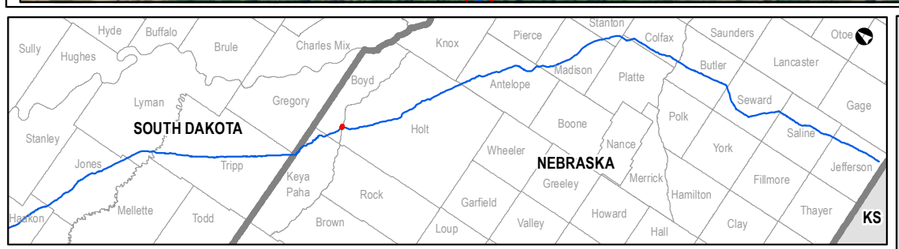
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- HDD CROSSINGS
- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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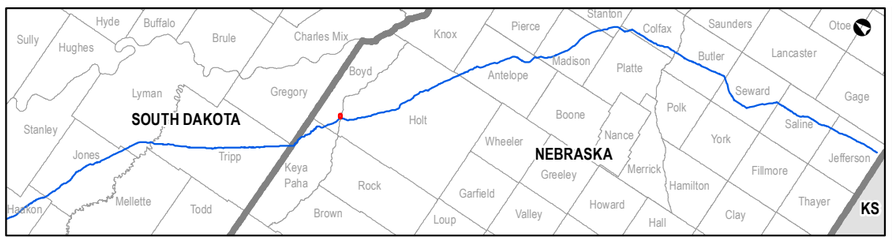
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

TEMPORARY ACCESS ROAD

ABB HABITAT RATING

GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

TEMPORARY ACCESS ROAD

ABB HABITAT RATING

GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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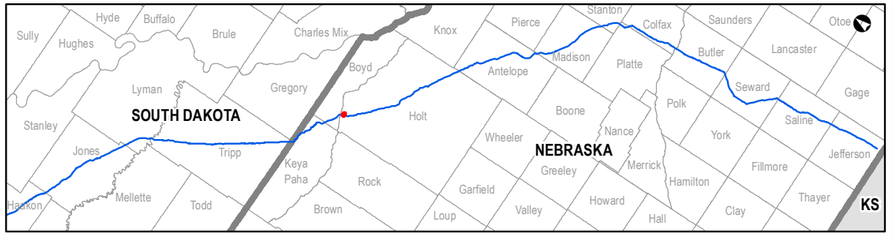
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- PERMANENT ACCESS ROAD

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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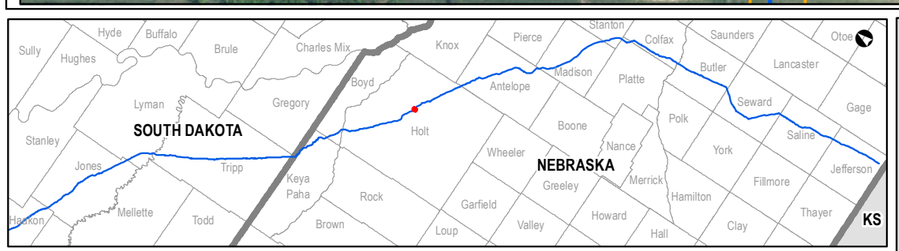
KEYSTONE XL PROJECT - ABB HABITAT RATING - ACCESS ROAD

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE
- TEMPORARY ACCESS ROAD

ABB HABITAT RATING

- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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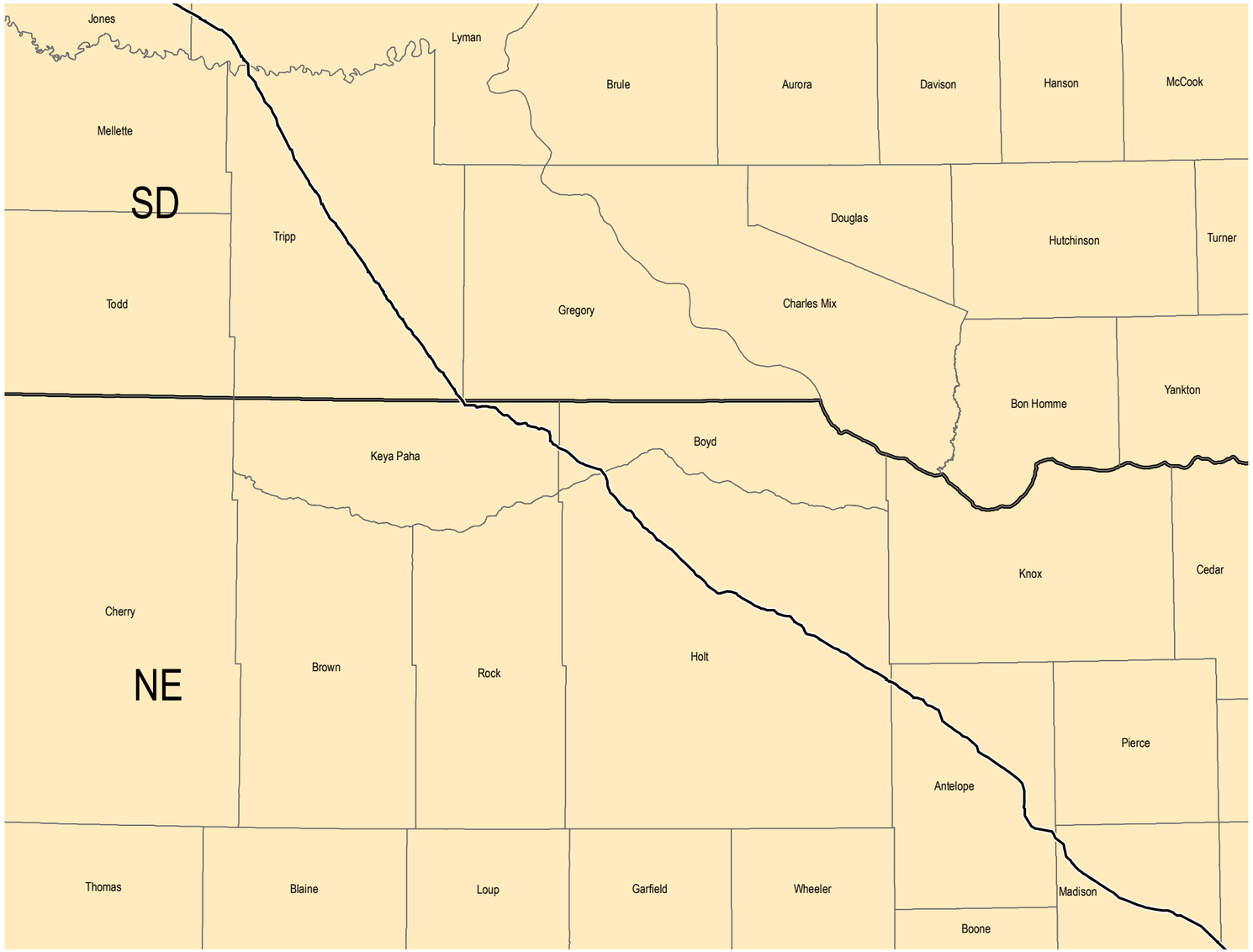
Keystone XL Project

ABB Habitat Rating Map Book
Auxiliary Sites



KEYSTONE XL PROJECT
ABB HABITAT RATING MAP BOOK
AUXILIARY SITES

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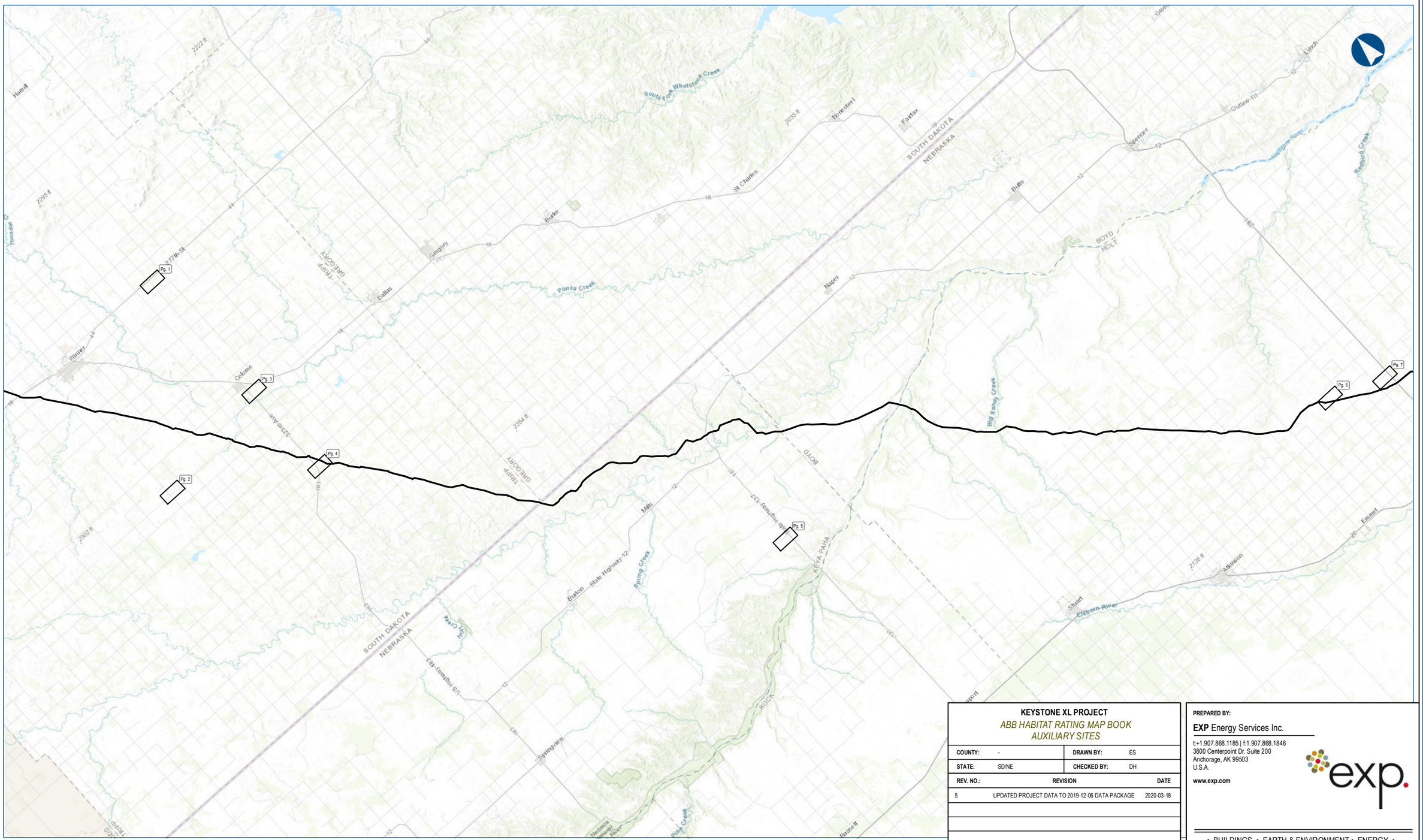
ABB HABITAT RATING - AUXILIARY SITES INDEX

TC Energy



KEYSTONE XL PROJECT

ABB HABITAT RATING MAP BOOK
AUXILIARY SITES

COUNTY:	-	DRAWN BY:	ES
STATE:	SD/NE	CHECKED BY:	DH

REV. NO.:	REVISION	DATE
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

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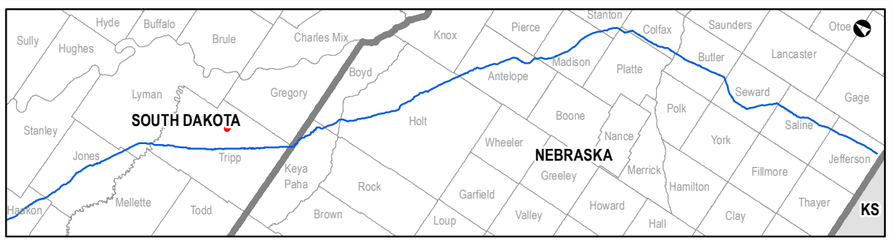
DATE: 2020-03-18	PROJECTION: NAD83 | UTM14 N	DWG: 0801-03-026-AUX-INDEX	SHEET: INDEX

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

ABB HABITAT RATING

POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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DWG:	0801-03-026-AUX	SHEET:	1

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy

315th Ave

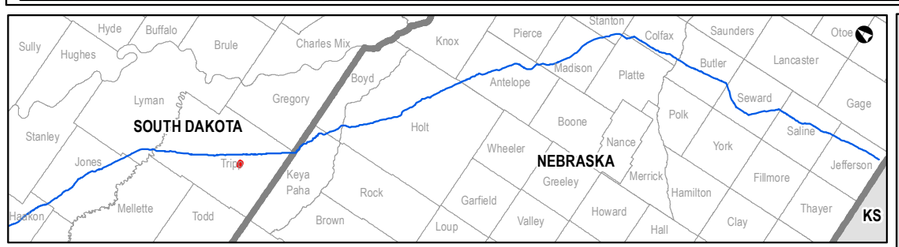
WATER STORAGE
AREA 10 SITE 1

288th St

Tripp County

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED
IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

ABB HABITAT RATING

GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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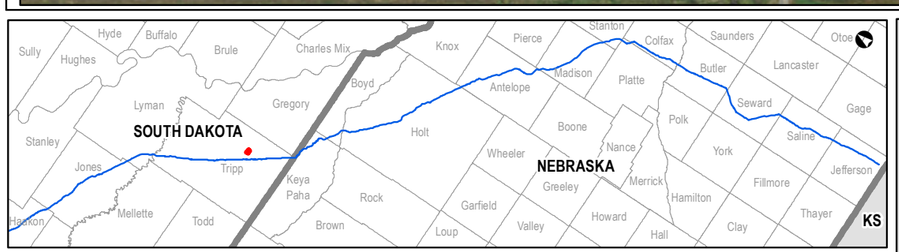
DWG:	0801-03-026-AUX	SHEET:	2

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

ABB HABITAT RATING

POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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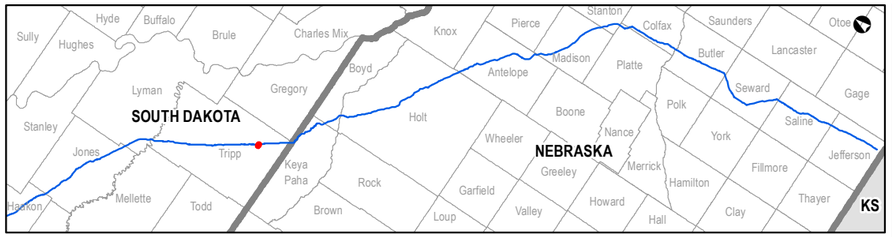
DWG:	0801-03-026-AUX	SHEET:	3

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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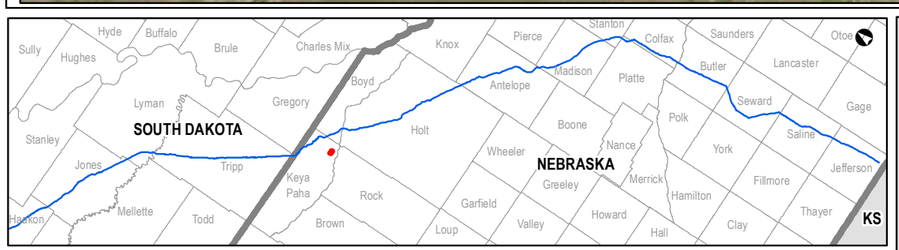
DWG:	0801-03-026-AUX	SHEET:	4

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

ABB HABITAT RATING

PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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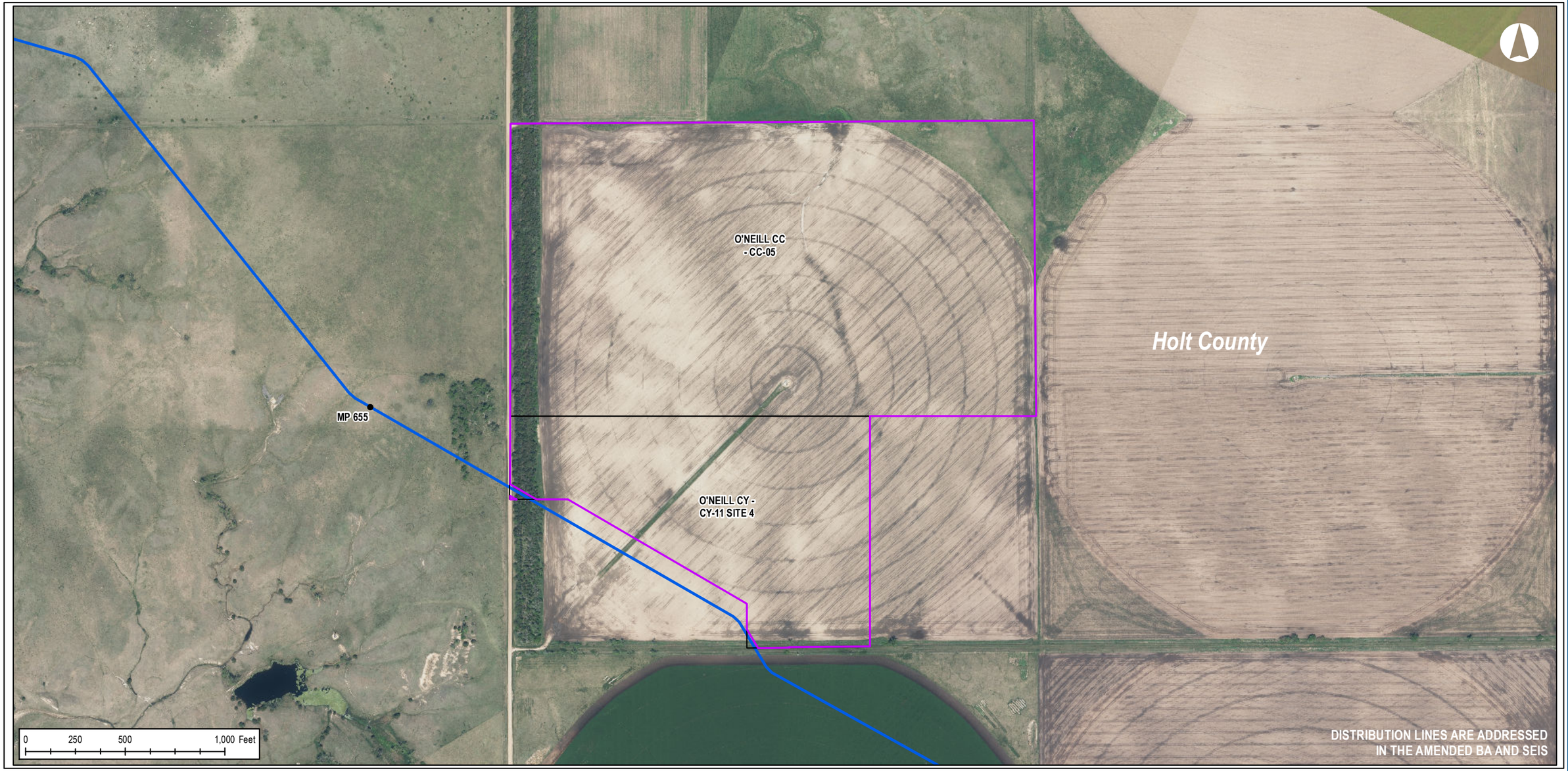
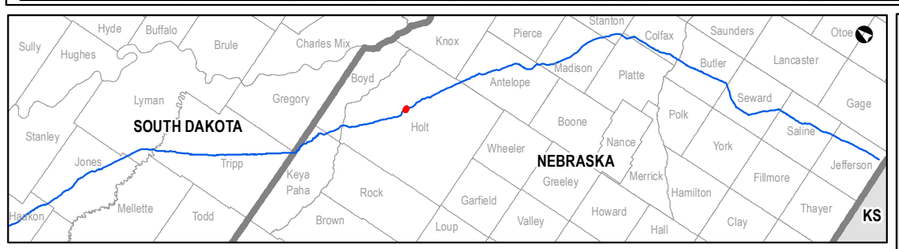
DWG:	0801-03-026-AUX	SHEET:	5

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
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DWG:	0801-03-026-AUX	SHEET:	6

KEYSTONE XL PROJECT - ABB HABITAT RATING - AUXILIARY SITE

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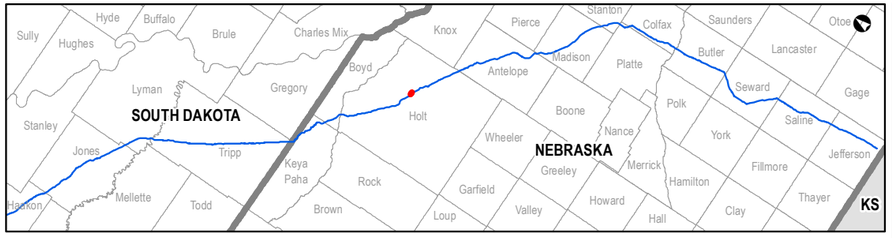

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

ABB HABITAT RATING

GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	**DRAWN BY:**	ES
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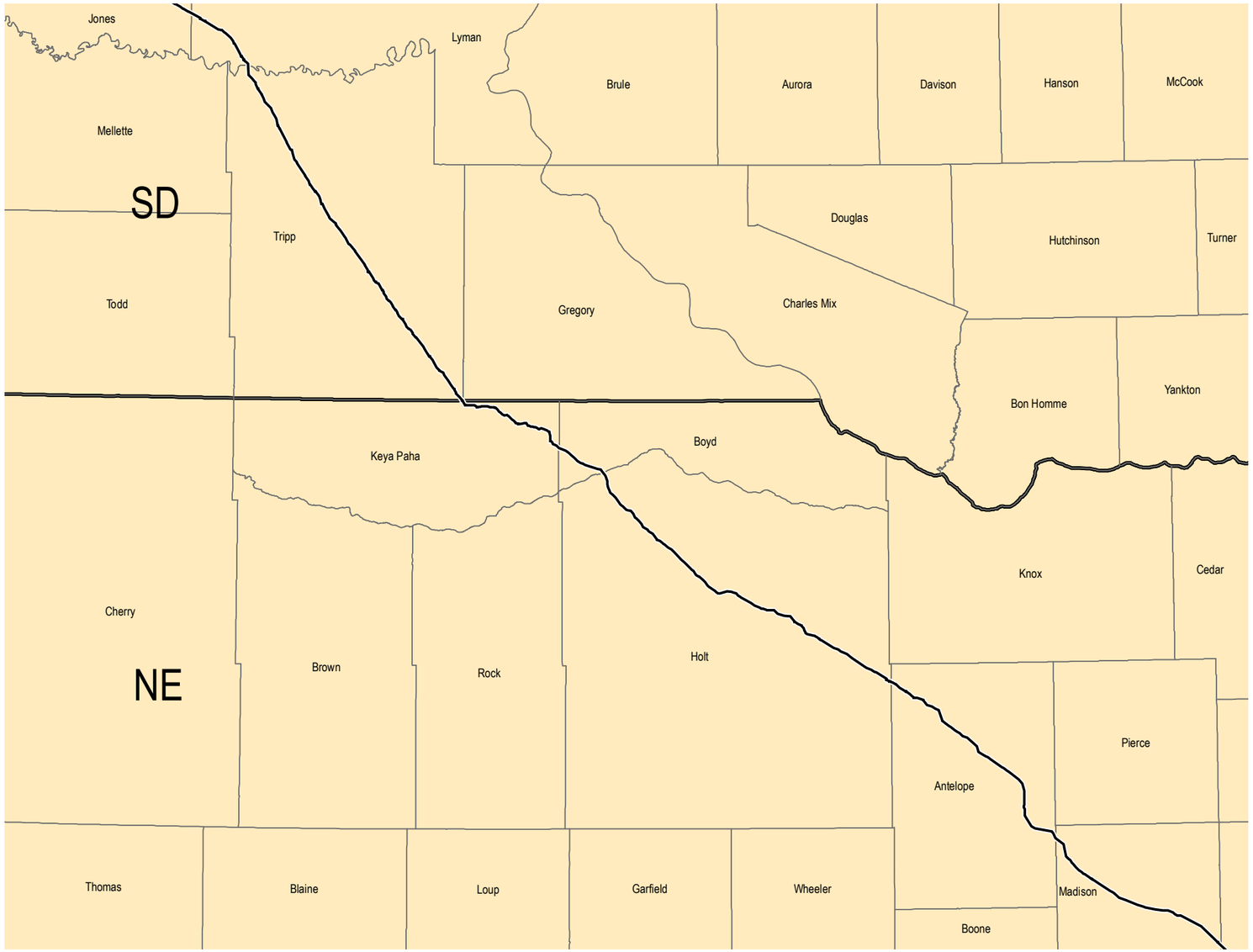

Keystone XL Project

ABB Habitat Rating Map Book
Pump Stations

KEYSTONE XL PROJECT
ABB HABITAT RATING MAP BOOK
PUMP STATIONS

COUNTY:	-	**DRAWN BY:**	ES
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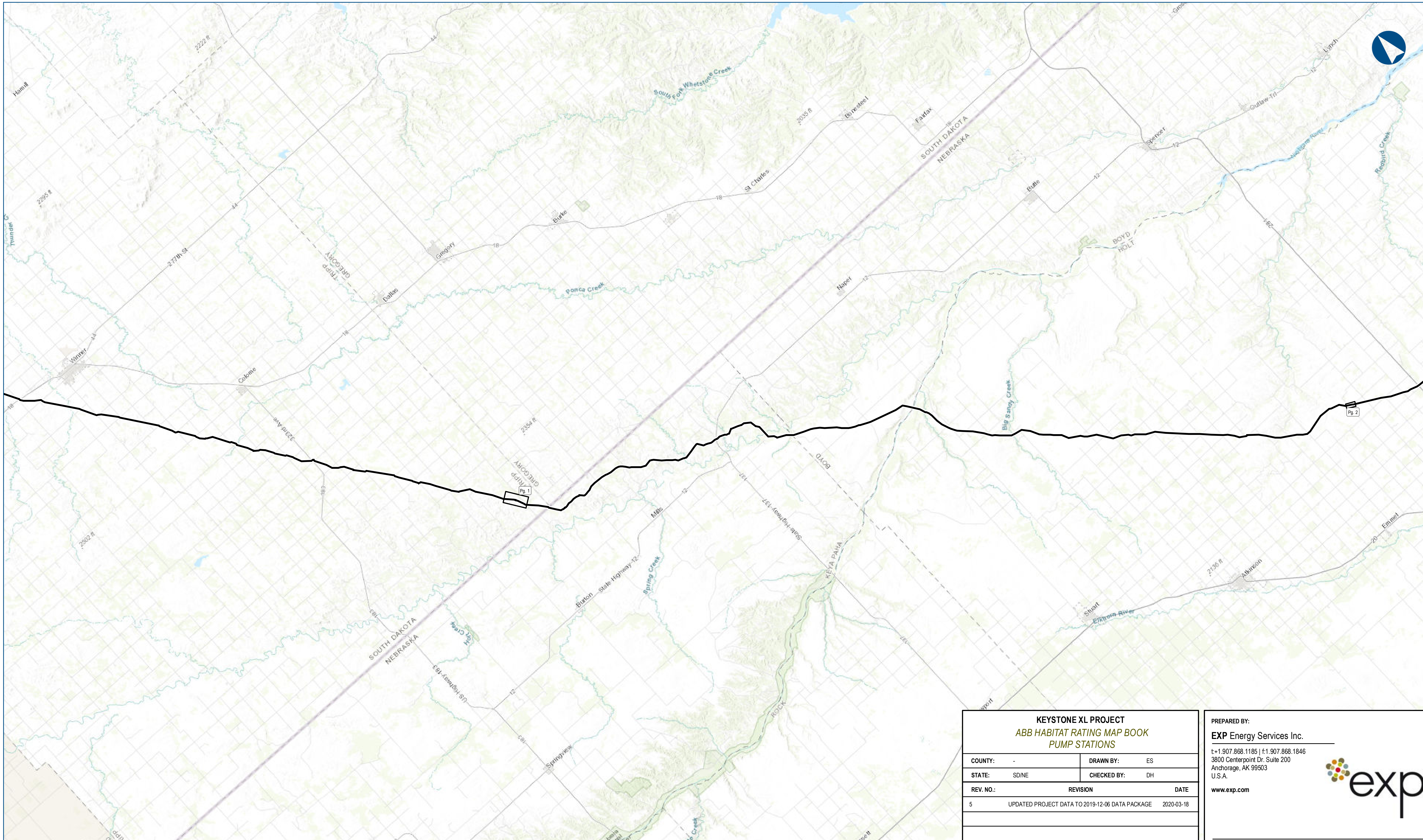
ABB HABITAT RATING - PUMP STATIONS INDEX

TC Energy



KEYSTONE XL PROJECT			
ABB HABITAT RATING MAP BOOK PUMP STATIONS			
COUNTY:	-	DRAWN BY:	ES
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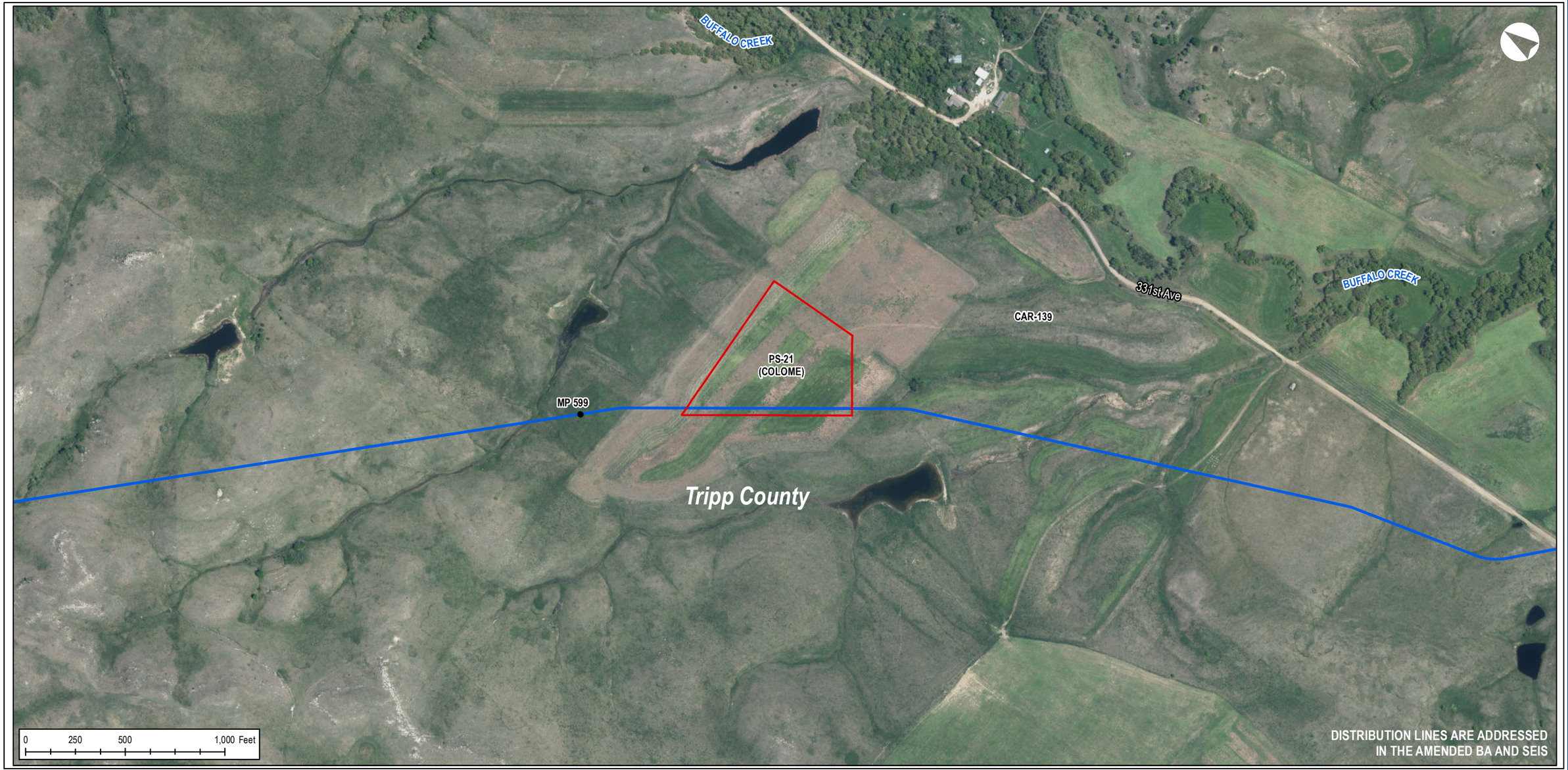
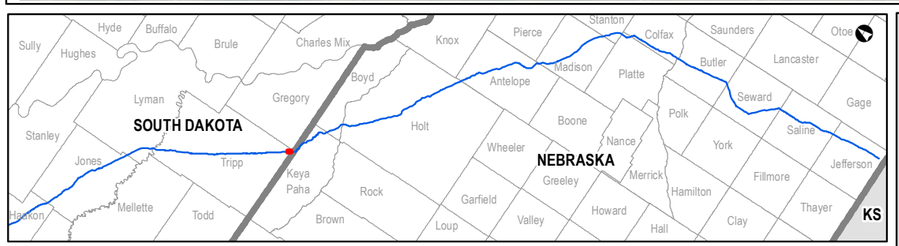
KEYSTONE XL PROJECT - ABB HABITAT RATING - PUMP STATION

TC Energy



DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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REV. NO.:	REVISION:	DATE:
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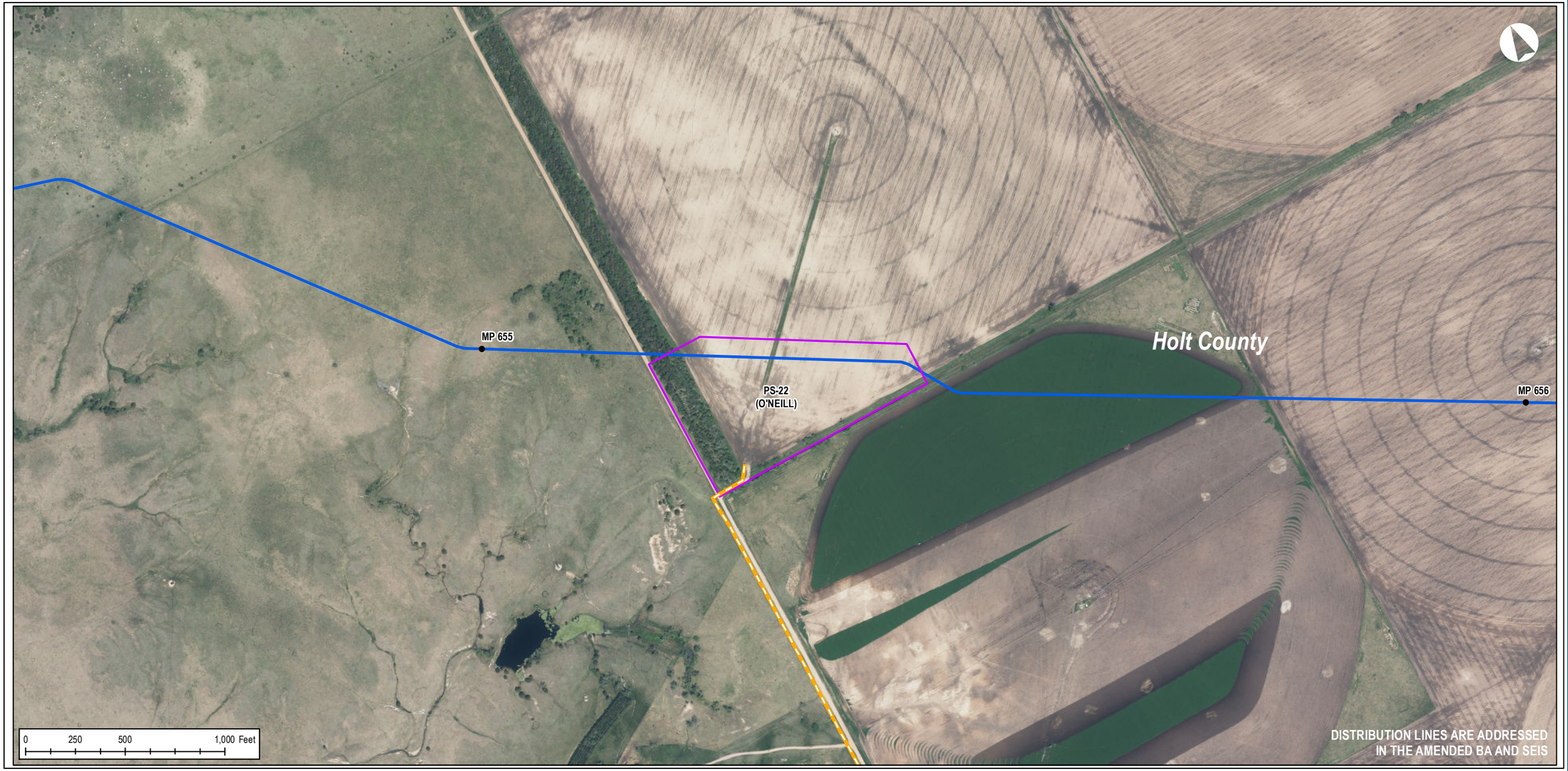
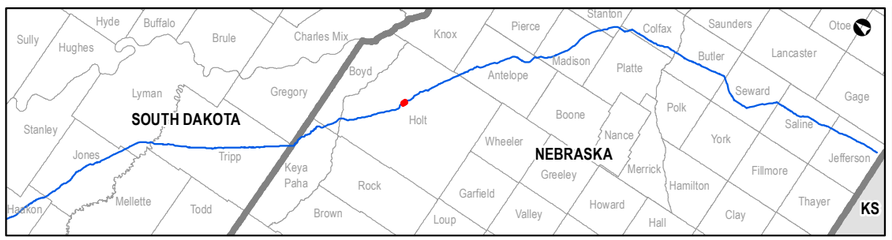
DWG:	0801-03-026-PS	SHEET:	1

KEYSTONE XL PROJECT - ABB HABITAT RATING - PUMP STATION

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

DISTRIBUTION LINE

- NPPD

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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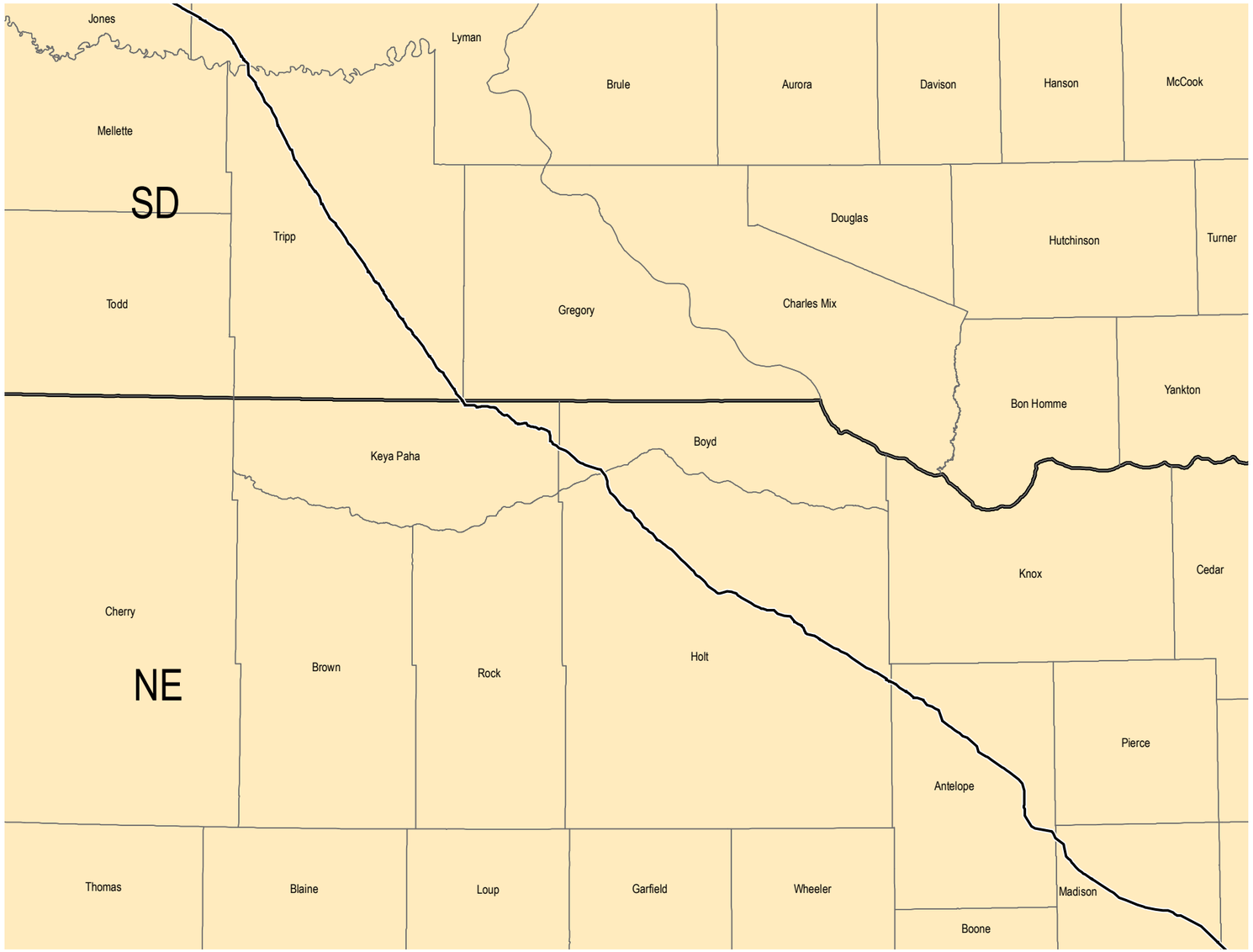
Keystone XL Project

ABB Habitat Rating Map Book
Centerline ROW



KEYSTONE XL PROJECT
ABB HABITAT RATING MAP BOOK
CENTERLINE ROW

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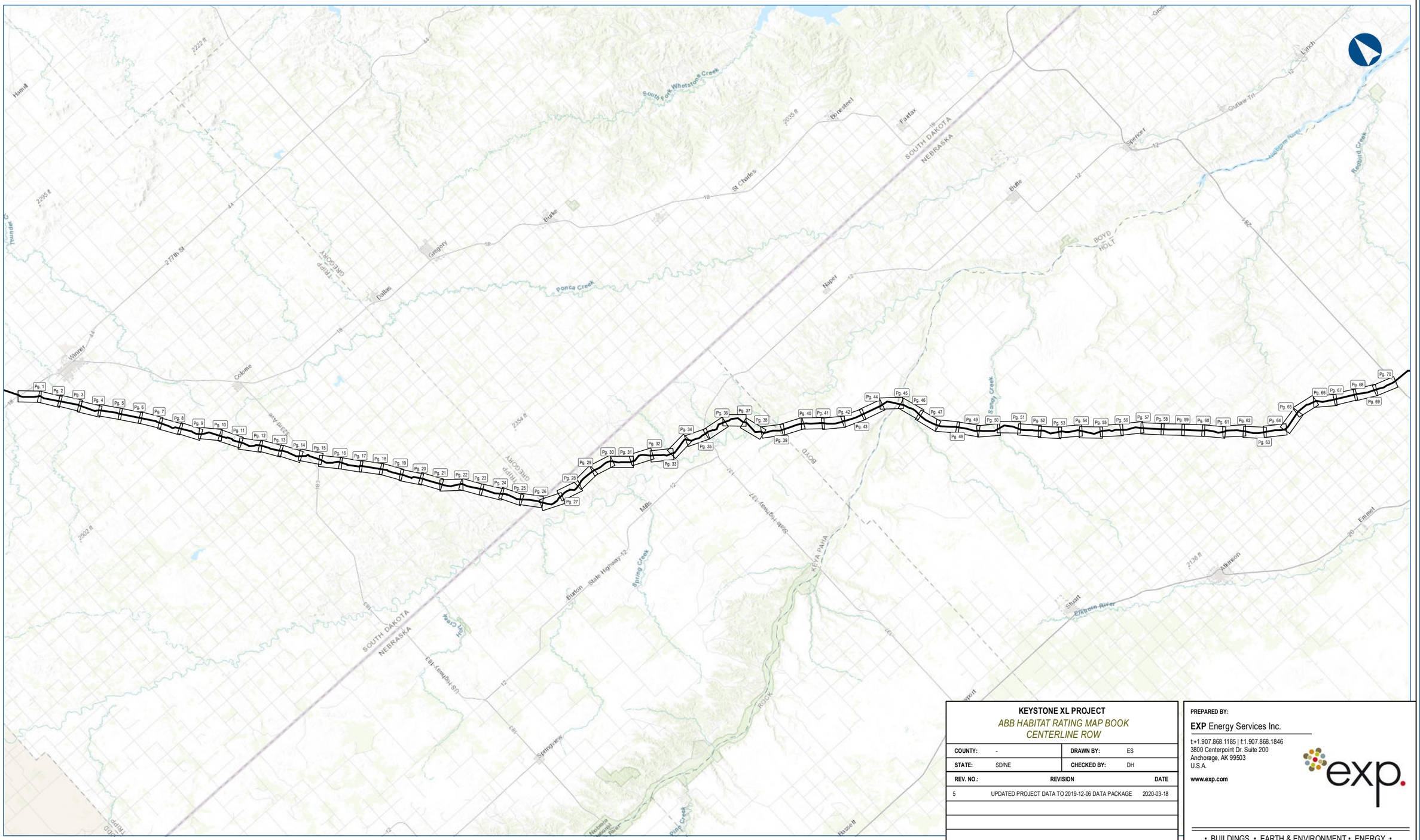
ABB HABITAT RATING - CENTERLINE ROW INDEX

TC Energy



KEYSTONE XL PROJECT

ABB HABITAT RATING MAP BOOK
CENTERLINE ROW

COUNTY:	-	**DRAWN BY:**	ES
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DATE: 2020-03-18	**PROJECTION:** NAD83 | UTM14 N	**DWG:** 0801-03-026-ROW-INDEX	**SHEET:** INDEX

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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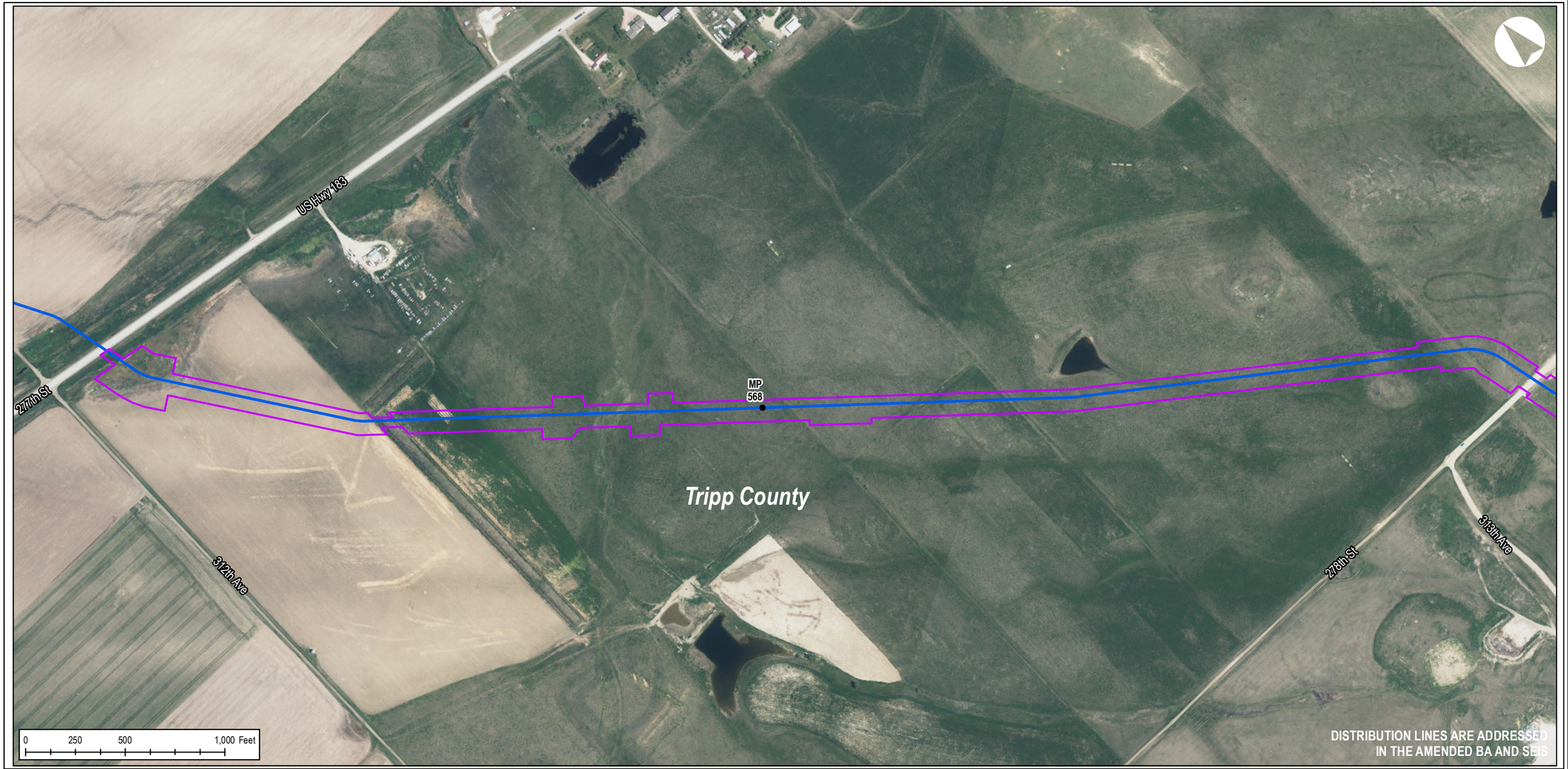

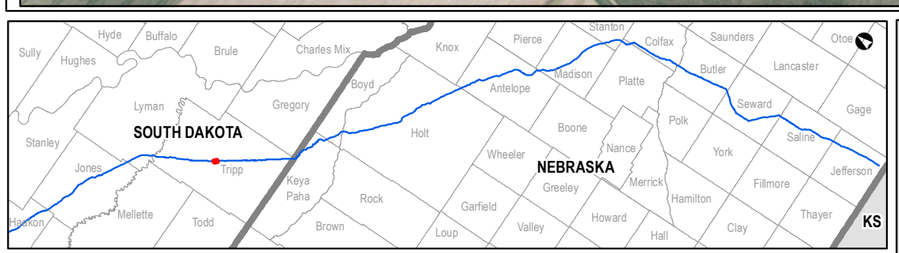

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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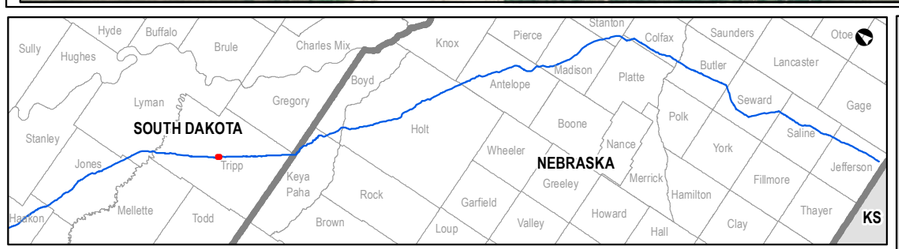
DWG:	0801-03-026-ROW	SHEET:	1

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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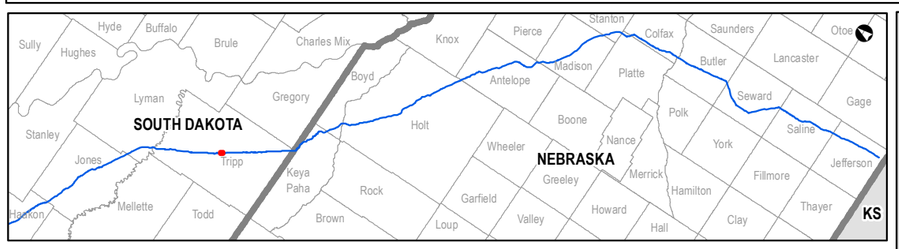

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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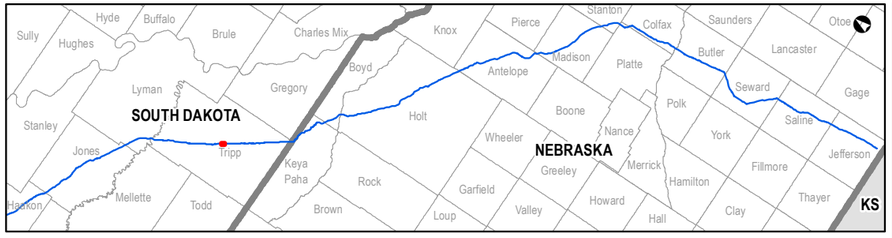
DWG:	0801-03-026-ROW	SHEET:	3

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

PREPARED BY:

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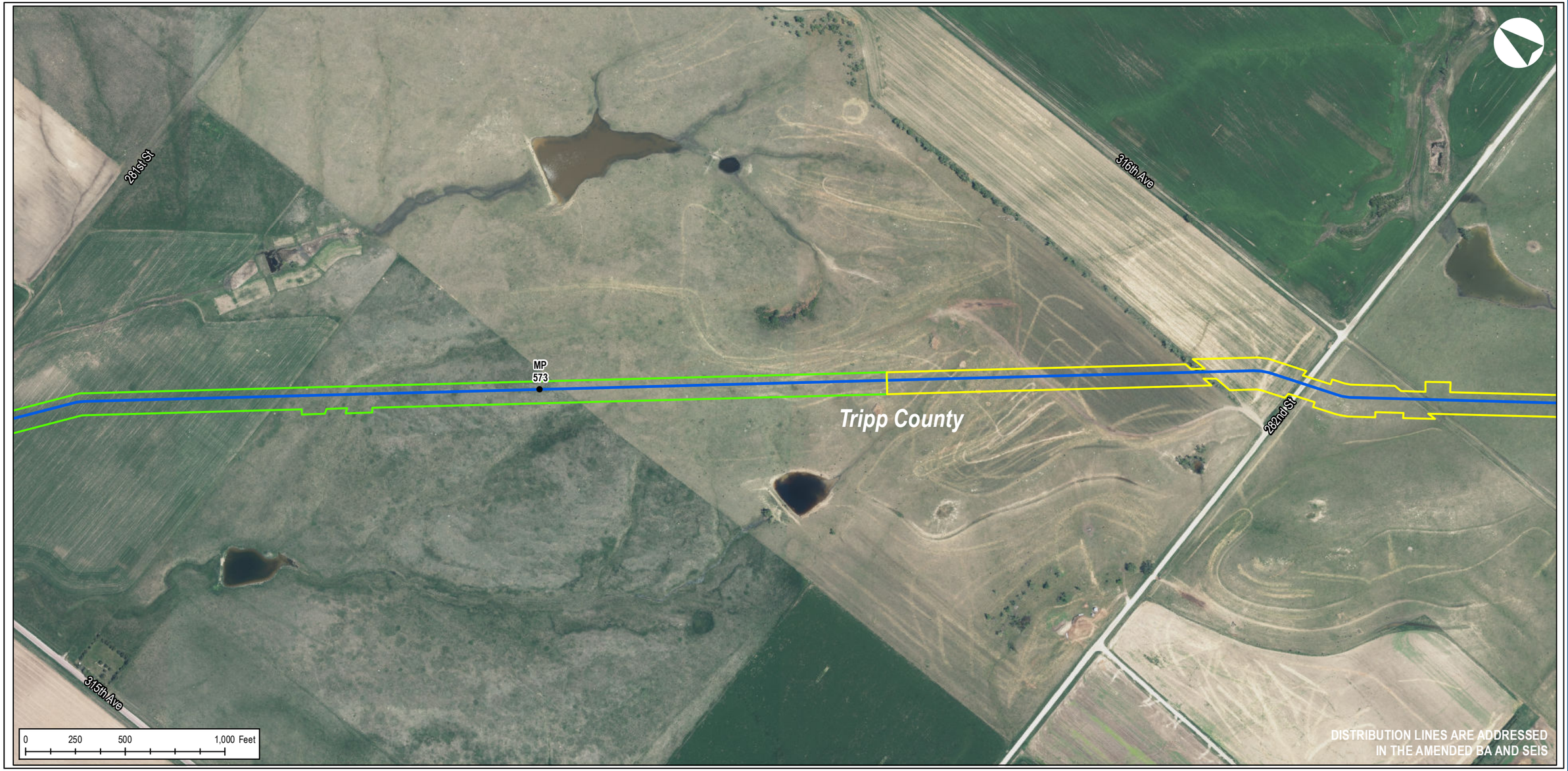
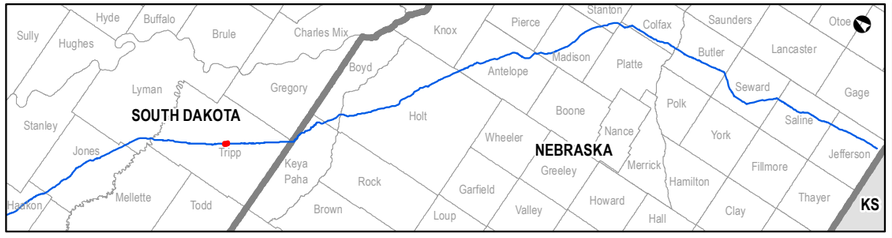
DWG:	0801-03-026-ROW	SHEET:	4

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- FAIR
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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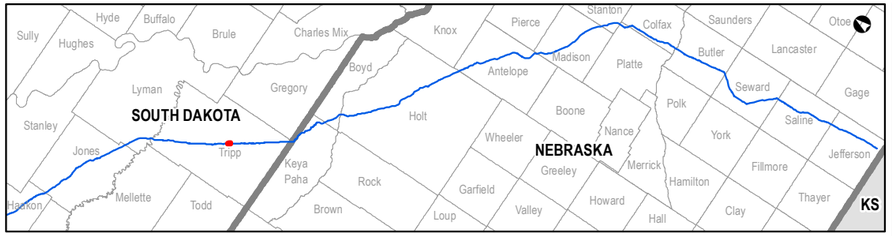
DWG:	0801-03-026-ROW	SHEET:	5

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

282nd St
317th Ave
283rd St
MP 574
MP 575
Tripp County
MUD CREEK
0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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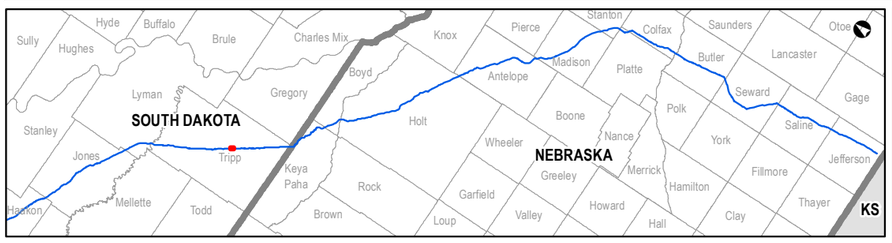
DWG:	0801-03-026-ROW	SHEET:	6

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DWG:	0801-03-026-ROW	SHEET:	7

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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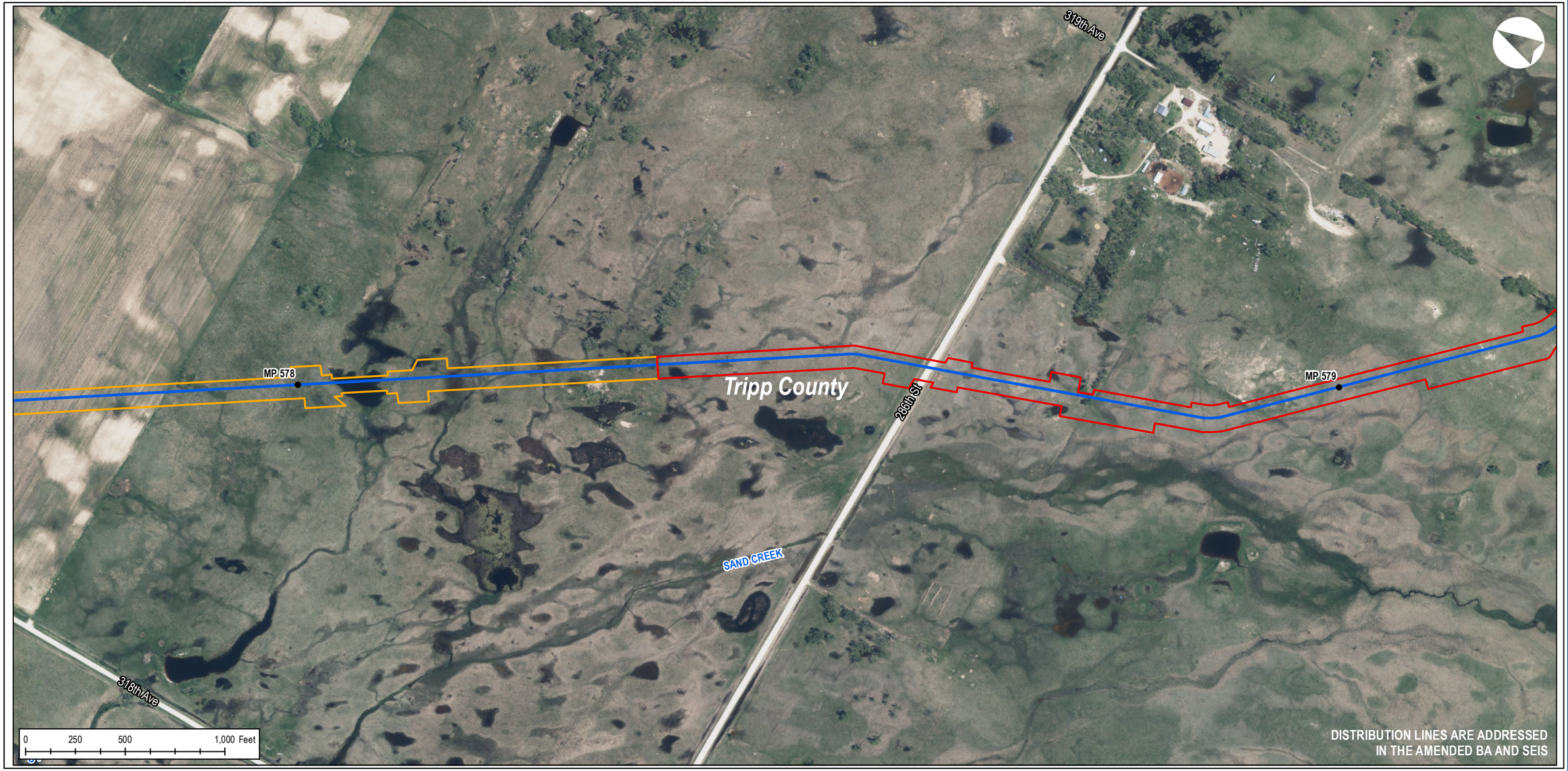
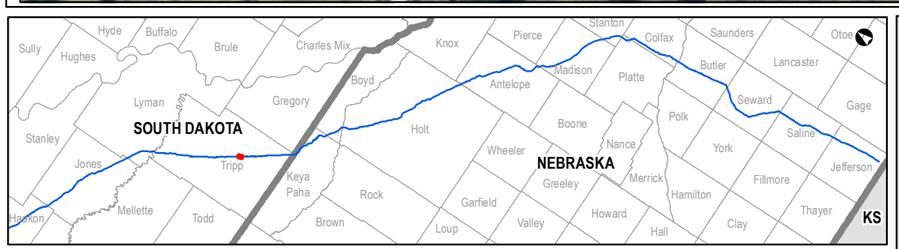
DWG:	0801-03-026-ROW	SHEET:	8

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DWG:	0801-03-026-ROW	SHEET:	9

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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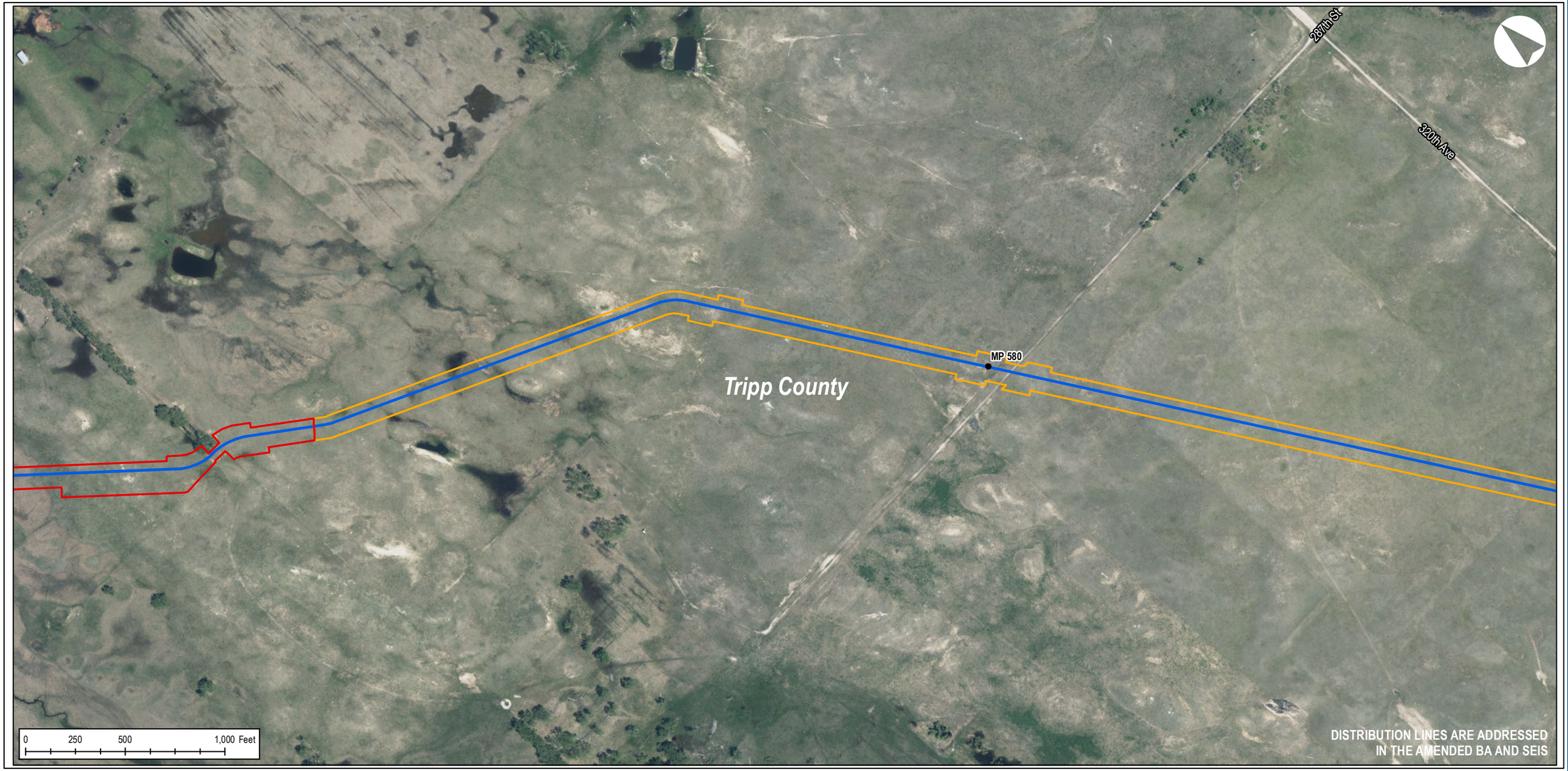

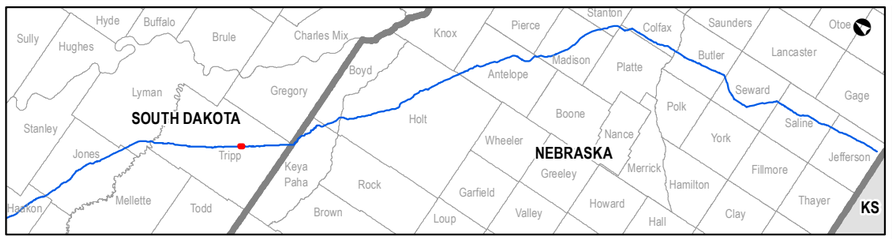

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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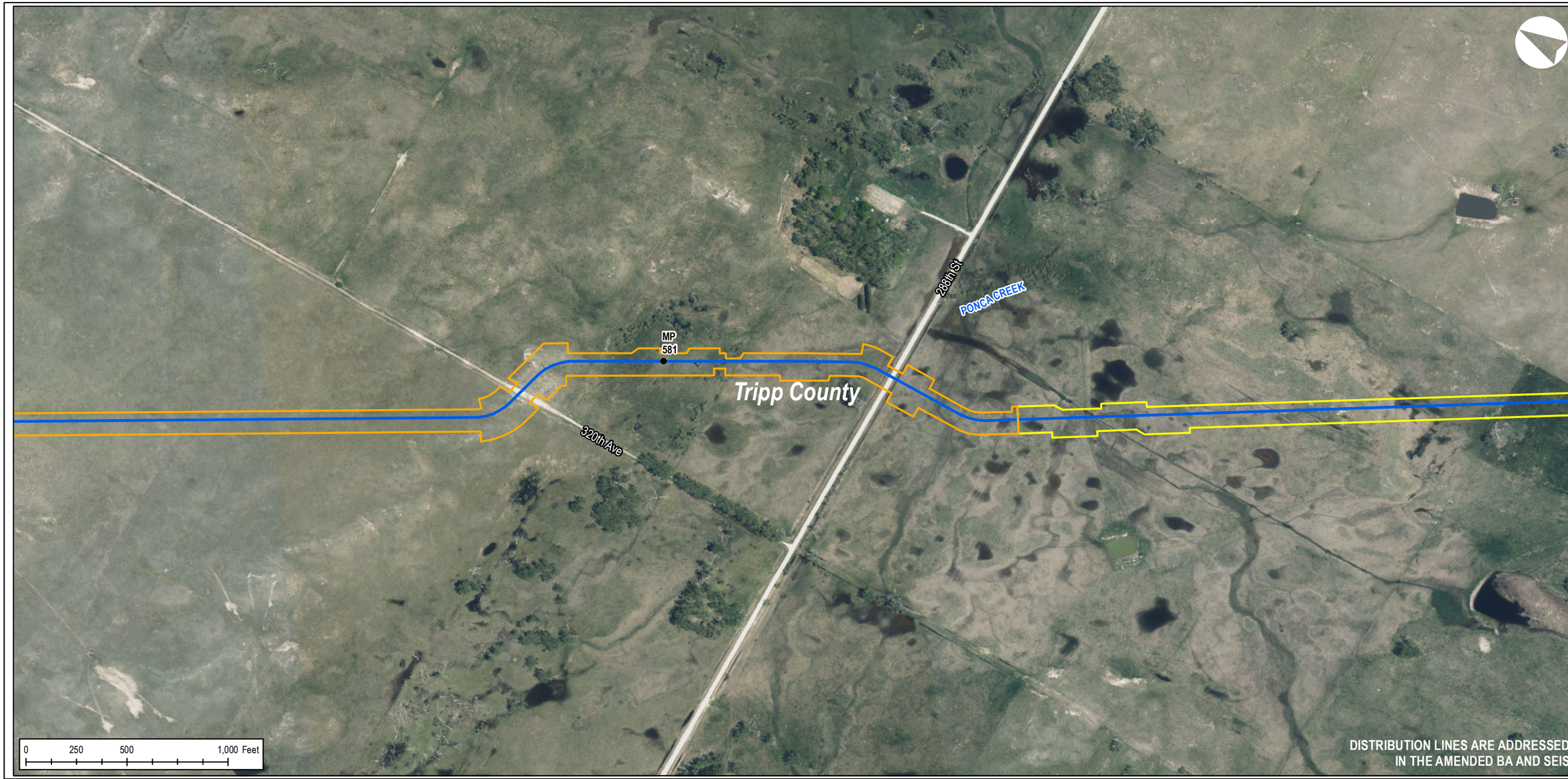
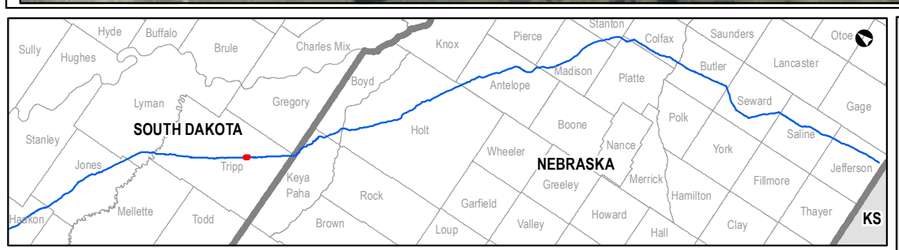
DWG:	0801-03-026-ROW	SHEET:	10

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	11

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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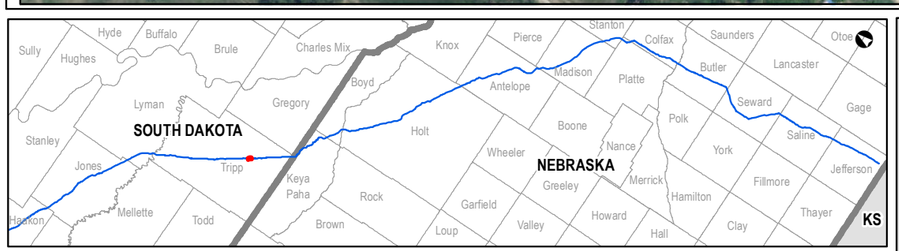

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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DWG:	0801-03-026-ROW	SHEET:	12

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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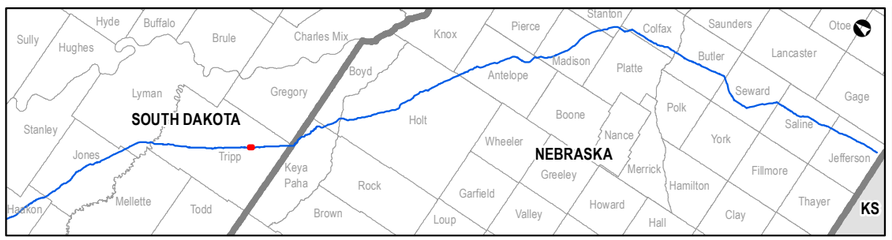

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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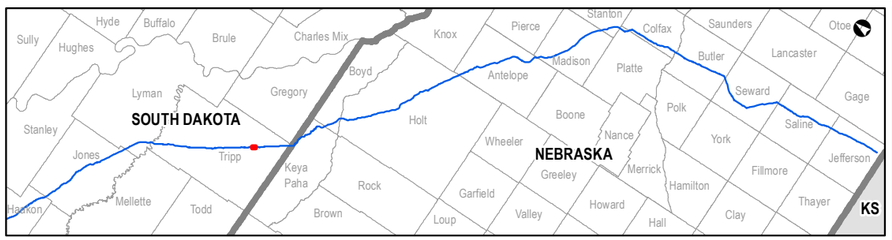
DWG:	0801-03-026-ROW	SHEET:	13

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	14

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

292nd St

323rd Ave

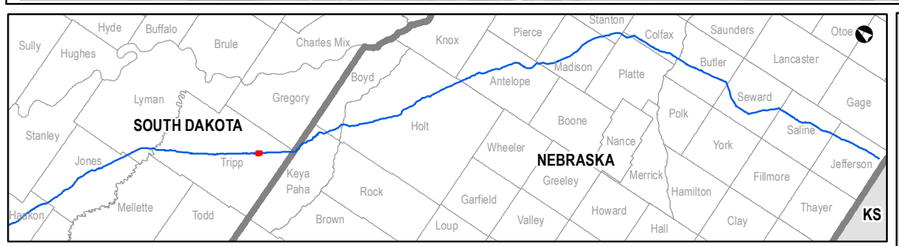
MP 586

MP 587

Tripp County

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	15

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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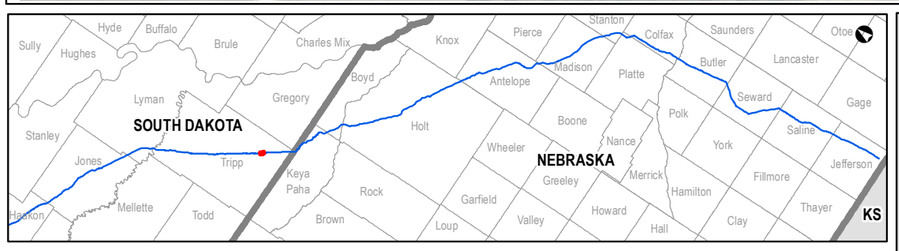

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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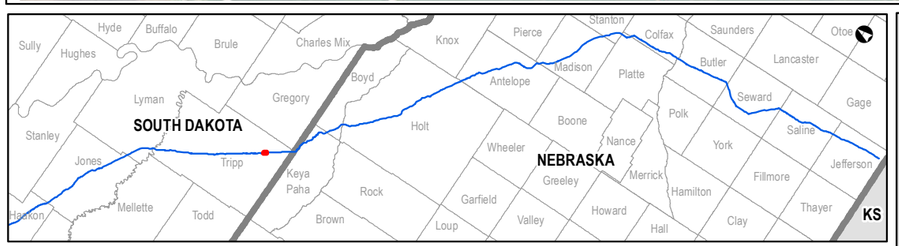
DWG:	0801-03-026-ROW	SHEET:	16

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

294th St
MP 589
325th Ave
Tripp County
324th Ave
0 250 500 1,000 Feet
DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

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2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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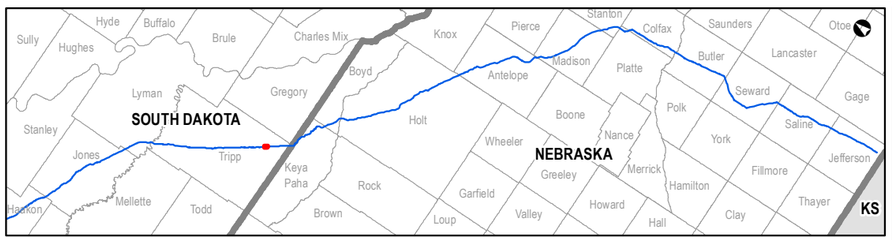
DWG:	0801-03-026-ROW	SHEET:	17

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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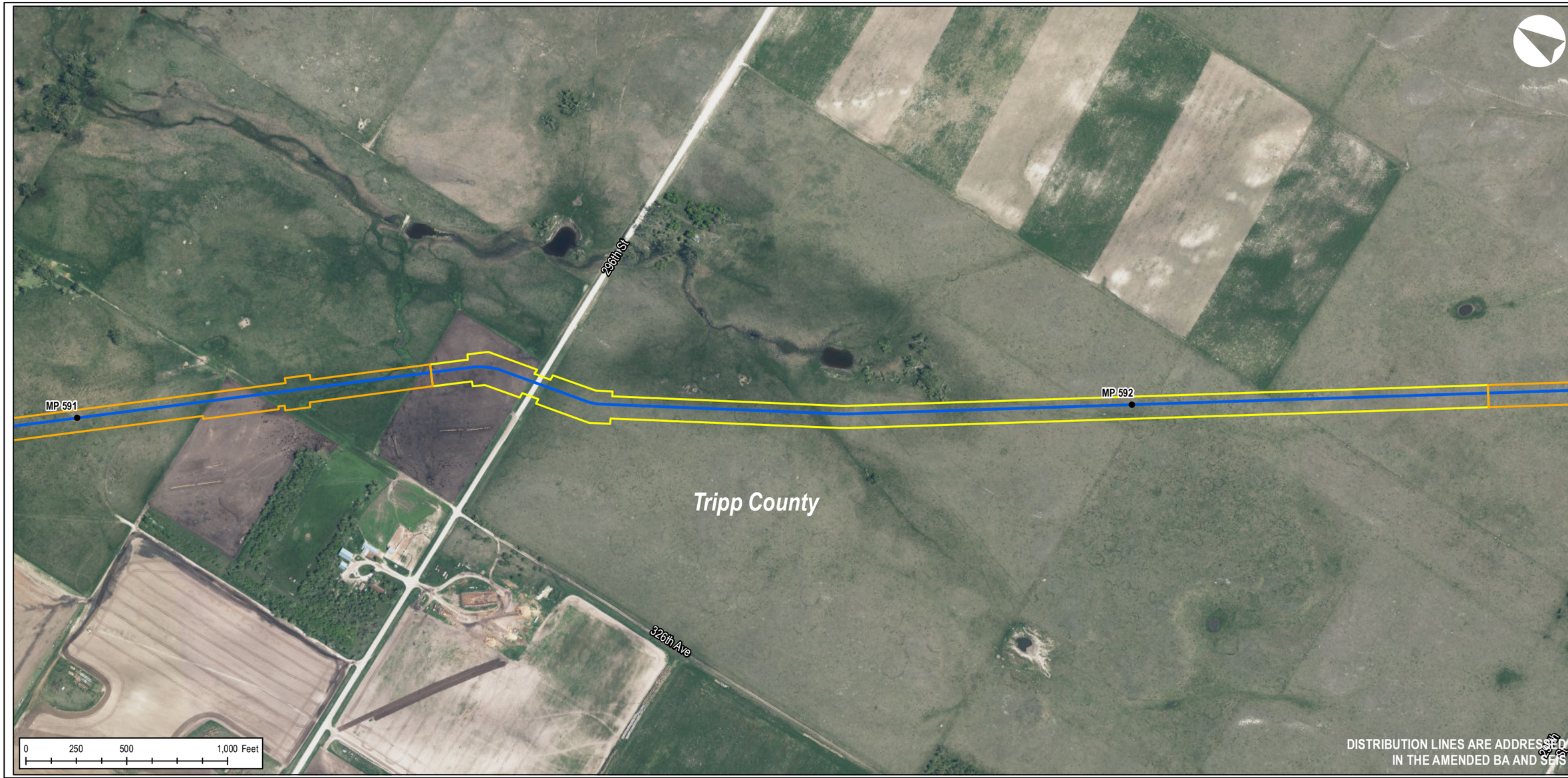
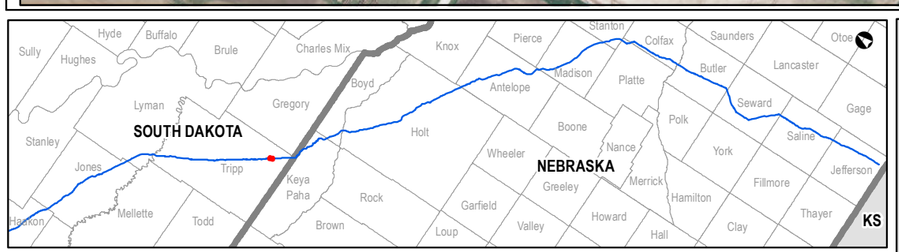
DWG:	0801-03-026-ROW	SHEET:	18

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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STATE:	SOUTH DAKOTA	CHECKED BY:	DH

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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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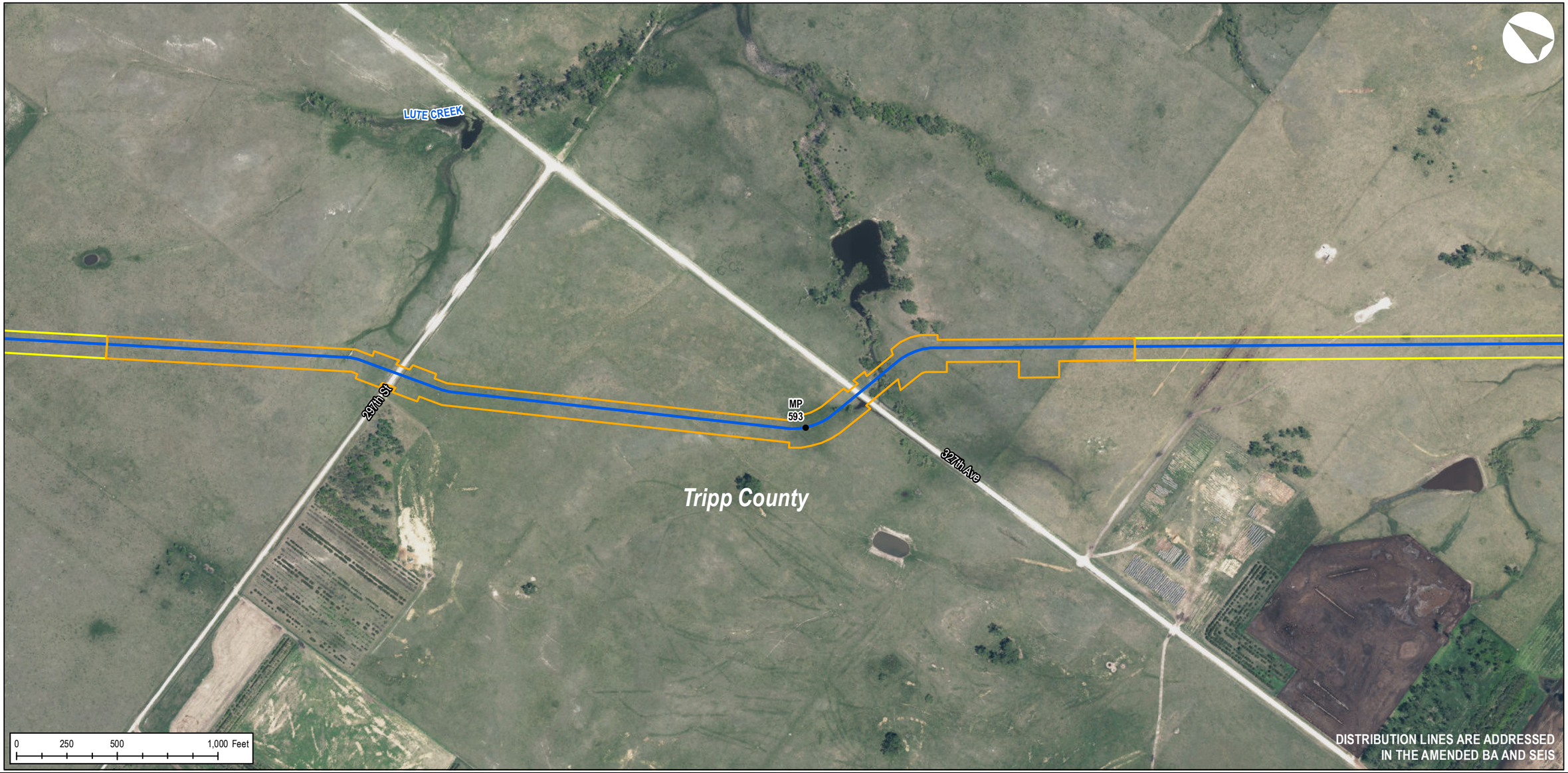
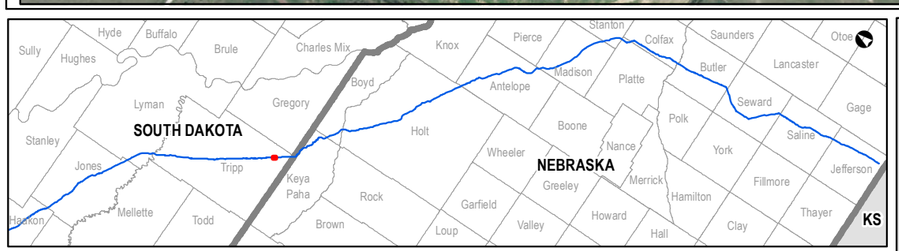
DWG:	0801-03-026-ROW	SHEET:	19

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
STATE:	SOUTH DAKOTA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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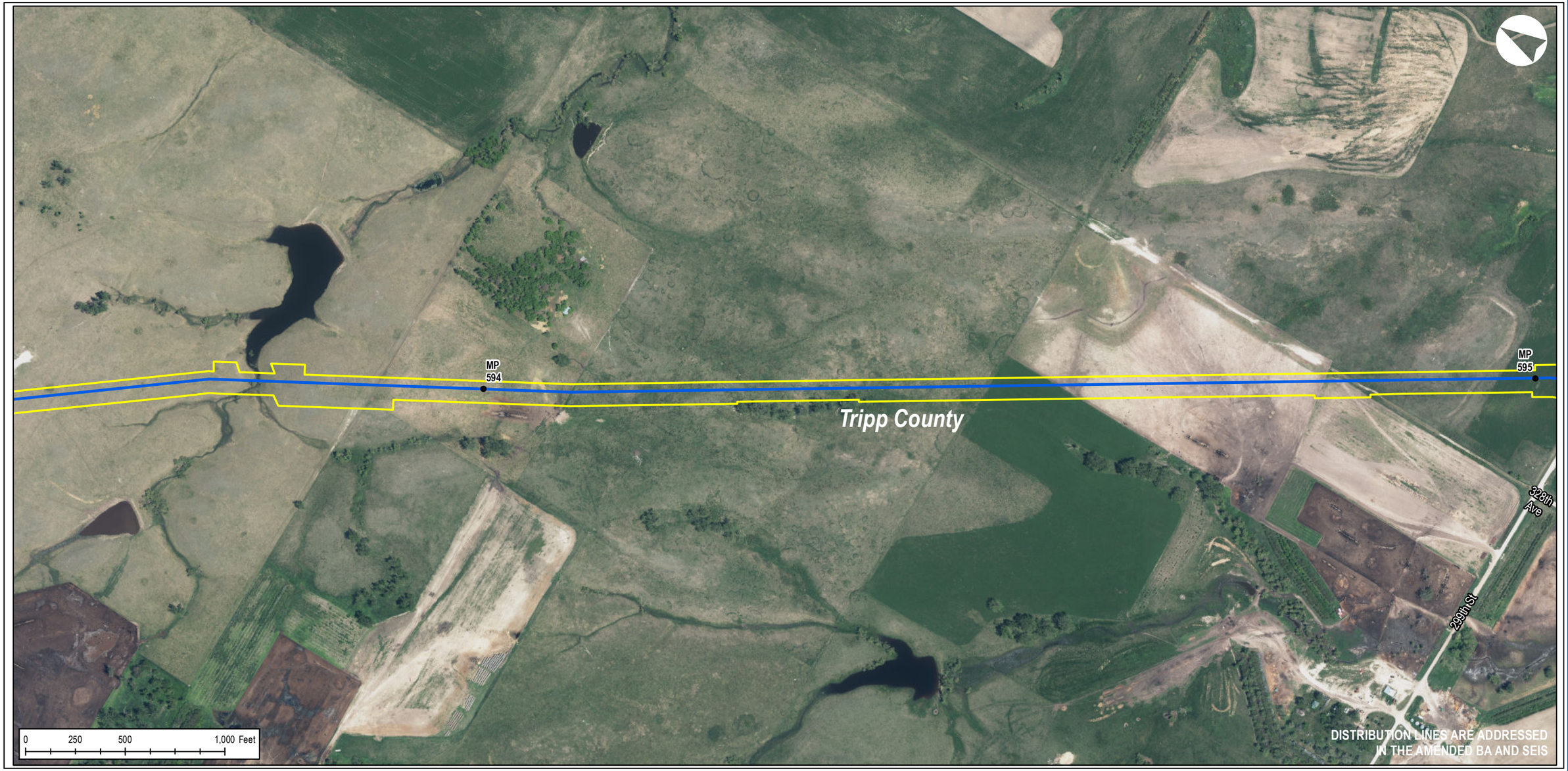
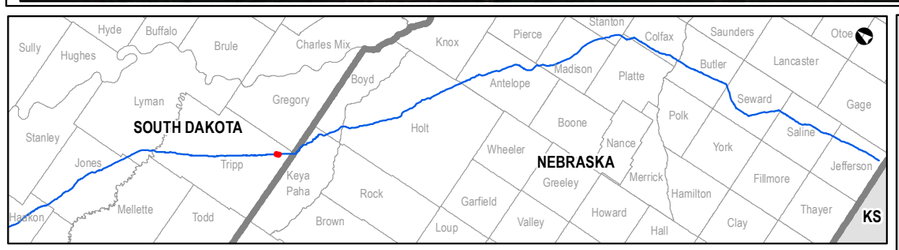
DWG:	0801-03-026-ROW	SHEET:	20

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- ● MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	TRIPP	DRAWN BY:	ES
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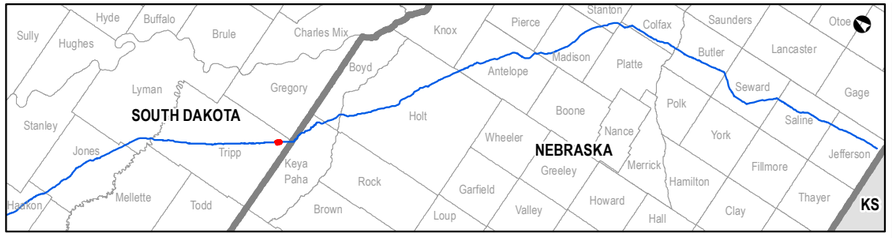
DWG:	0801-03-026-ROW	SHEET:	21

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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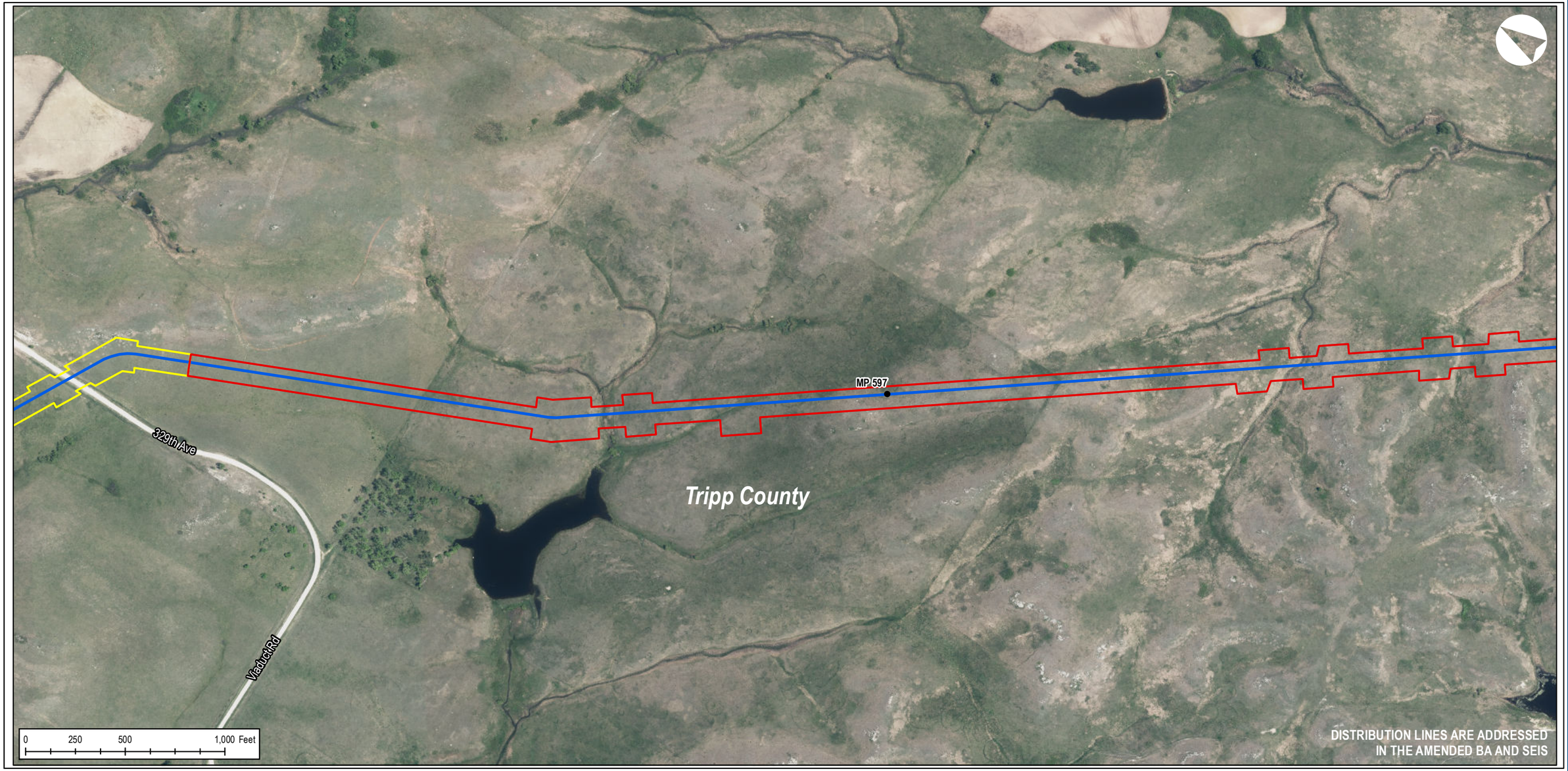
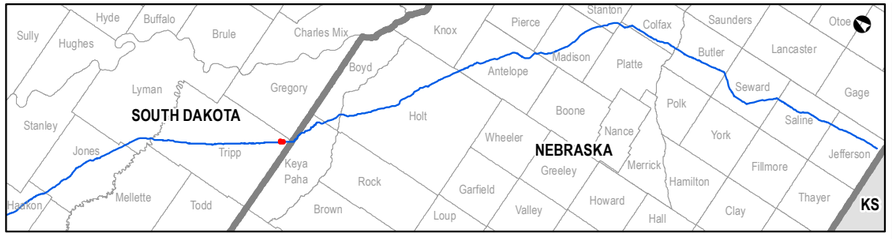
DWG:	0801-03-026-ROW	SHEET:	22

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
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2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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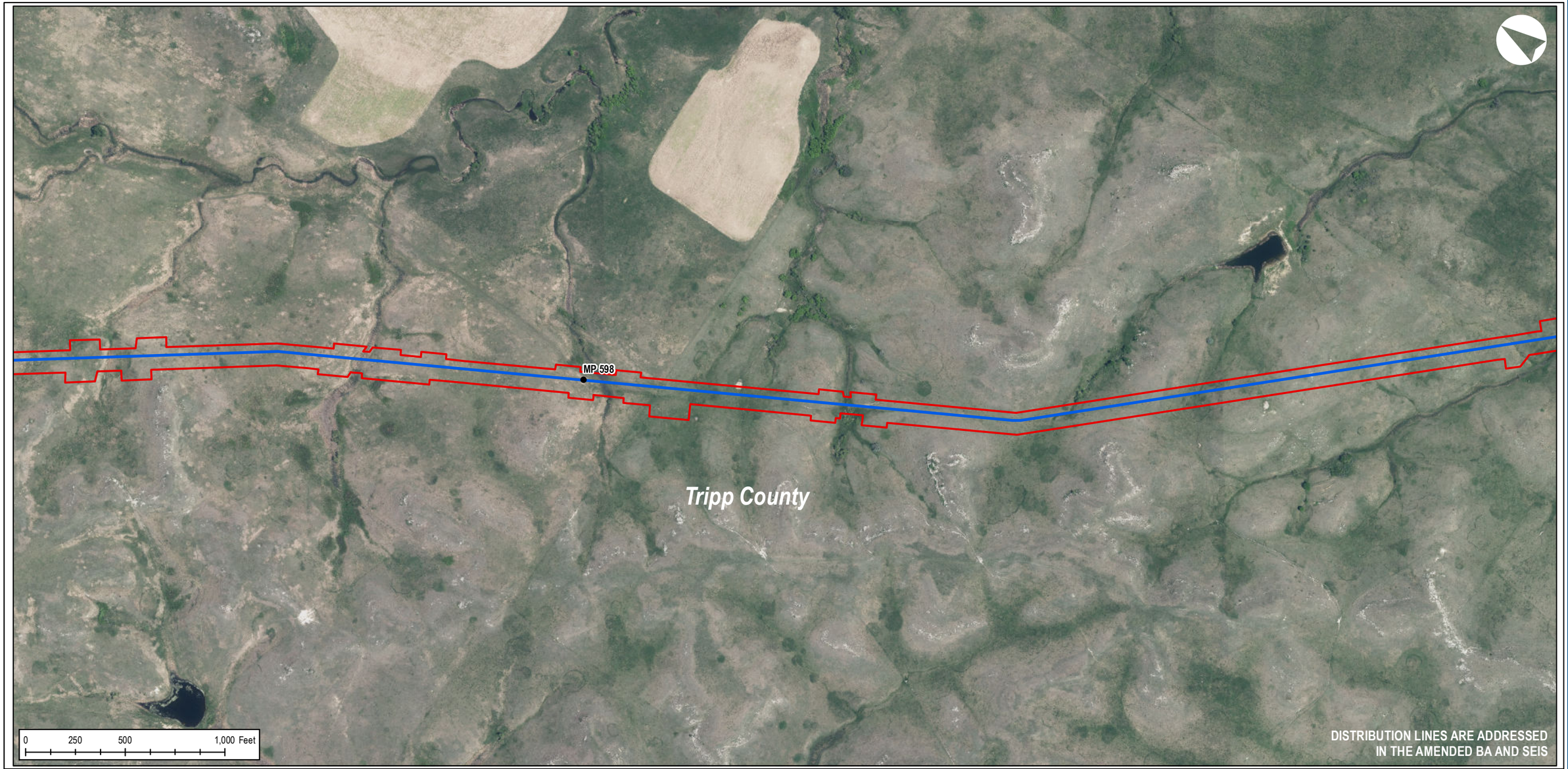
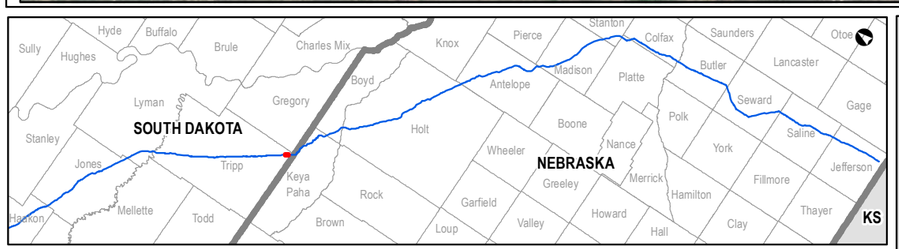
DWG:	0801-03-026-ROW	SHEET:	23

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
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ABB HABITAT RATING

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KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	24

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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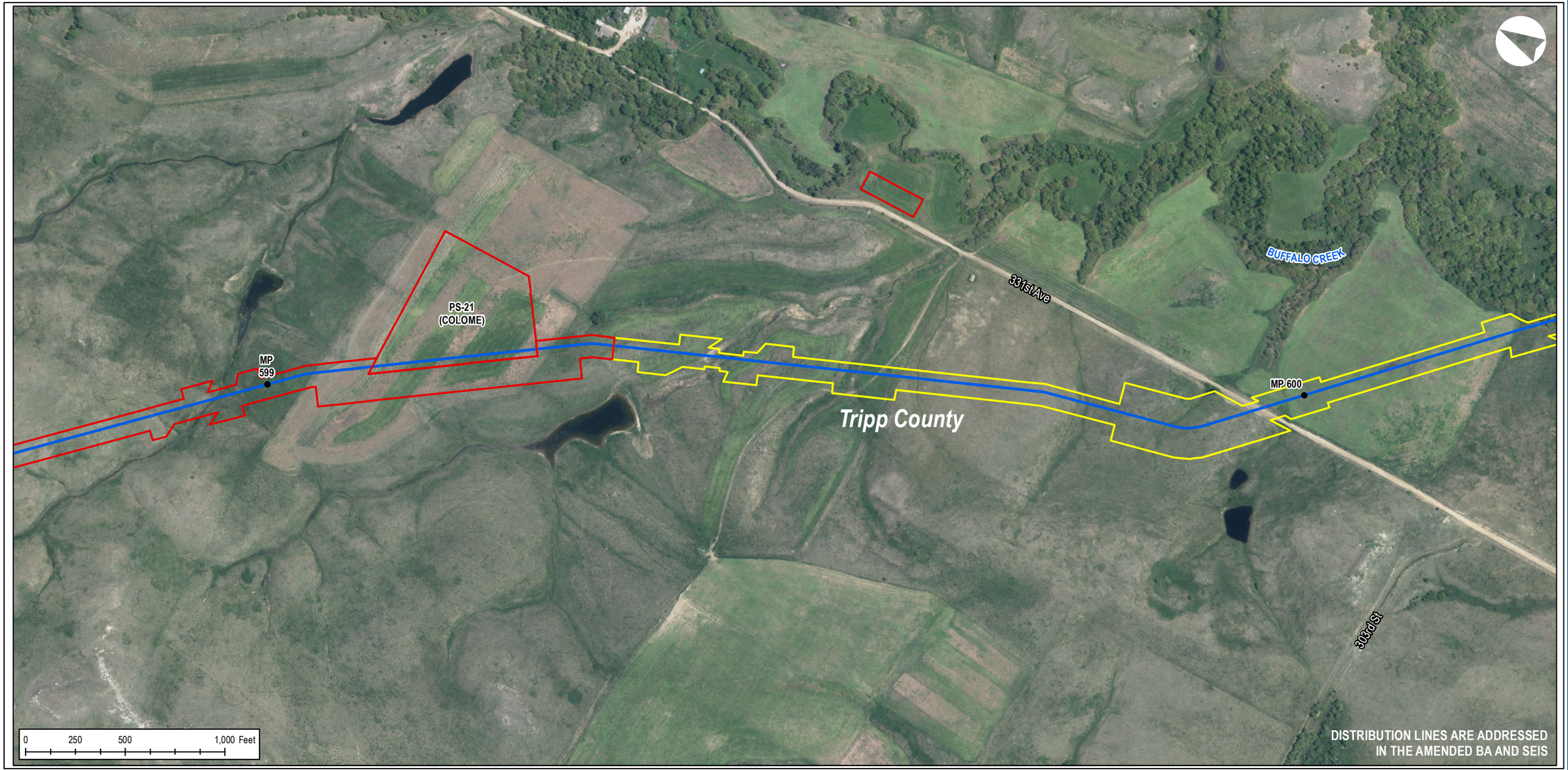

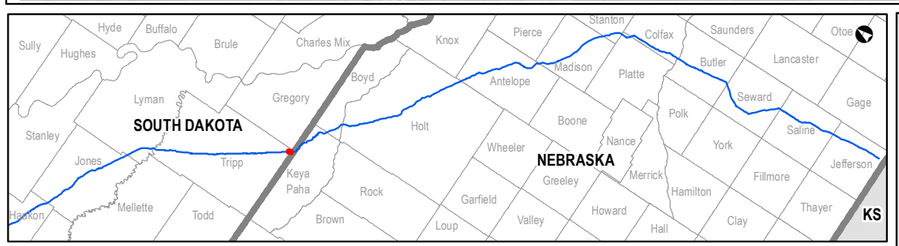

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- FAIR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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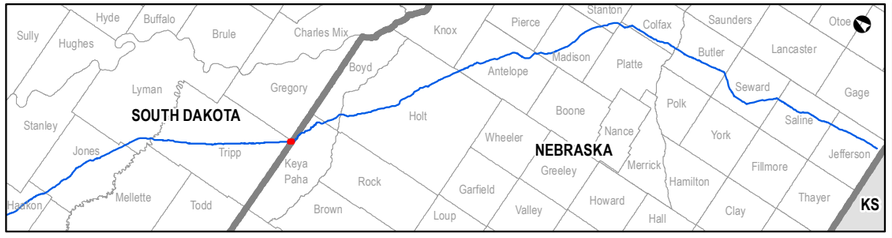

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
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2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	26

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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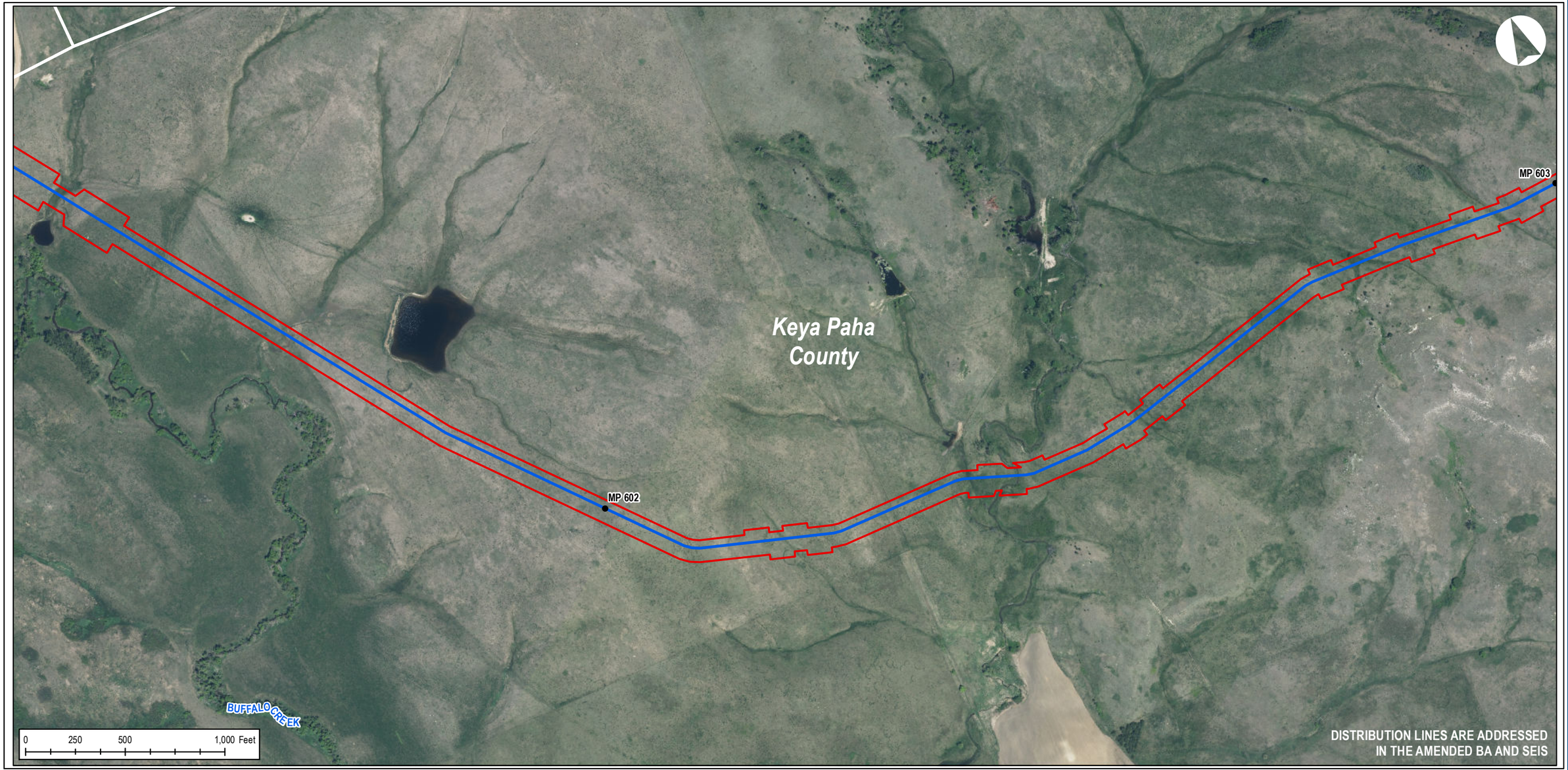

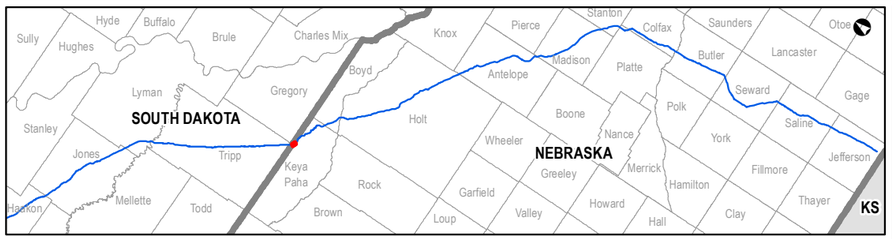

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

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2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	27

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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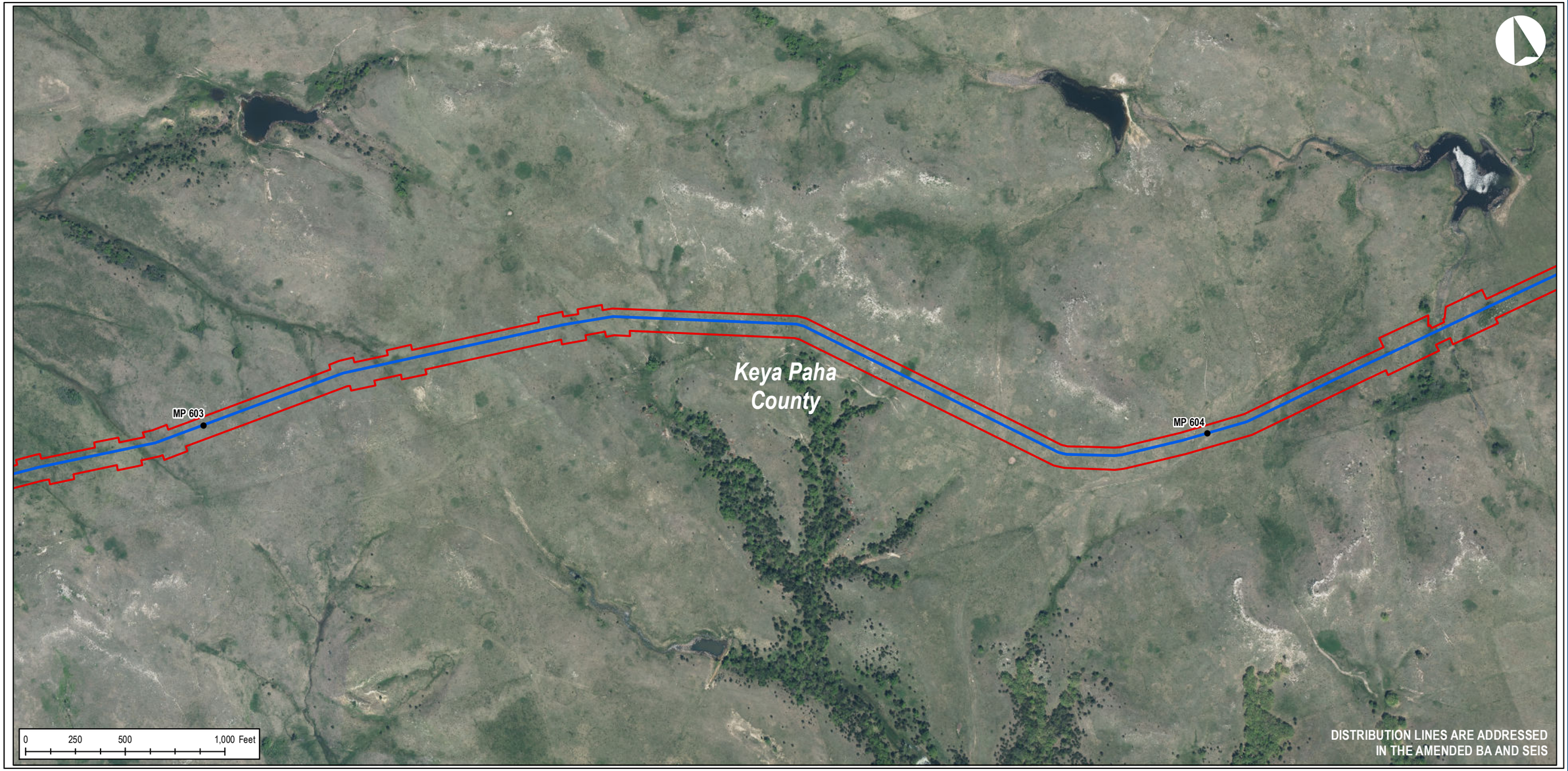

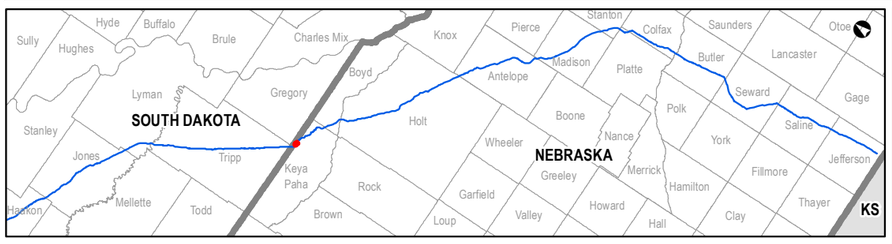

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

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2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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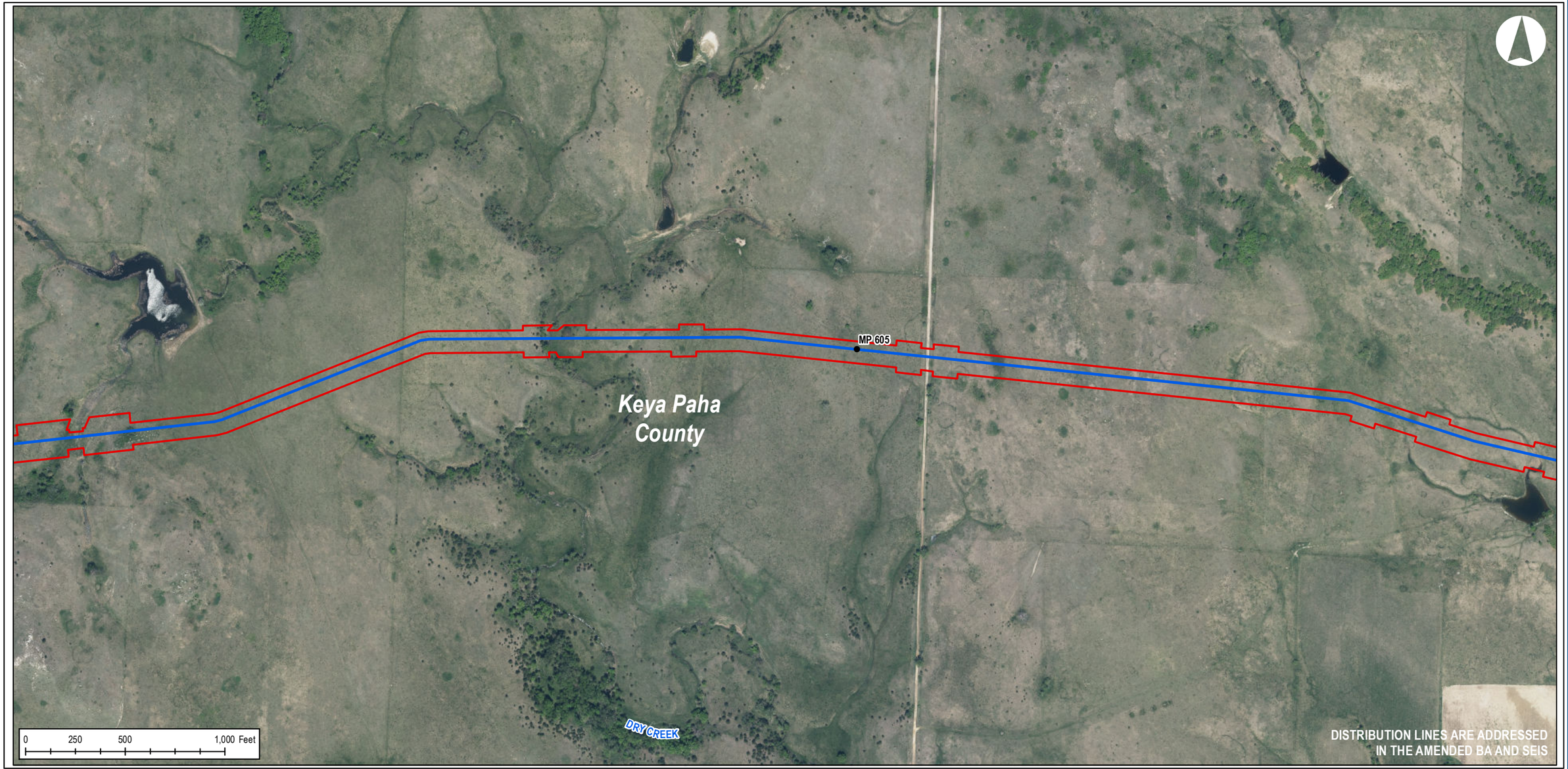

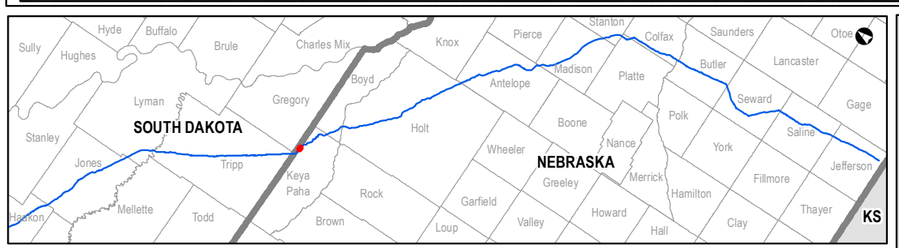

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

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KEYSTONE XL PROJECT

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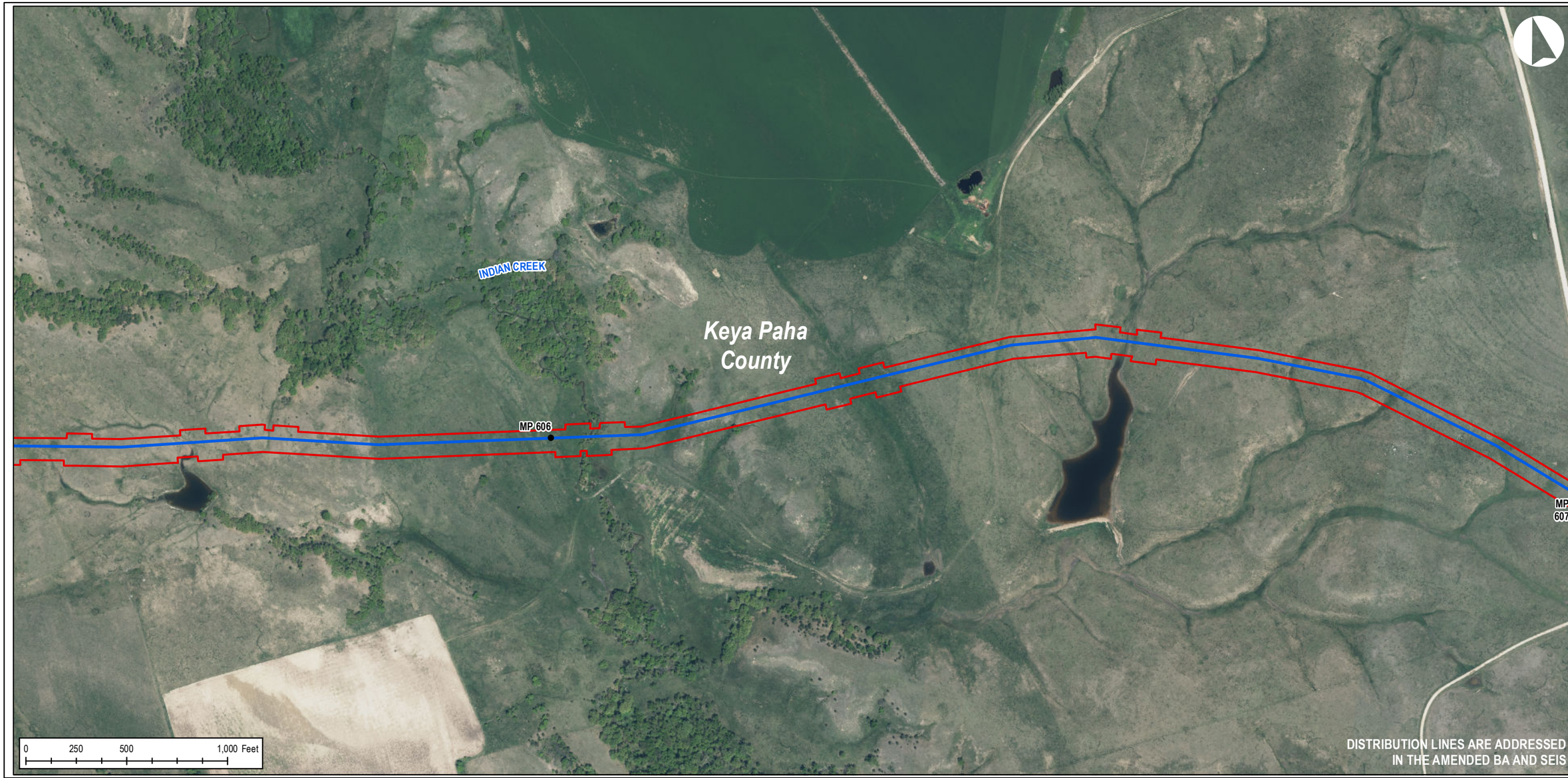
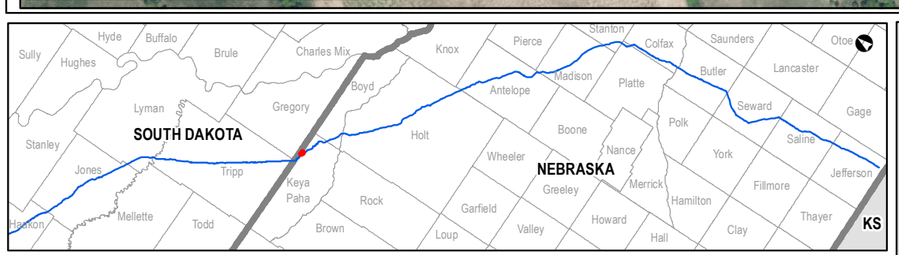
DWG:	0801-03-026-ROW	SHEET:	29

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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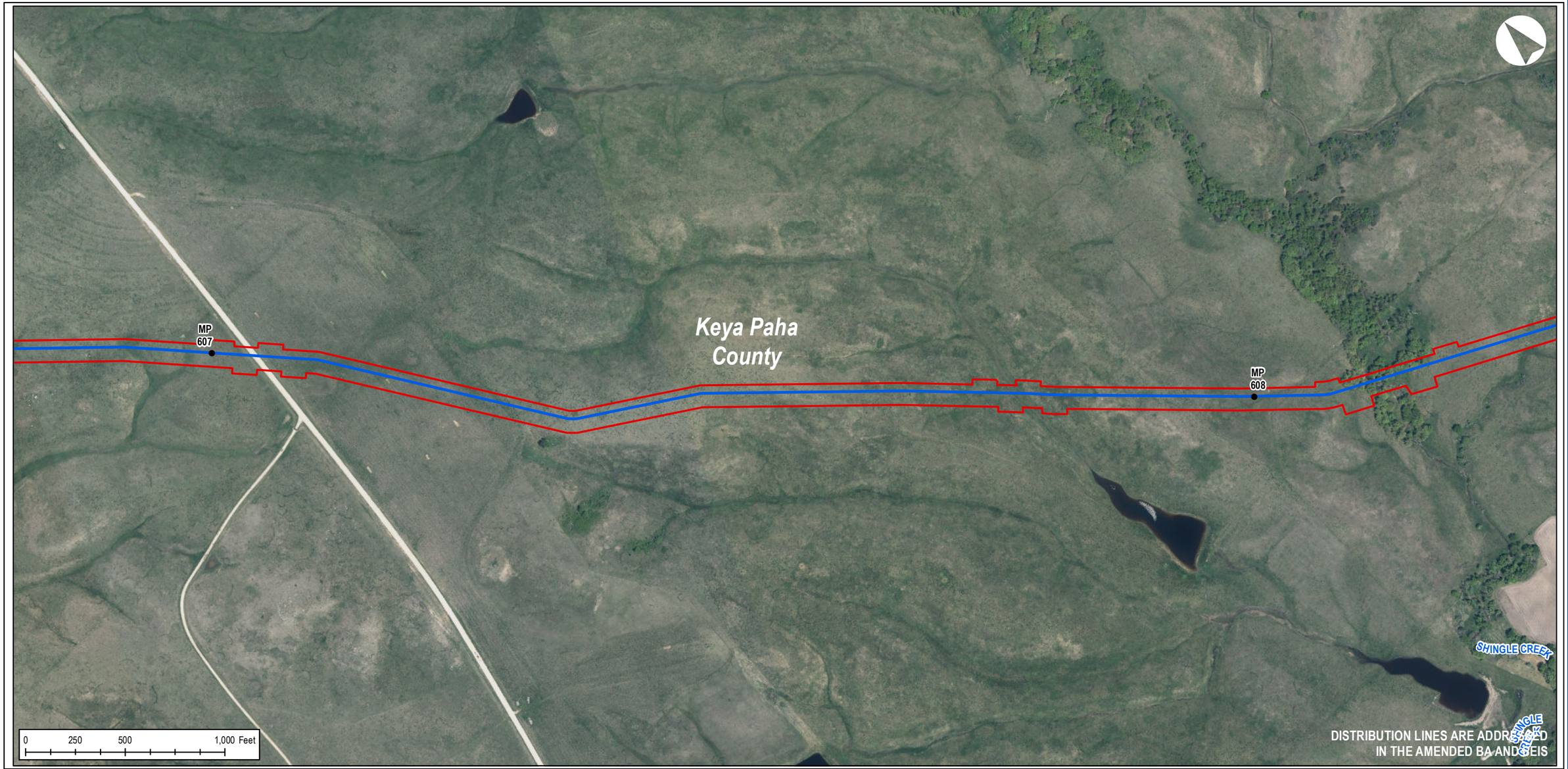
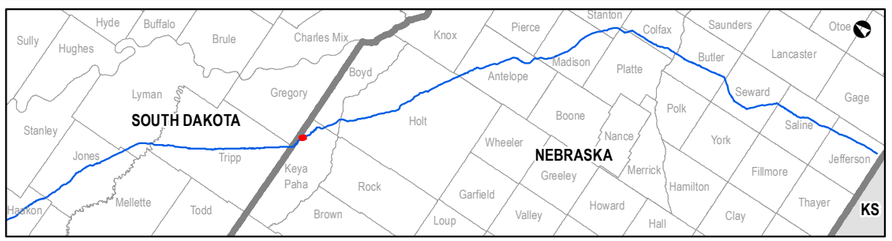
DWG:	0801-03-026-ROW	SHEET:	30

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

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ABB HABITAT RATING

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KEYSTONE XL PROJECT

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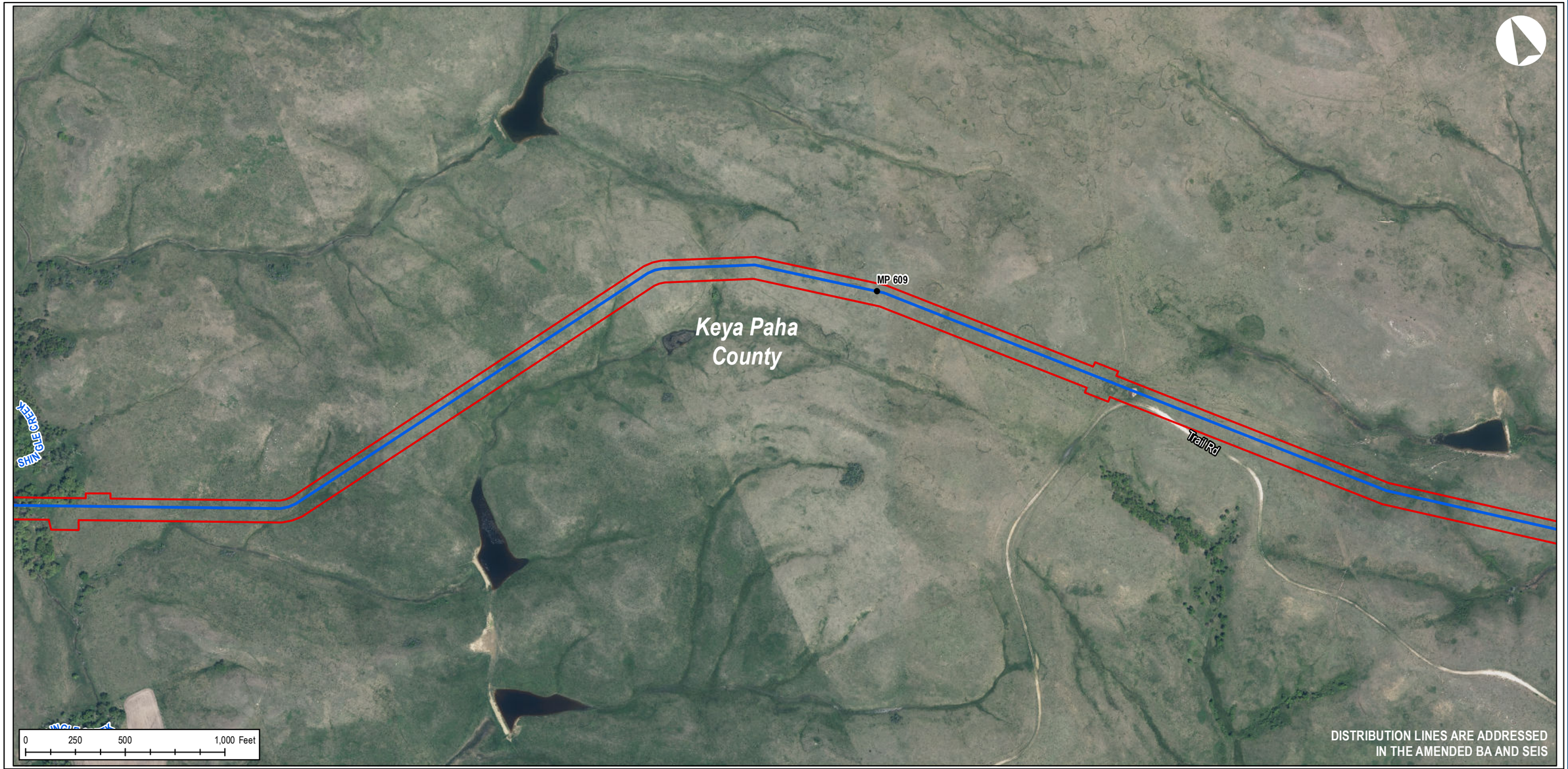
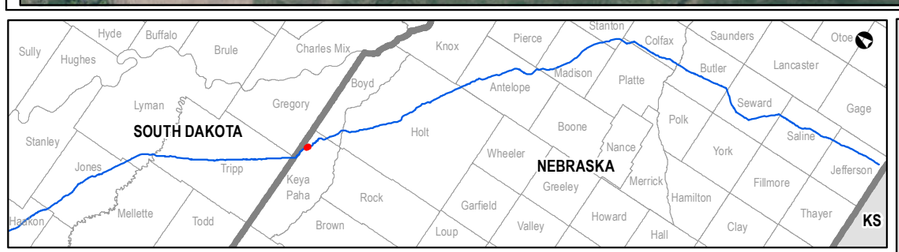
DWG:	0801-03-026-ROW	SHEET:	31

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

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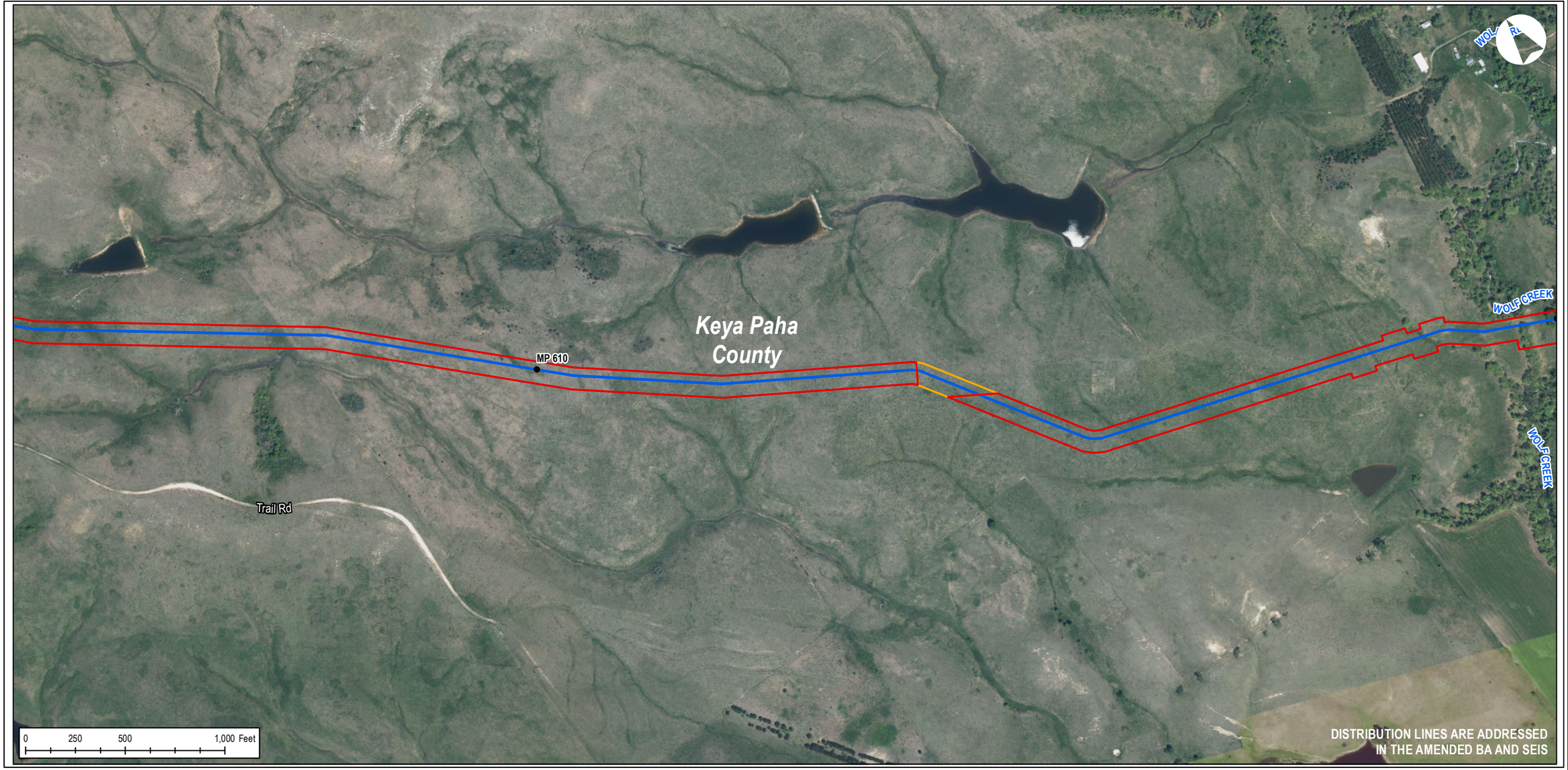
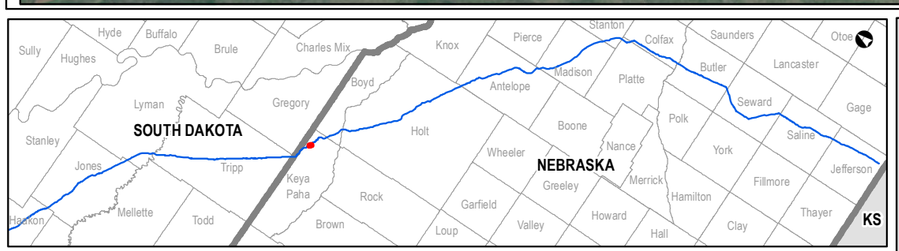
DWG:	0801-03-026-ROW	SHEET:	32

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

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ABB HABITAT RATING

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2018 FLOWN IMAGERY

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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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DWG:	0801-03-026-ROW	SHEET:	33

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

WOLF CREEK

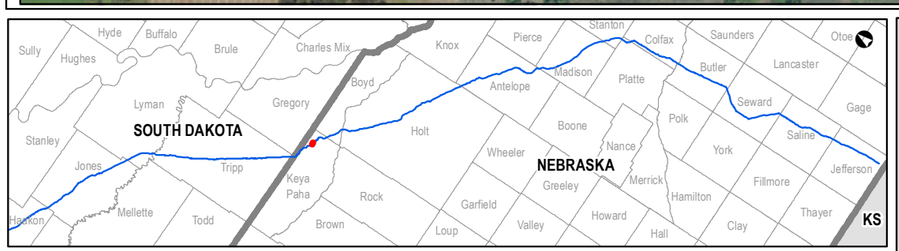
Keya Paha County

MP 611

MP 612

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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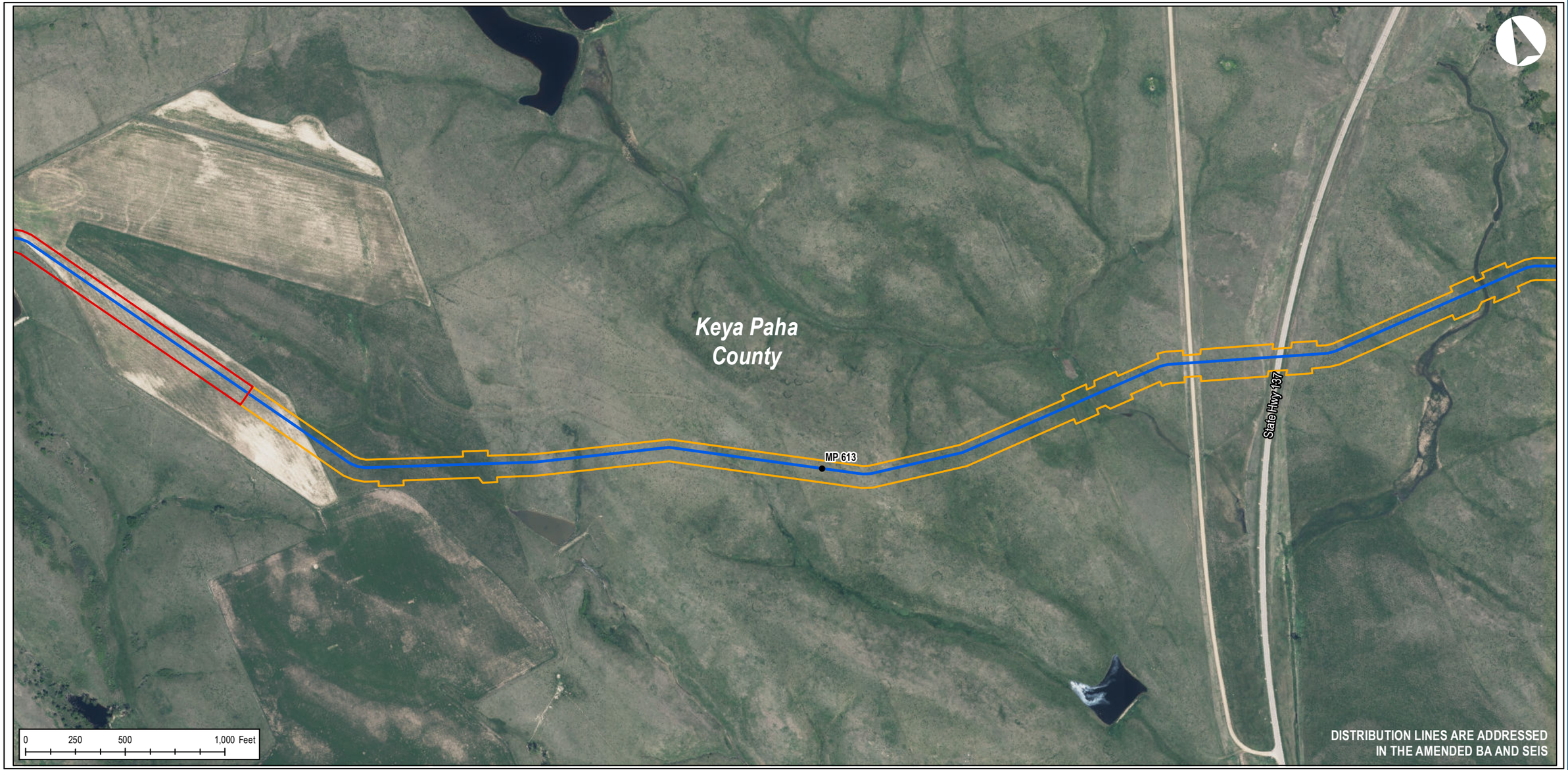
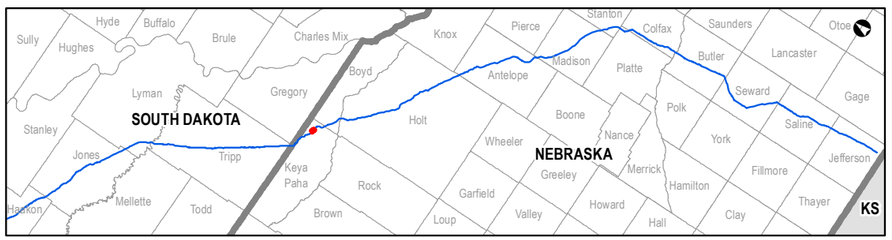
DWG:	0801-03-026-ROW	SHEET:	34

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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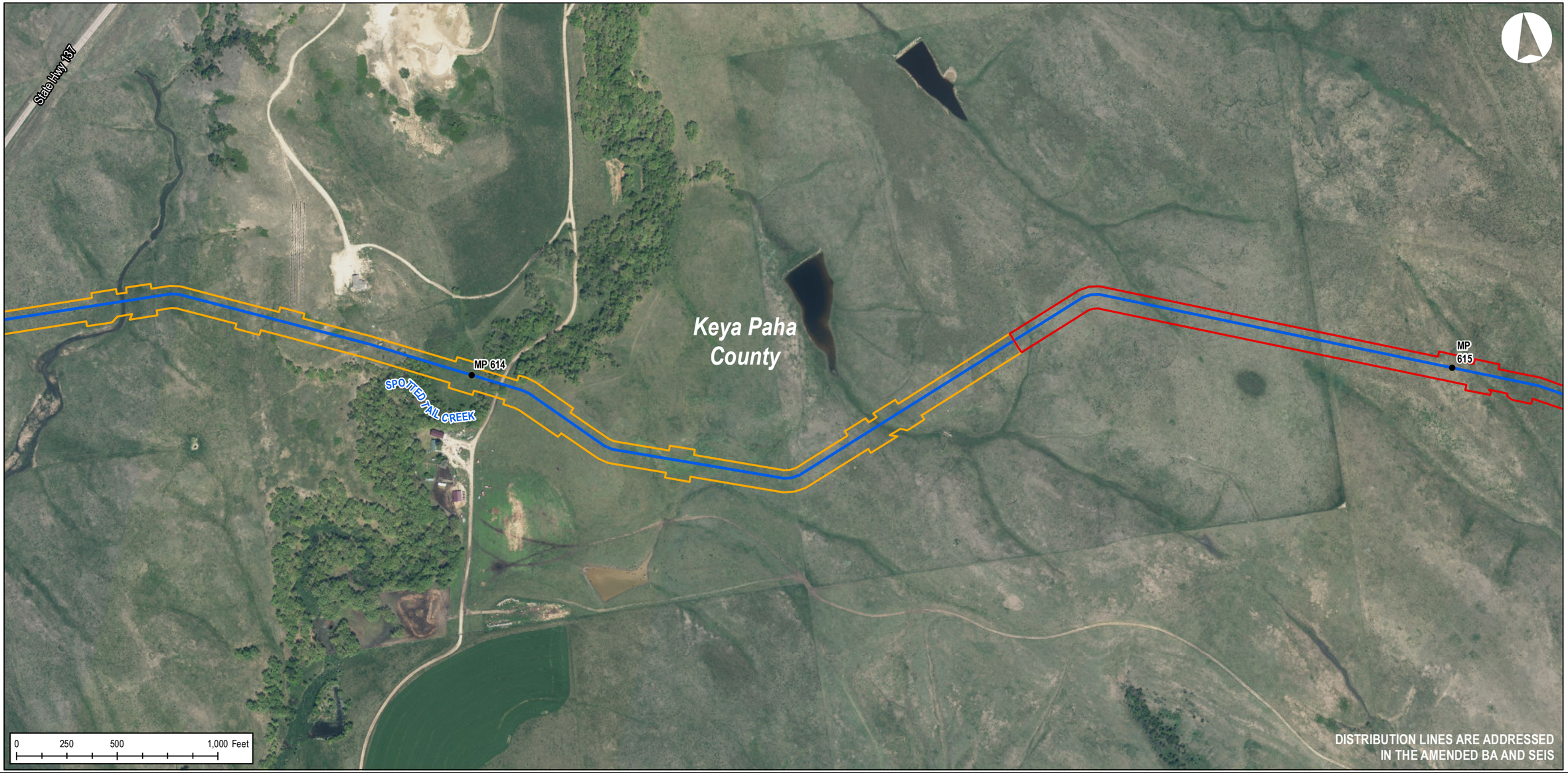
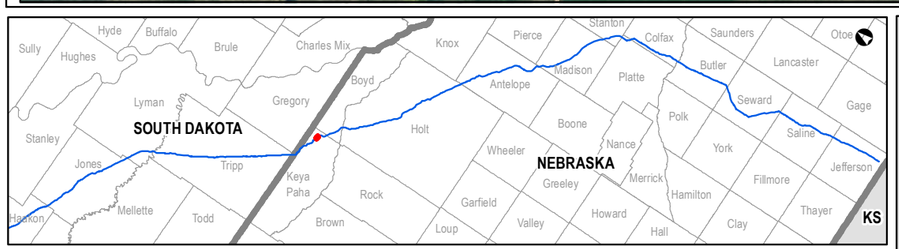
DWG:	0801-03-026-ROW	SHEET:	35

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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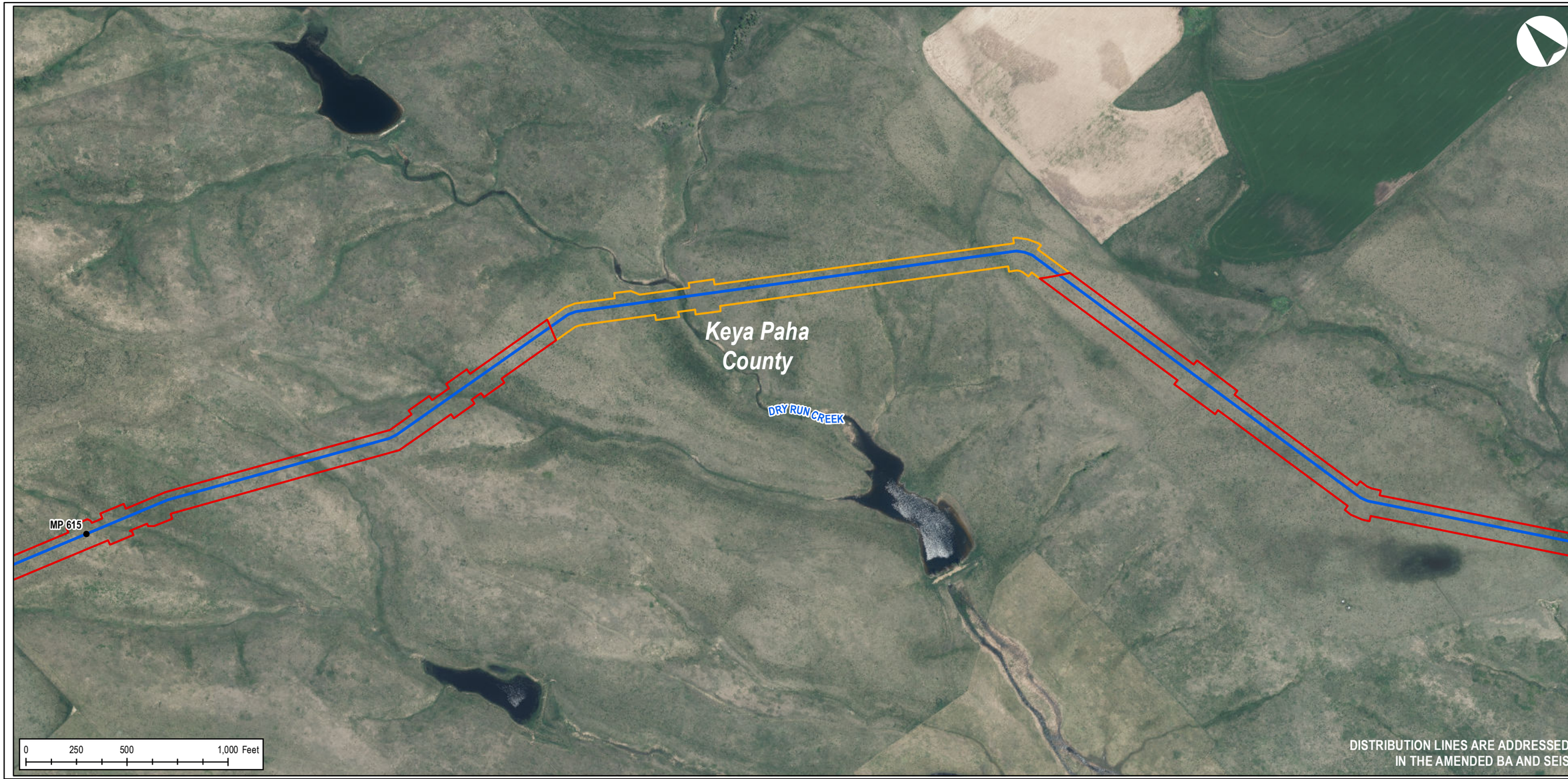
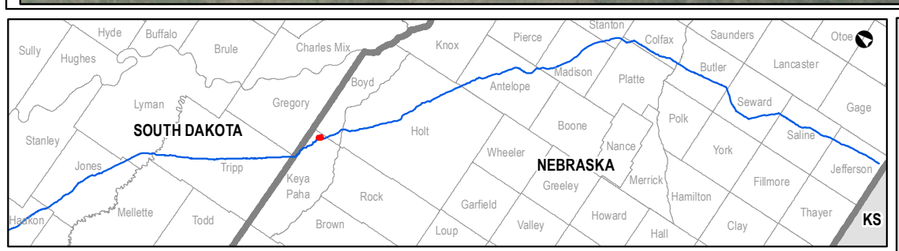
DWG:	0801-03-026-ROW	SHEET:	36

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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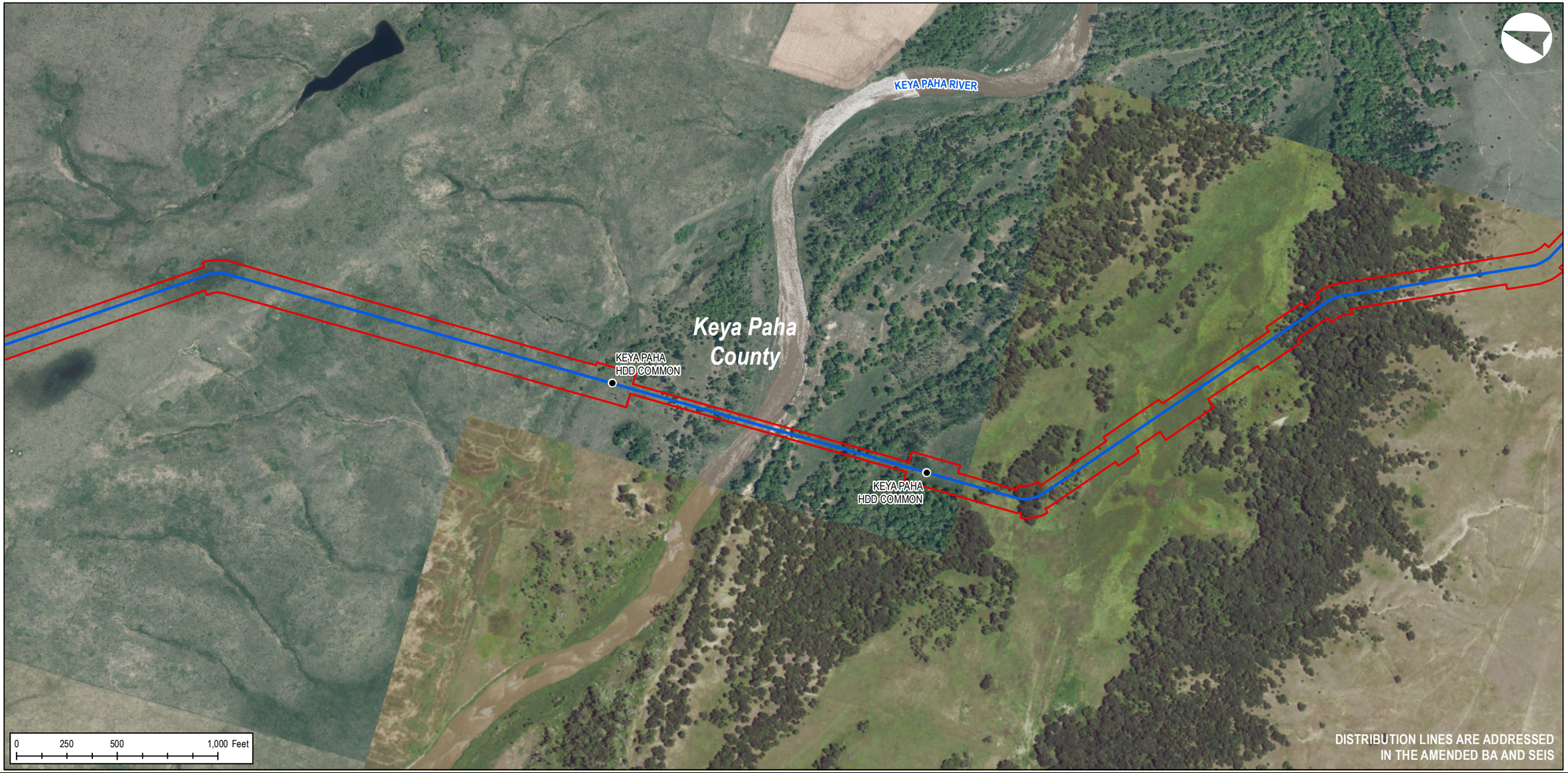
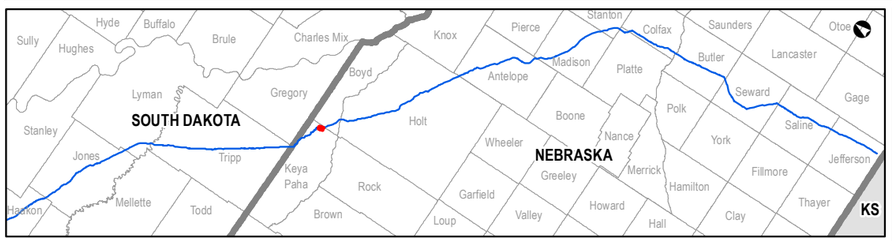
KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- HDD CROSSINGS
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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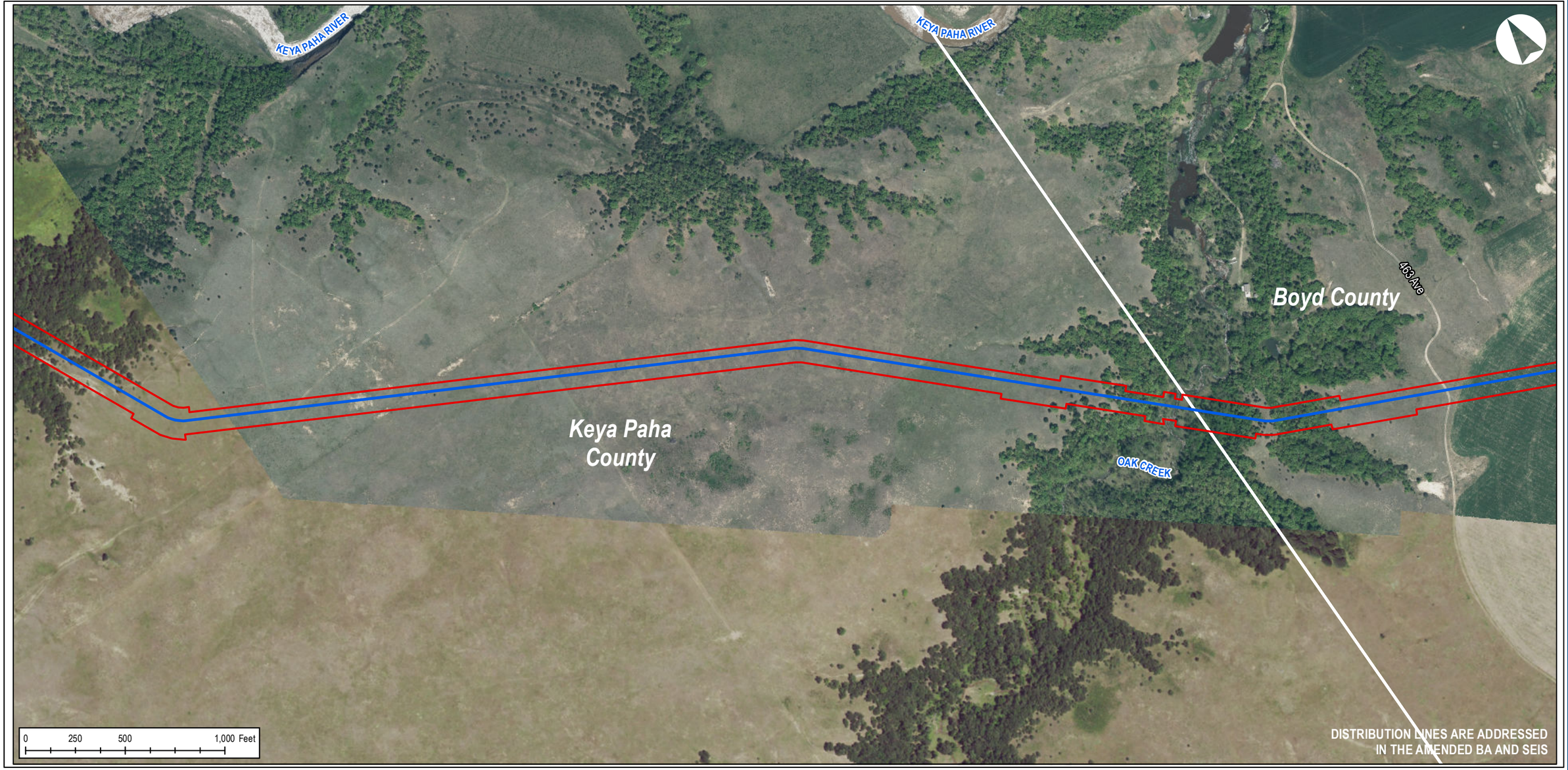

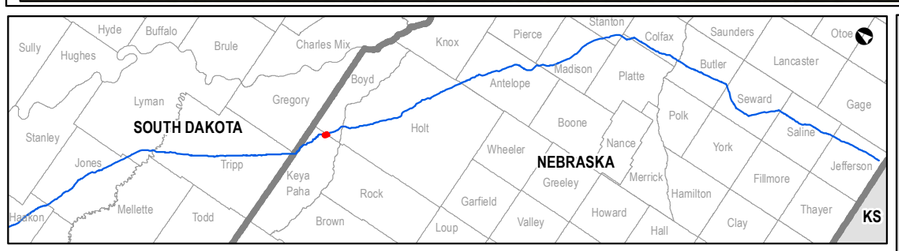

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

KEYSTONE XL ROUTE

ABB HABITAT RATING

PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	KEYA PAHA	**DRAWN BY:**	ES
STATE:	NEBRASKA	**CHECKED BY:**	DH

REV. NO.:	REVISION:	DATE:
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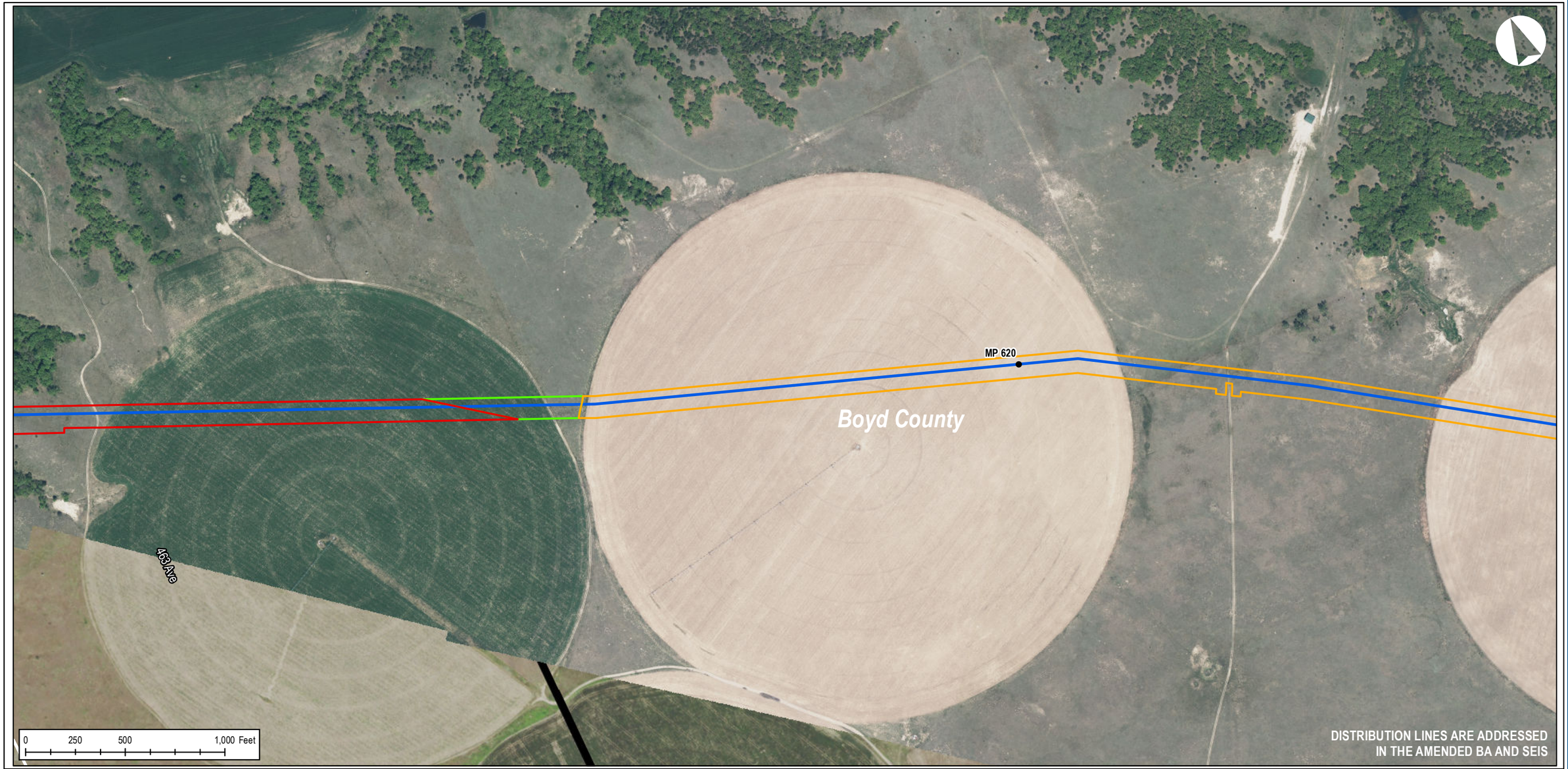
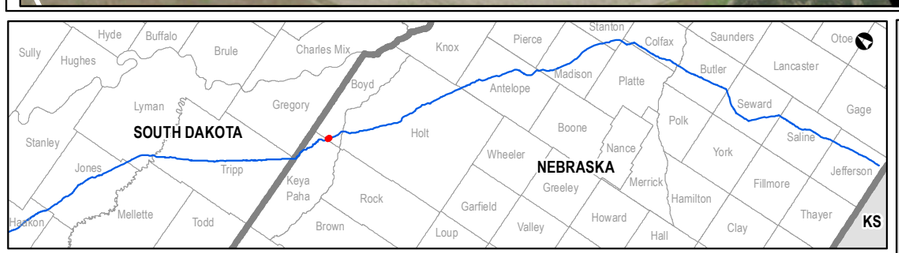
DWG:	0801-03-026-ROW	**SHEET:**	39

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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DWG:	0801-03-026-ROW	SHEET:	40

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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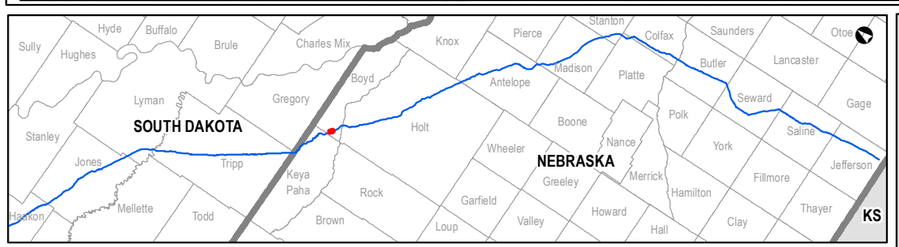

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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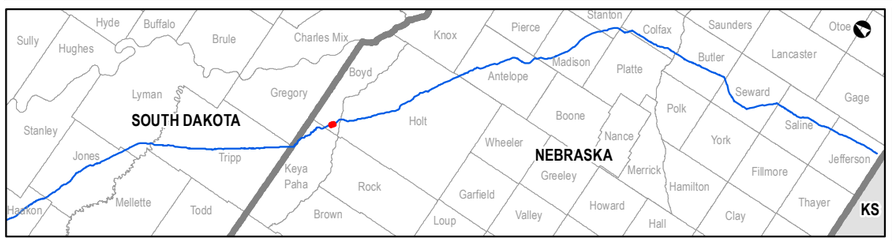
DWG:	0801-03-026-ROW	SHEET:	41

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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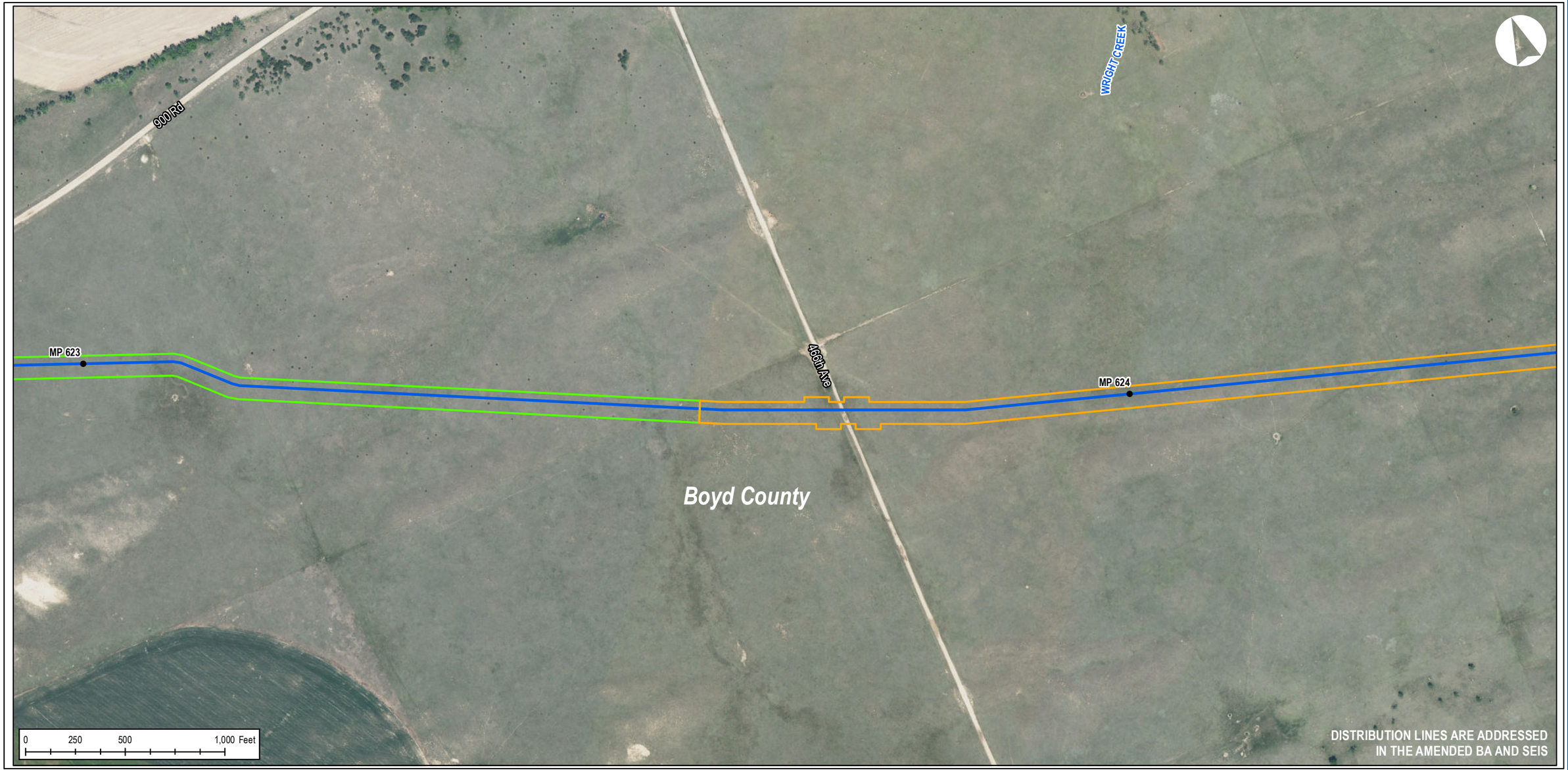
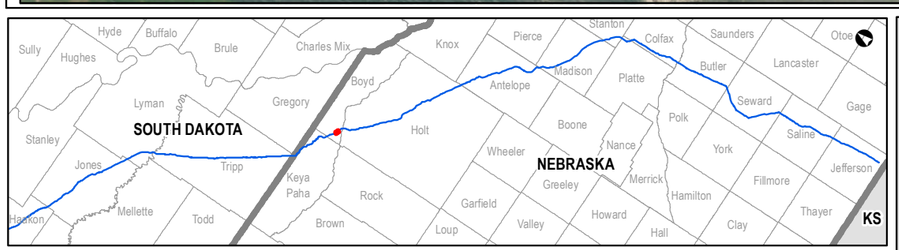
DWG:	0801-03-026-ROW	SHEET:	42

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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DWG:	0801-03-026-ROW	SHEET:	43

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

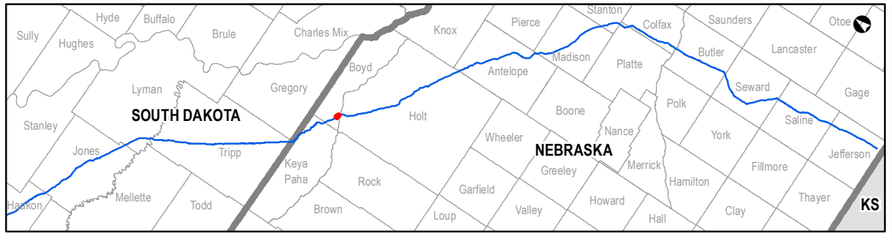
TC Energy

MP 625

Boyd County

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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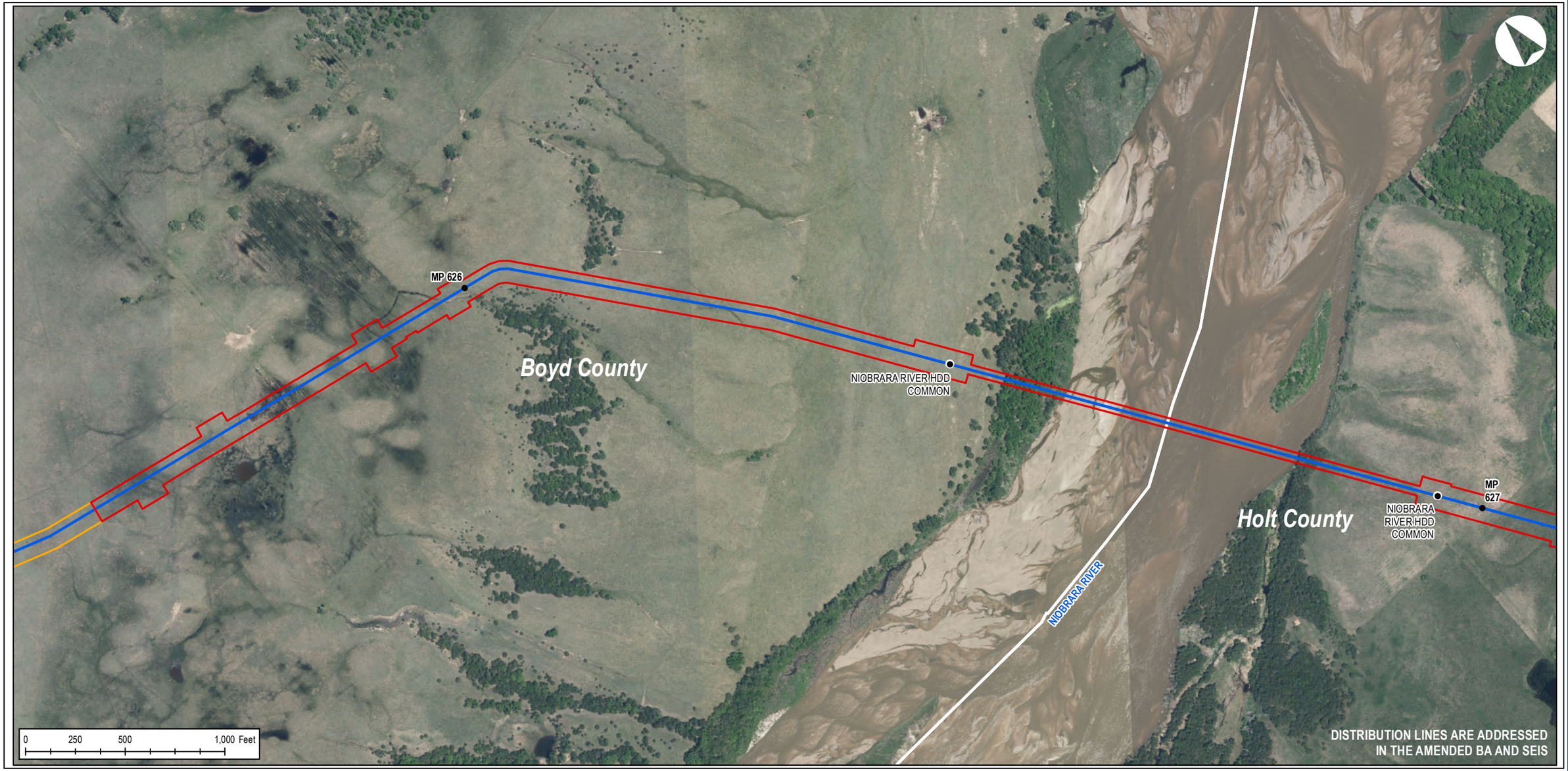
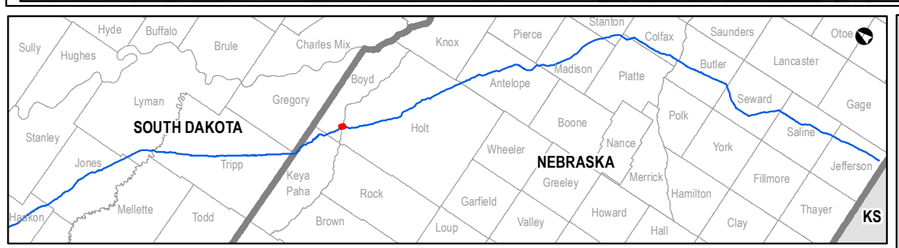
DWG:	0801-03-026-ROW	SHEET:	44

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- HDD CROSSINGS
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	BOYD	DRAWN BY:	ES
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DWG:	0801-03-026-ROW	SHEET:	45

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

469 Ave

Holt County

NIOBRARA RIVER HDD COMMON

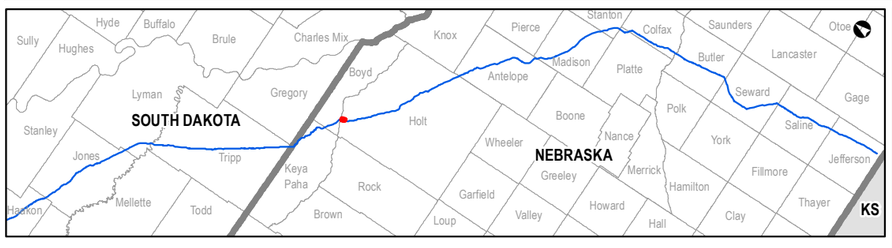
MP 627

MP 628

BEAVER CREEK

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- HDD CROSSINGS
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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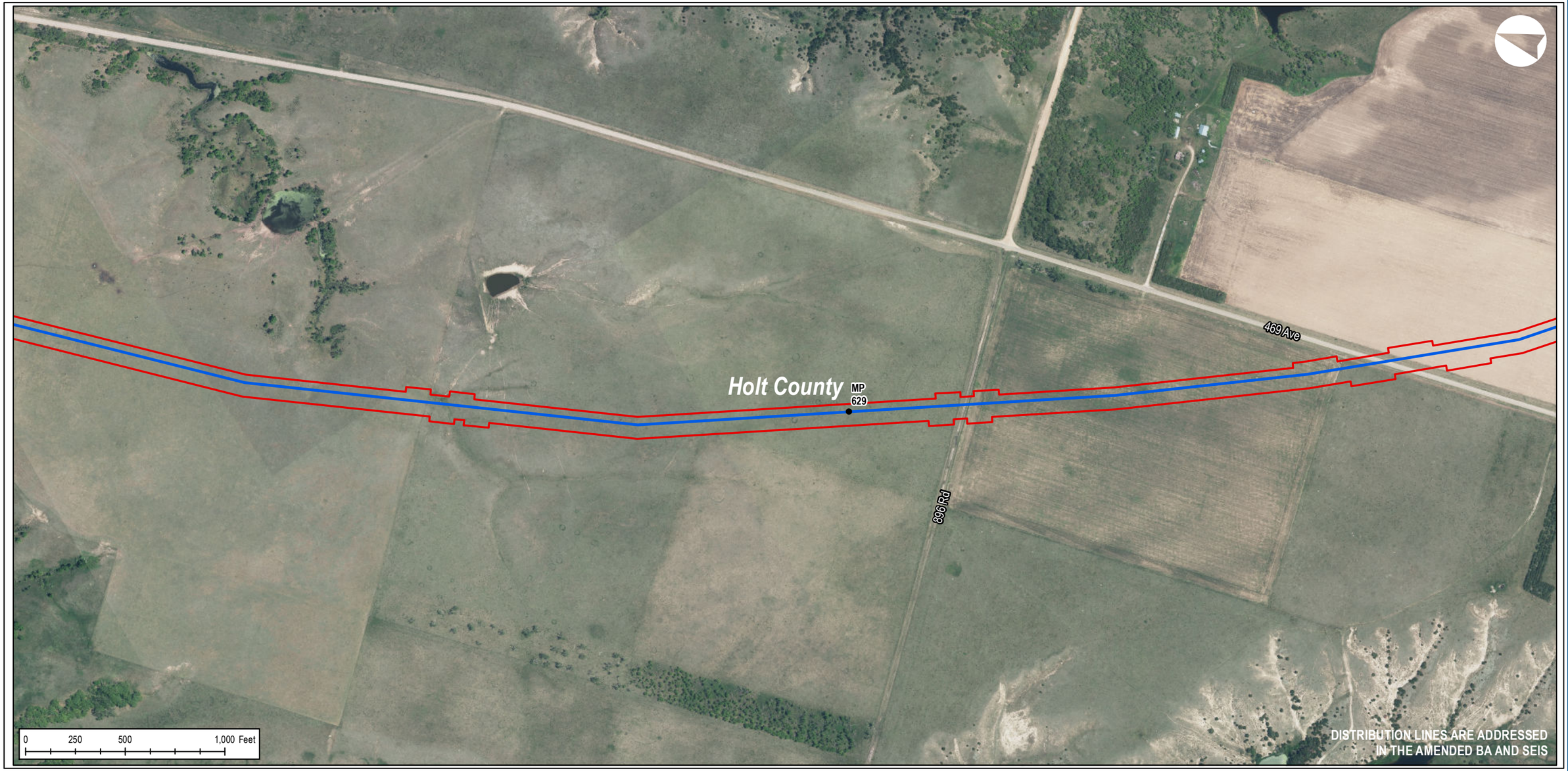
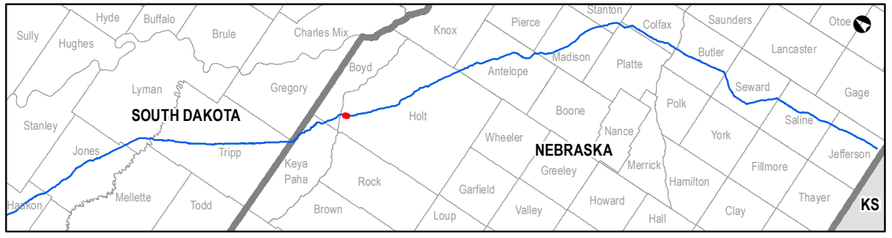
DWG:	0801-03-026-ROW	SHEET:	46

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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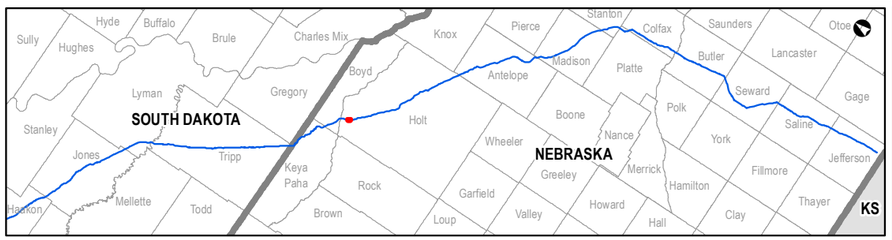
KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

PREPARED BY:

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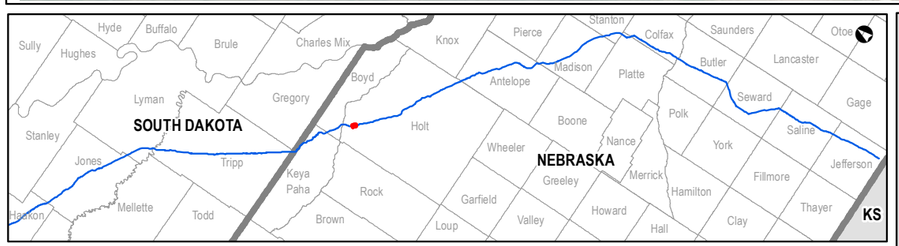
DWG:	0801-03-026-ROW	SHEET:	48

KEYSTONE XL PROJECT - VICINITY MAP

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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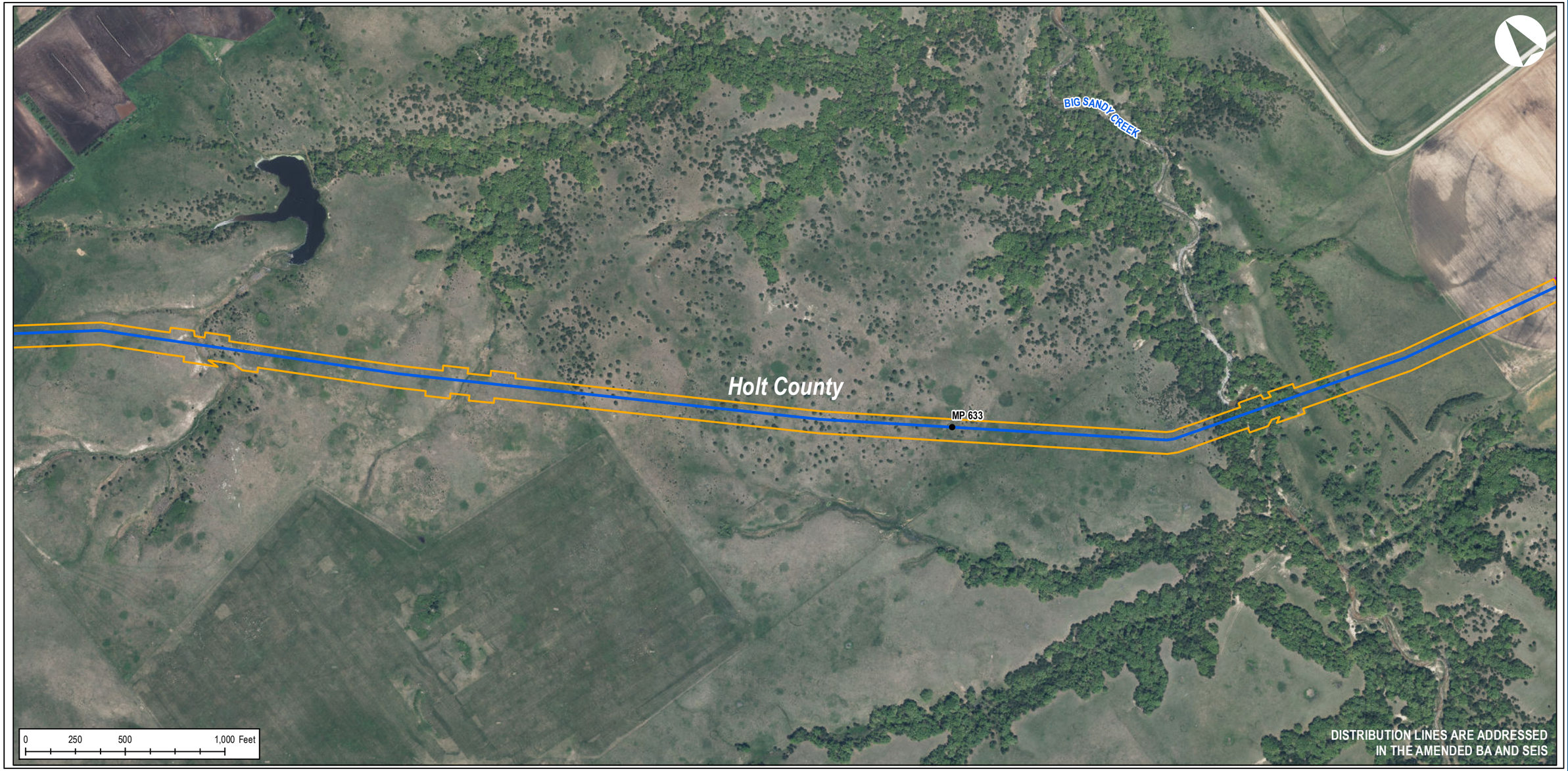
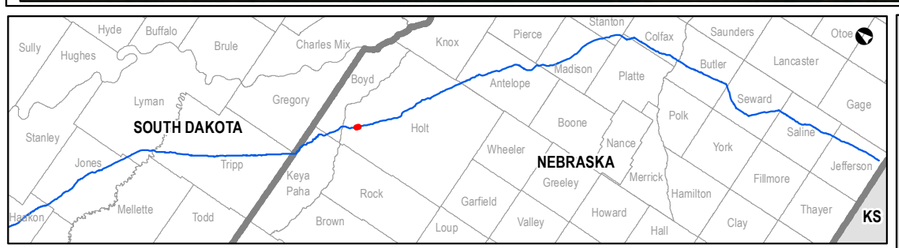
DWG:	0801-03-026-ROW	SHEET:	49

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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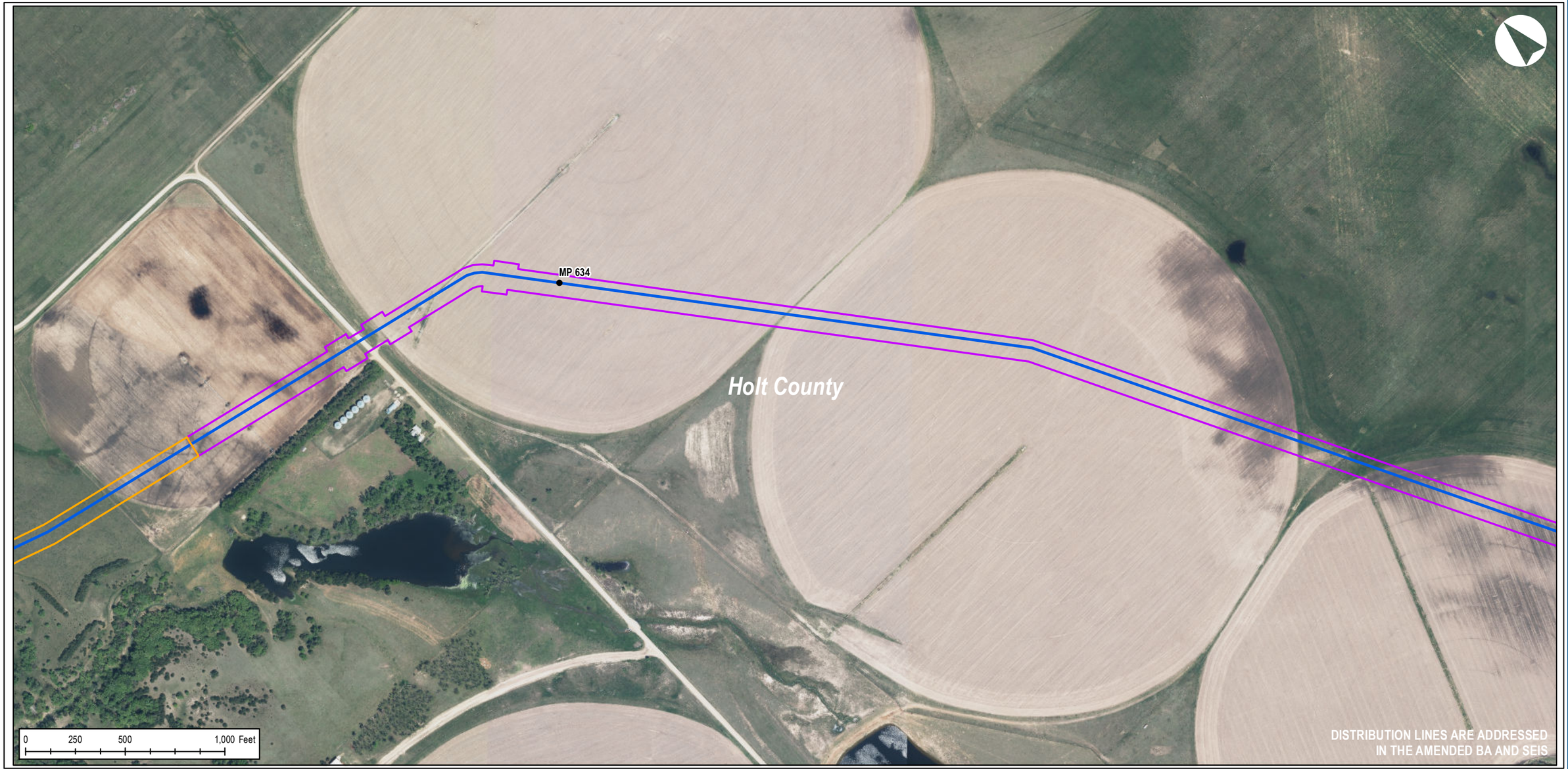
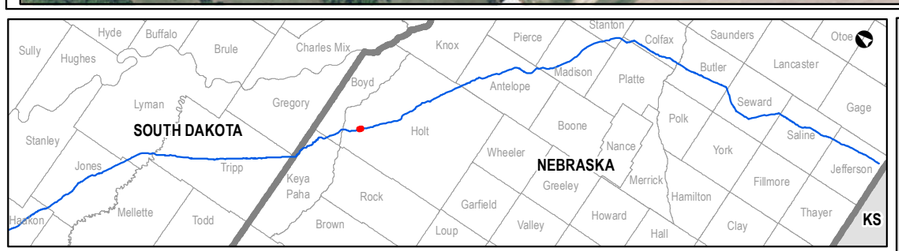
DWG:	0801-03-026-ROW	SHEET:	50

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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STATE:	NEBRASKA	CHECKED BY:	DH

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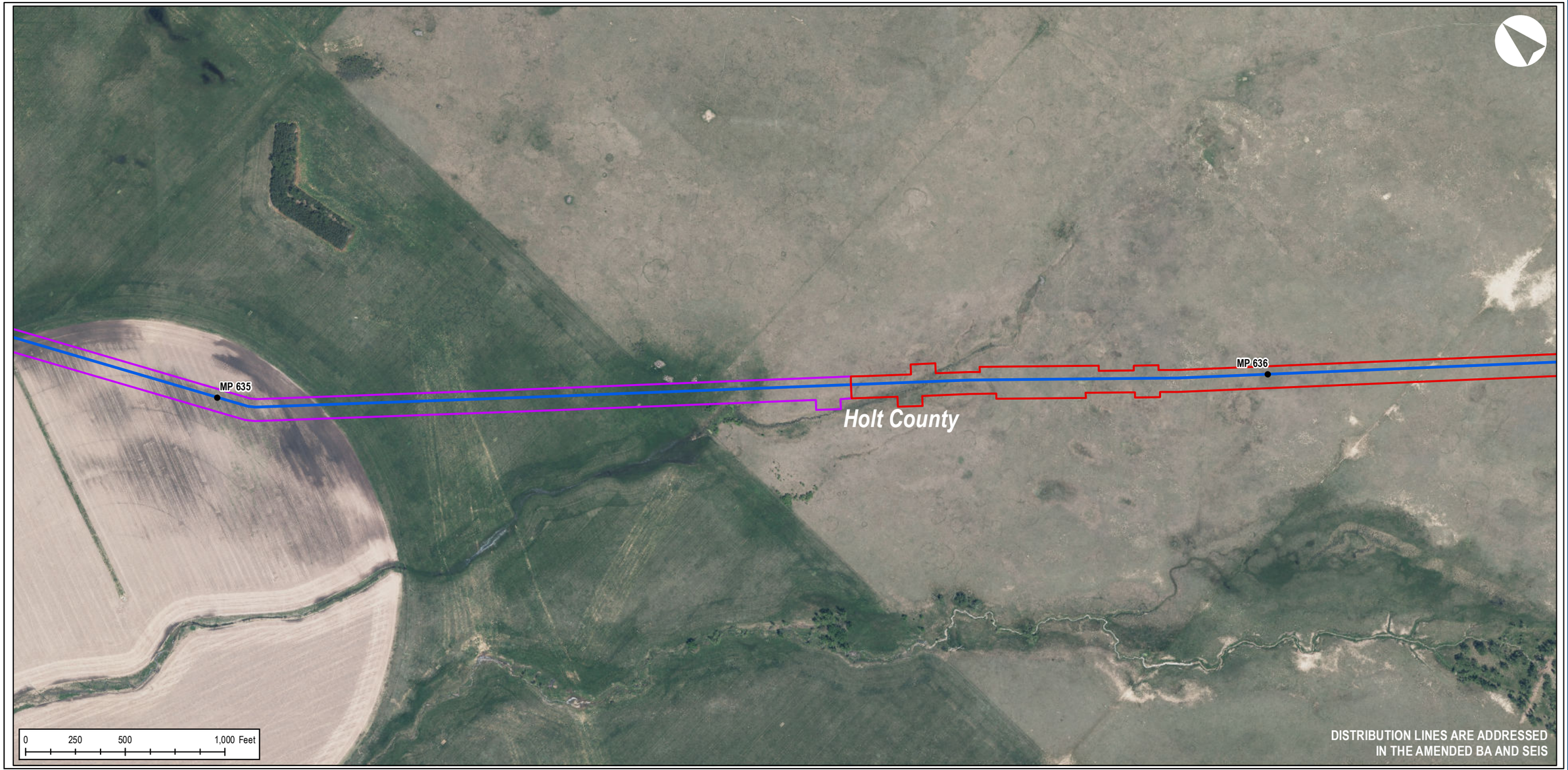
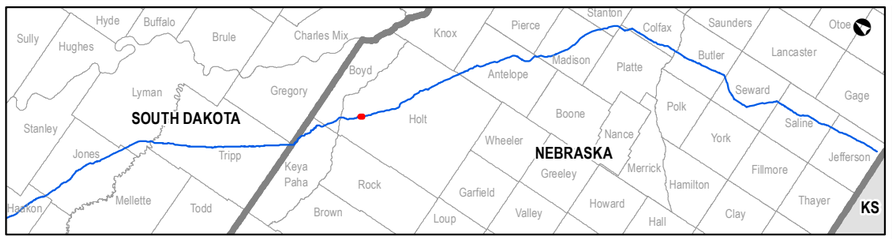
DWG:	0801-03-026-ROW	SHEET:	51

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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STATE:	NEBRASKA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	52

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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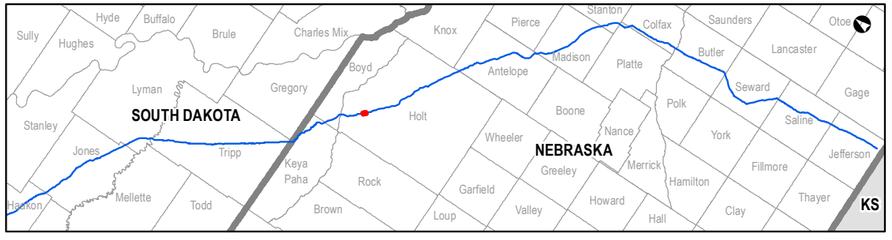

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- FAIR
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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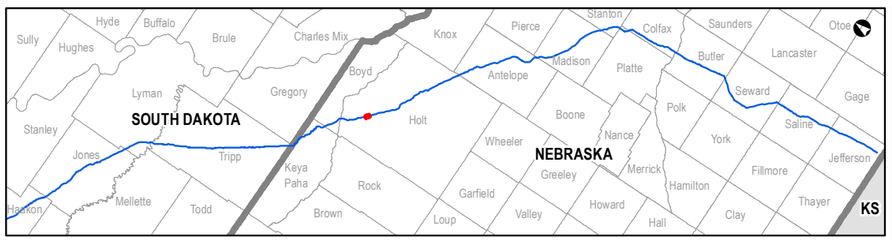

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- FAIR
- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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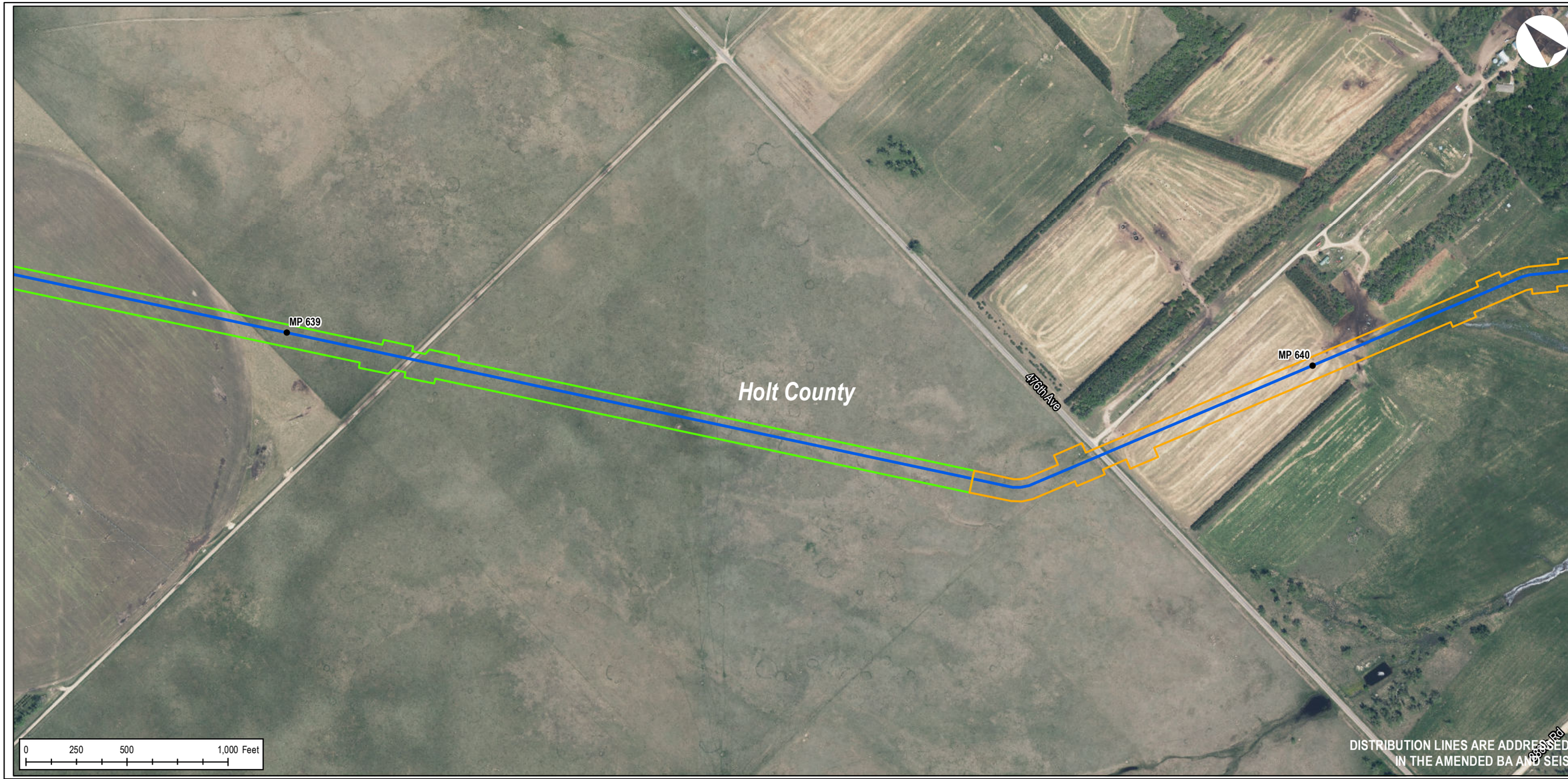

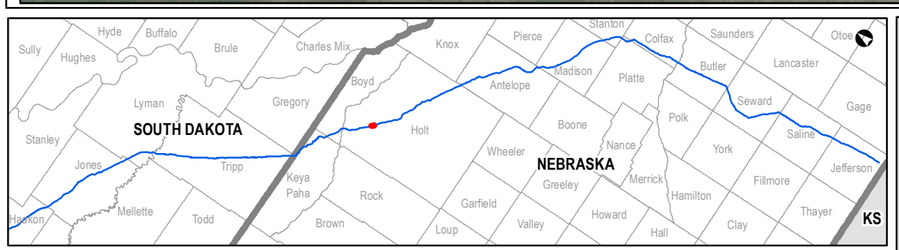

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	55

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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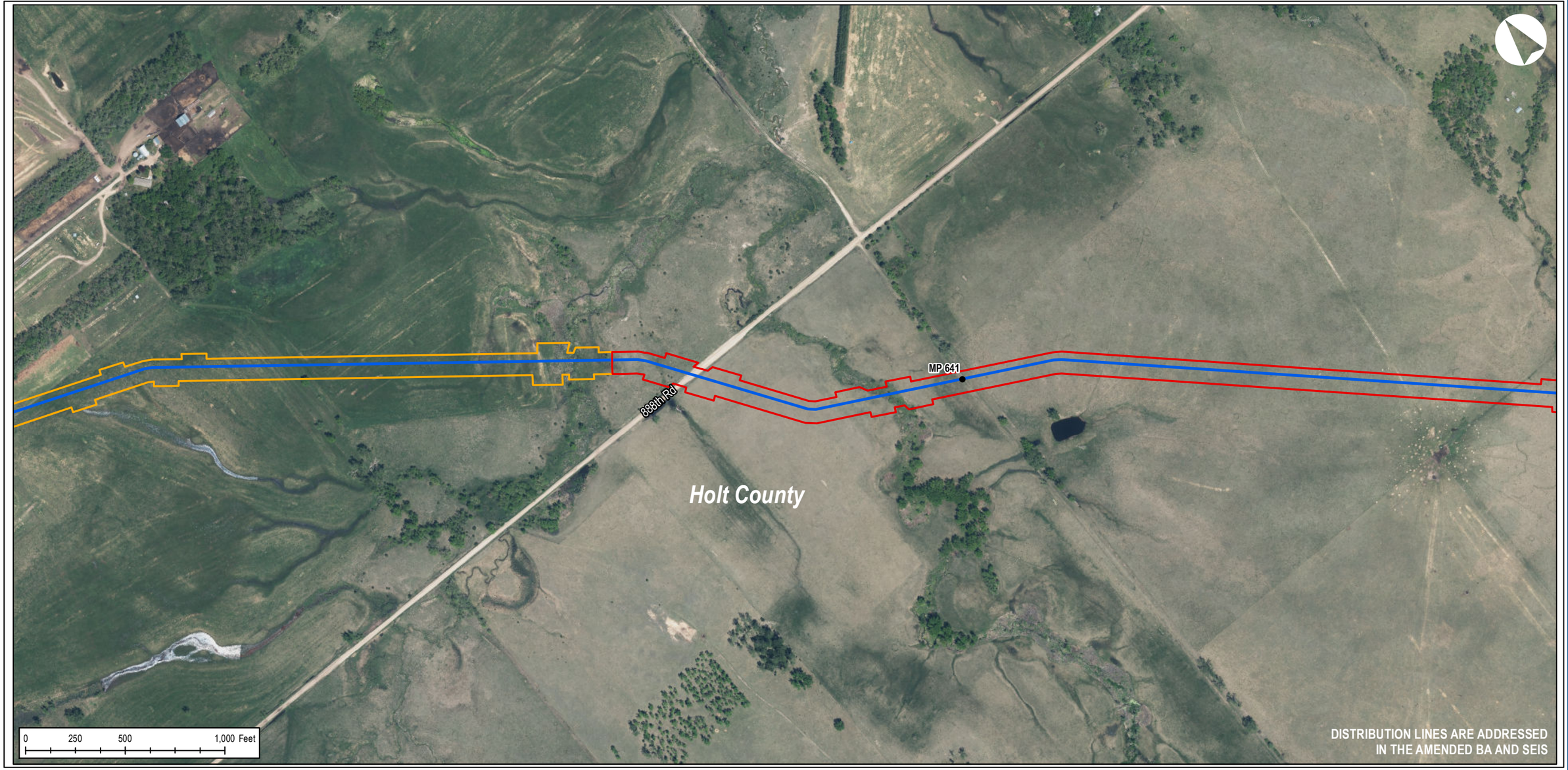

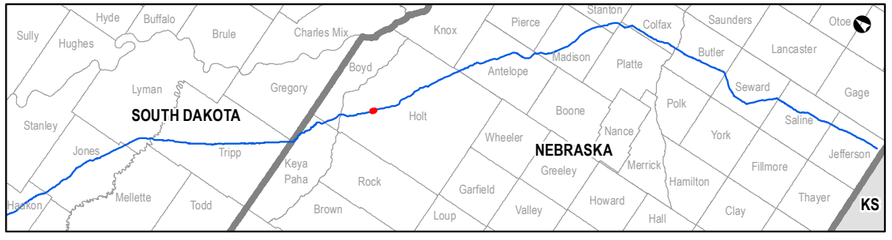

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	56

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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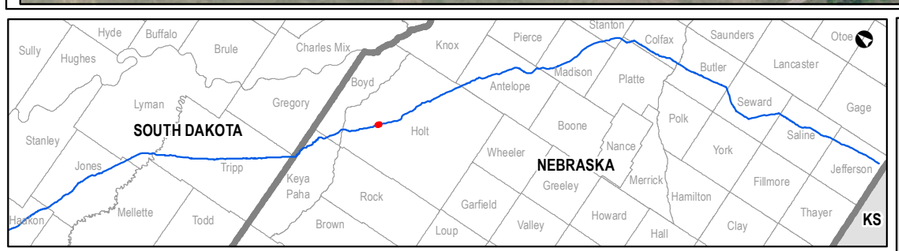

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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DWG:	0801-03-026-ROW	SHEET:	57

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

887th Rd

MP 643

479th Ave

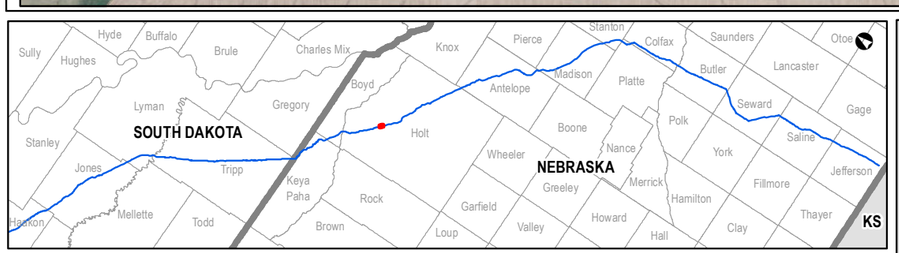
MP 644

Holt County

BRUSH CREEK

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	58

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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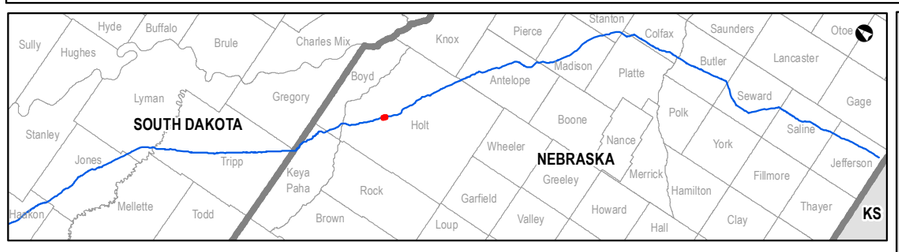

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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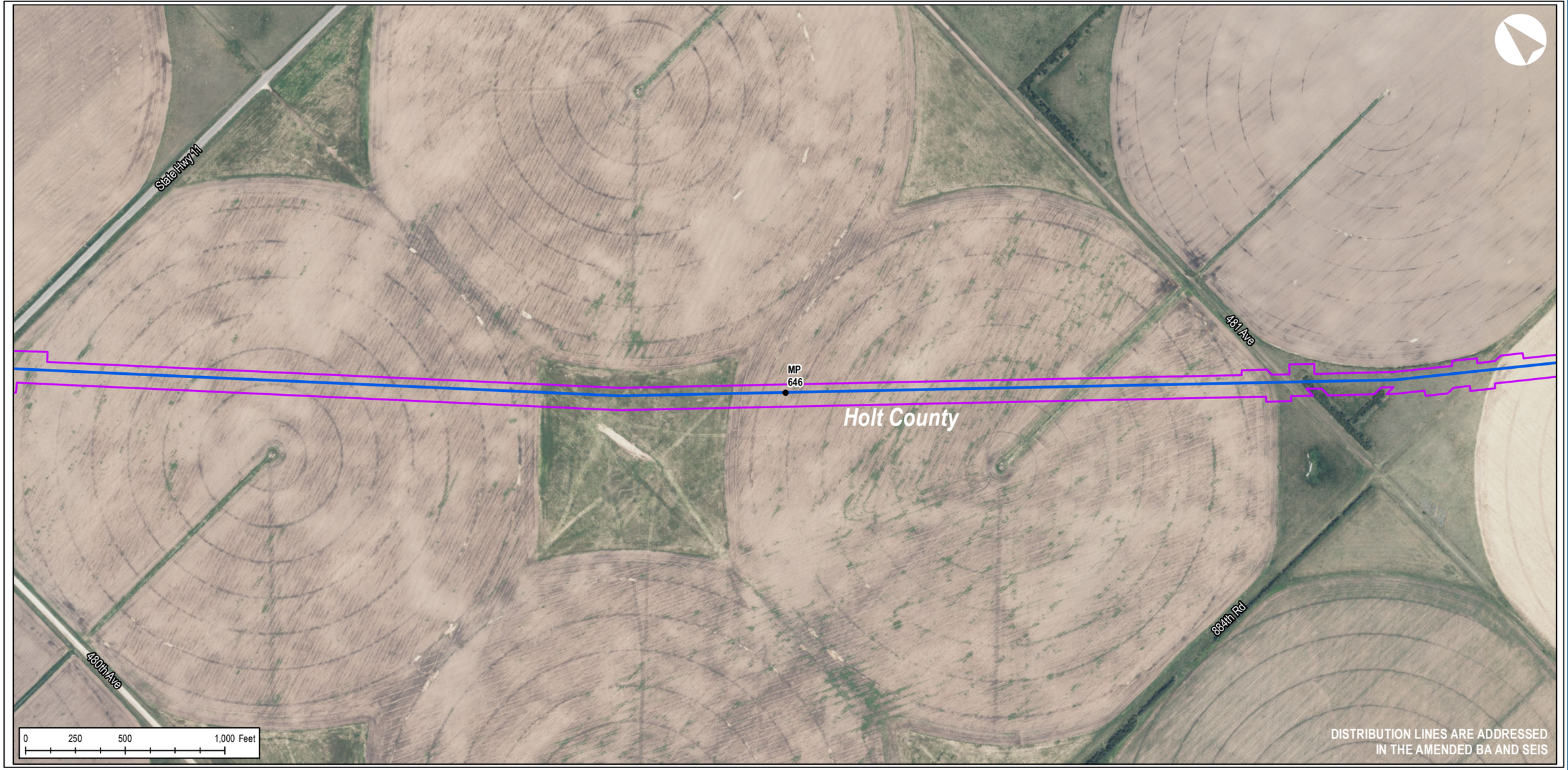
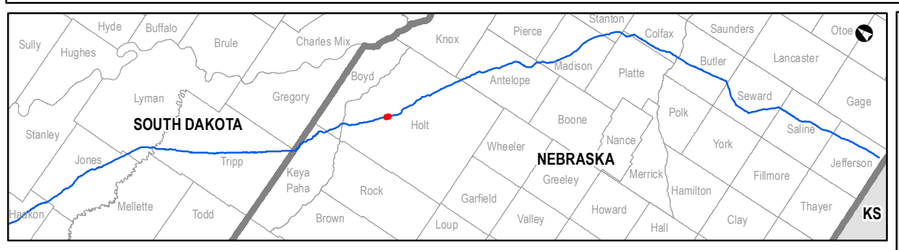
DWG:	0801-03-026-ROW	SHEET:	59

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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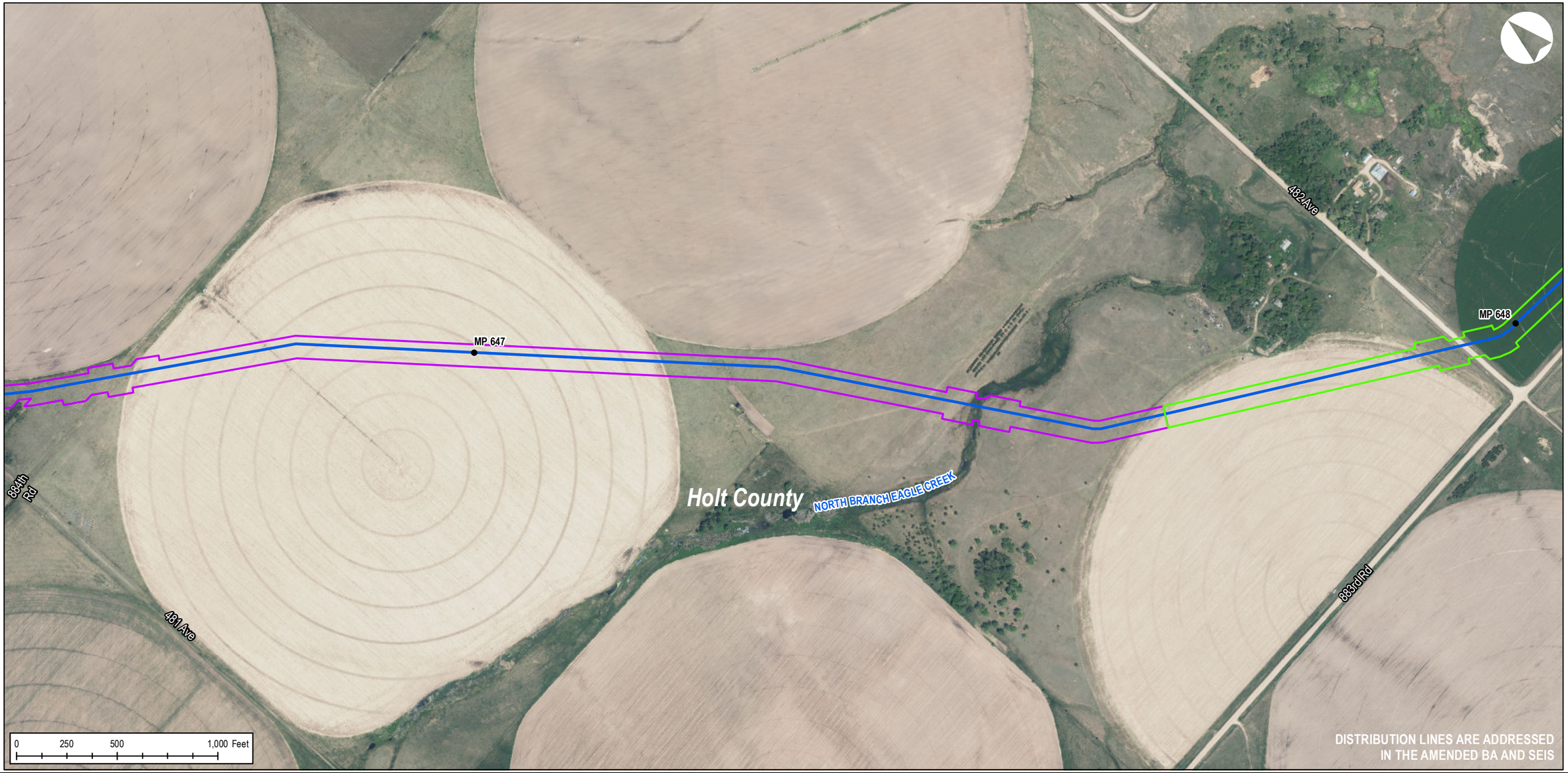
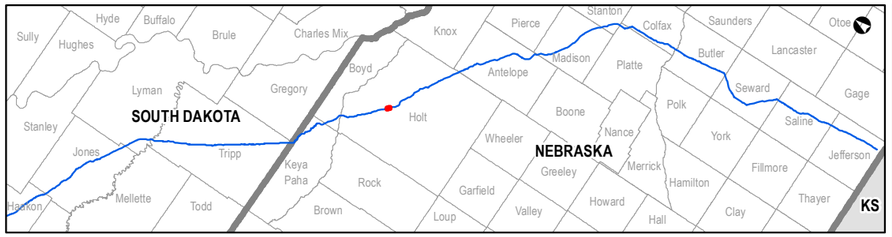
DWG:	0801-03-026-ROW	SHEET:	60

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-ROW	SHEET:	61

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy

NORTH BRANCH EAGLE CREEK

482 Ave

MP 648

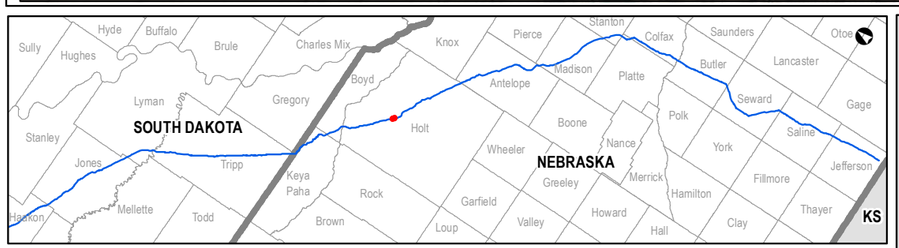
683rd Rd

Holt County

MP 649

0 250 500 1,000 Feet

DISTRIBUTION LINES ARE ADDRESSED IN THE AMENDED BA AND SEIS



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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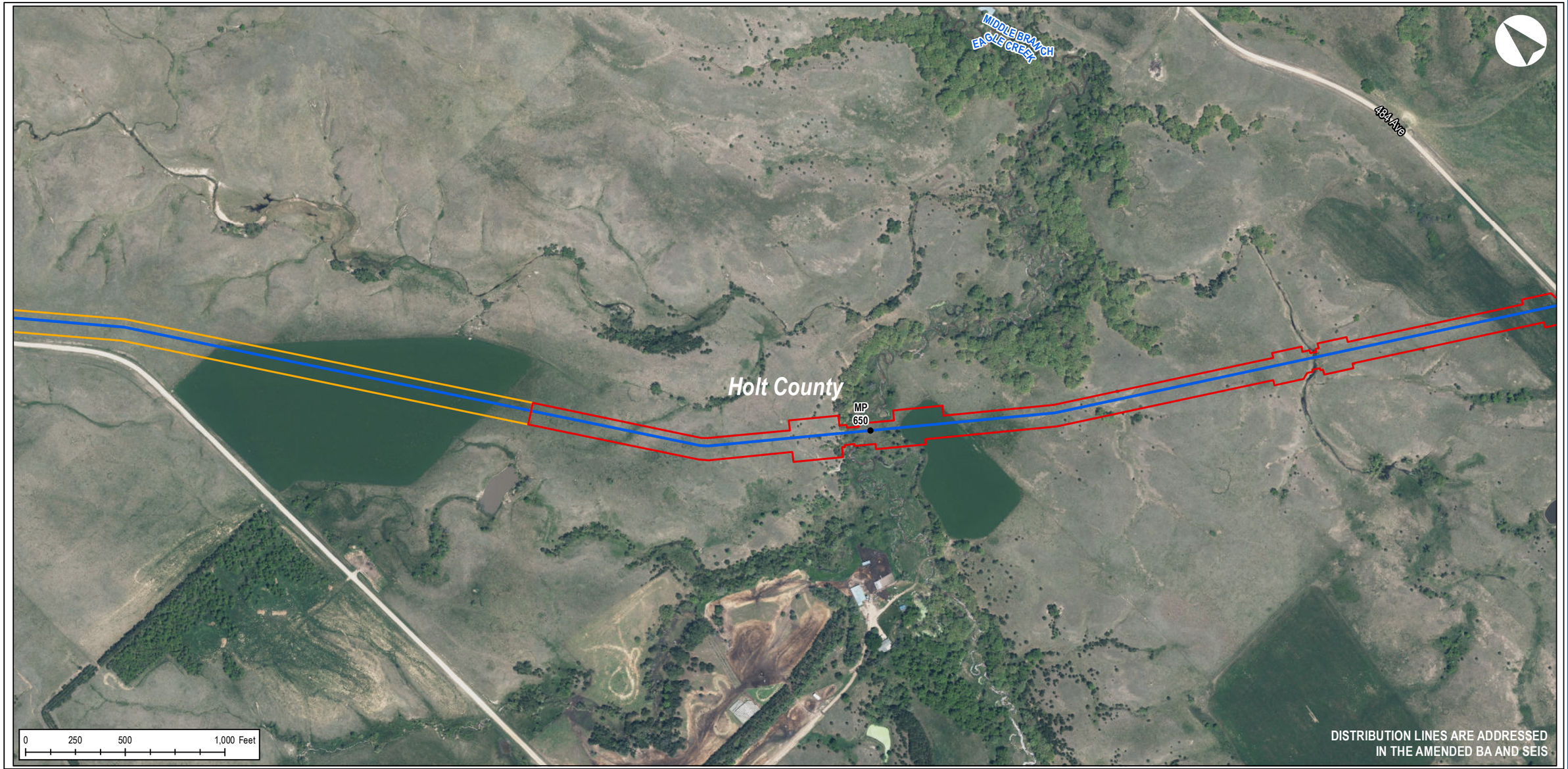

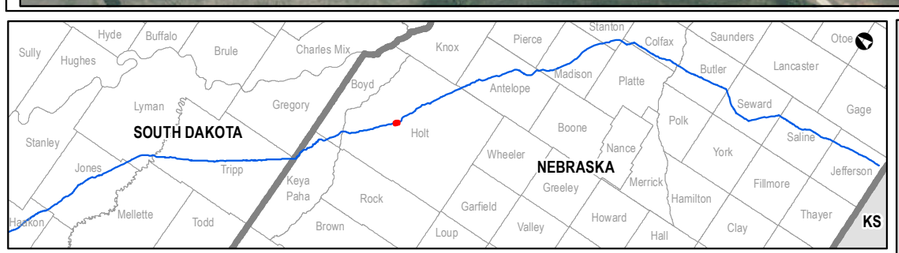

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

REV. NO.:	REVISION:	DATE:
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

DATE:	2020-03-18	PROJECTION:	NAD83 | UTM14 N

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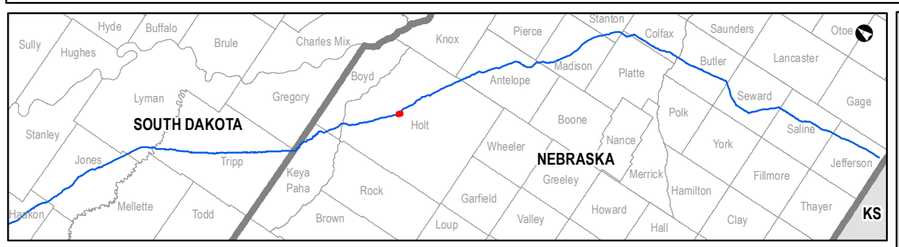
DWG:	0801-03-026-ROW	SHEET:	63

KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD
- MARGINAL

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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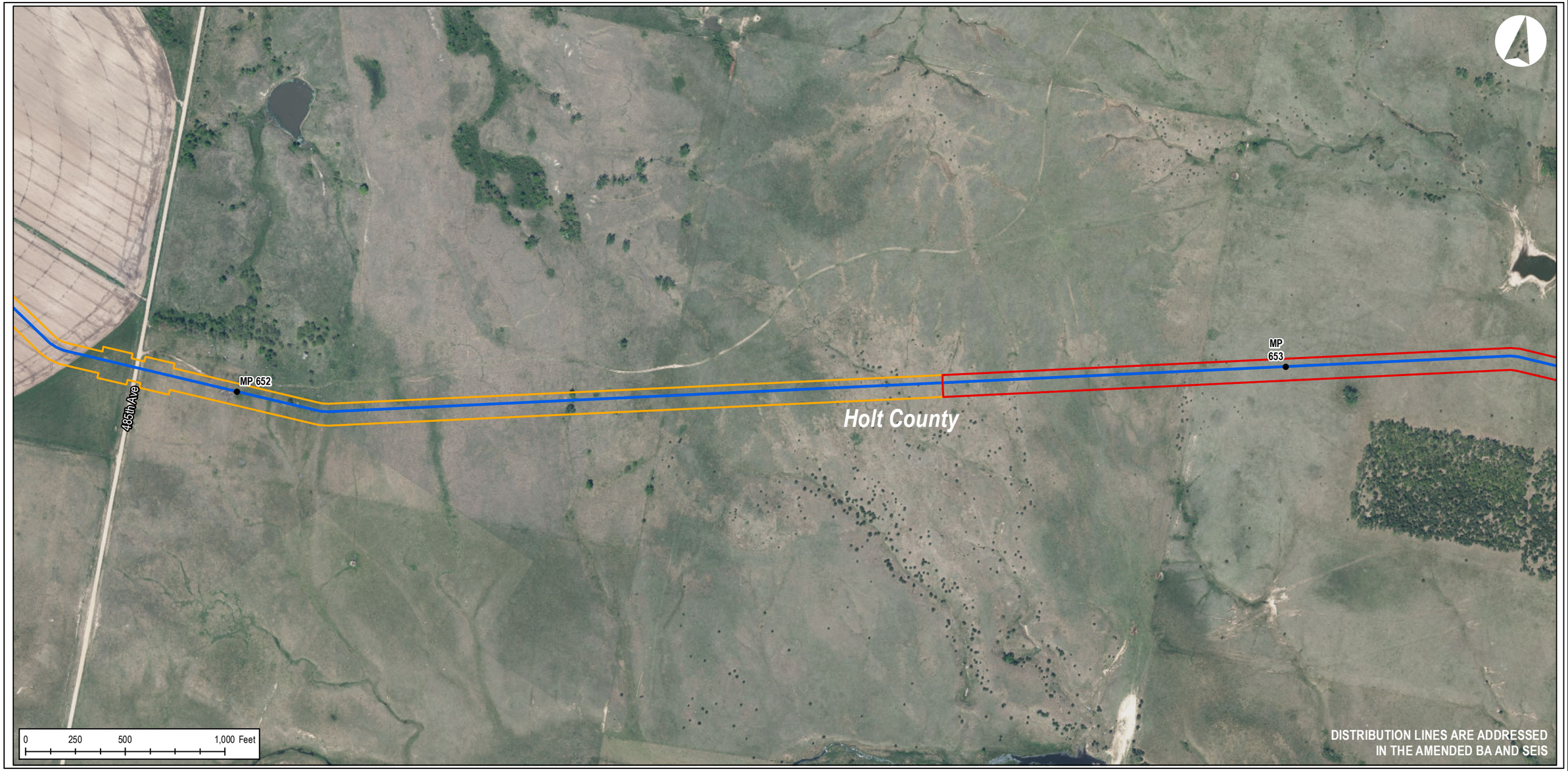

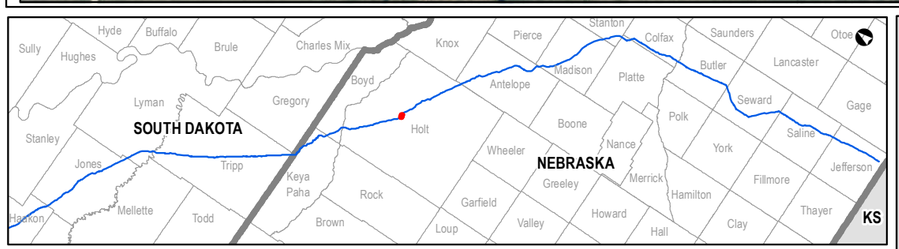

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME
- GOOD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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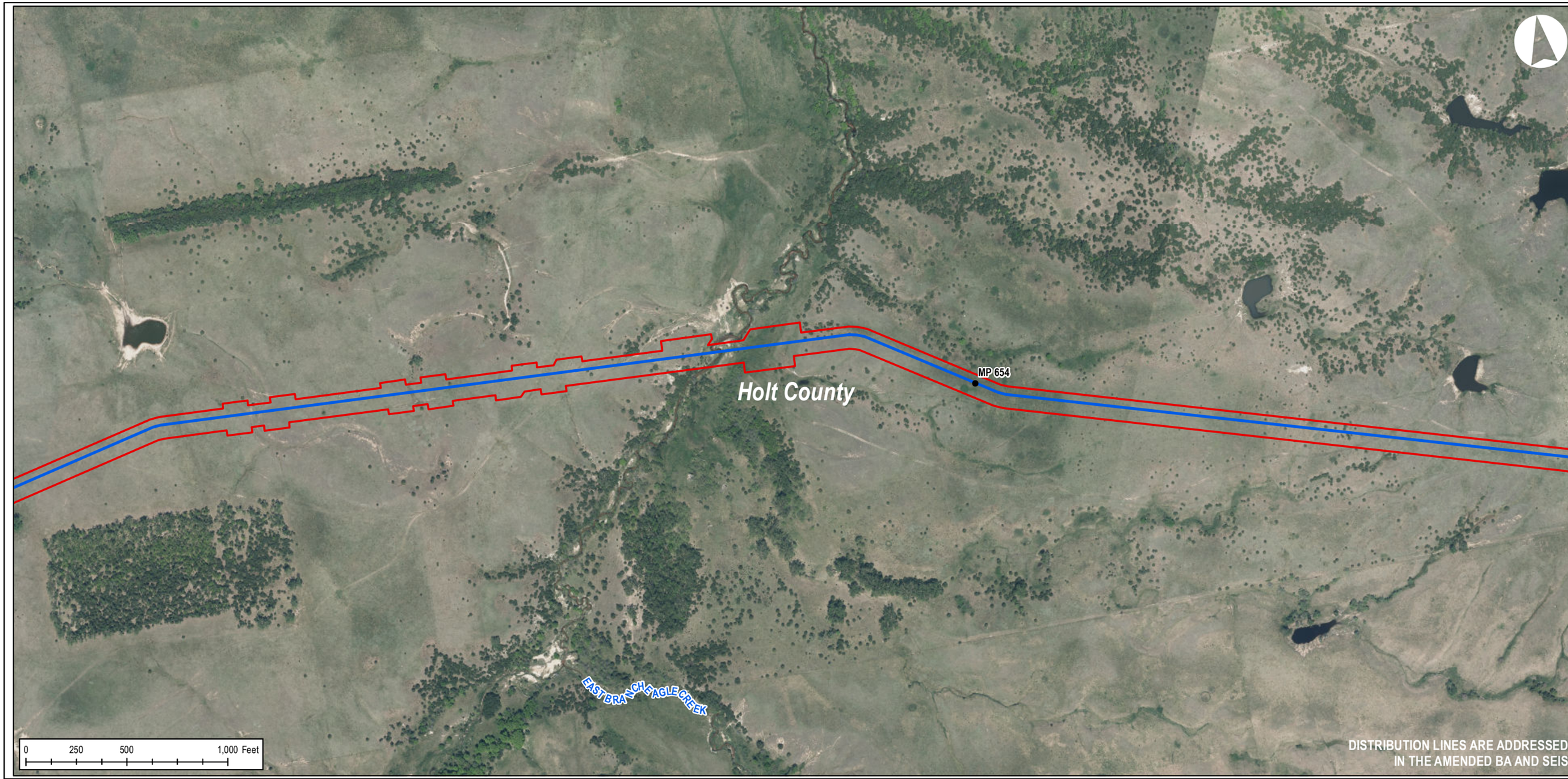
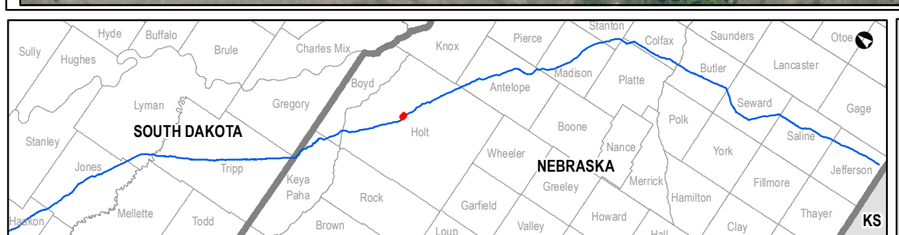
KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- PRIME

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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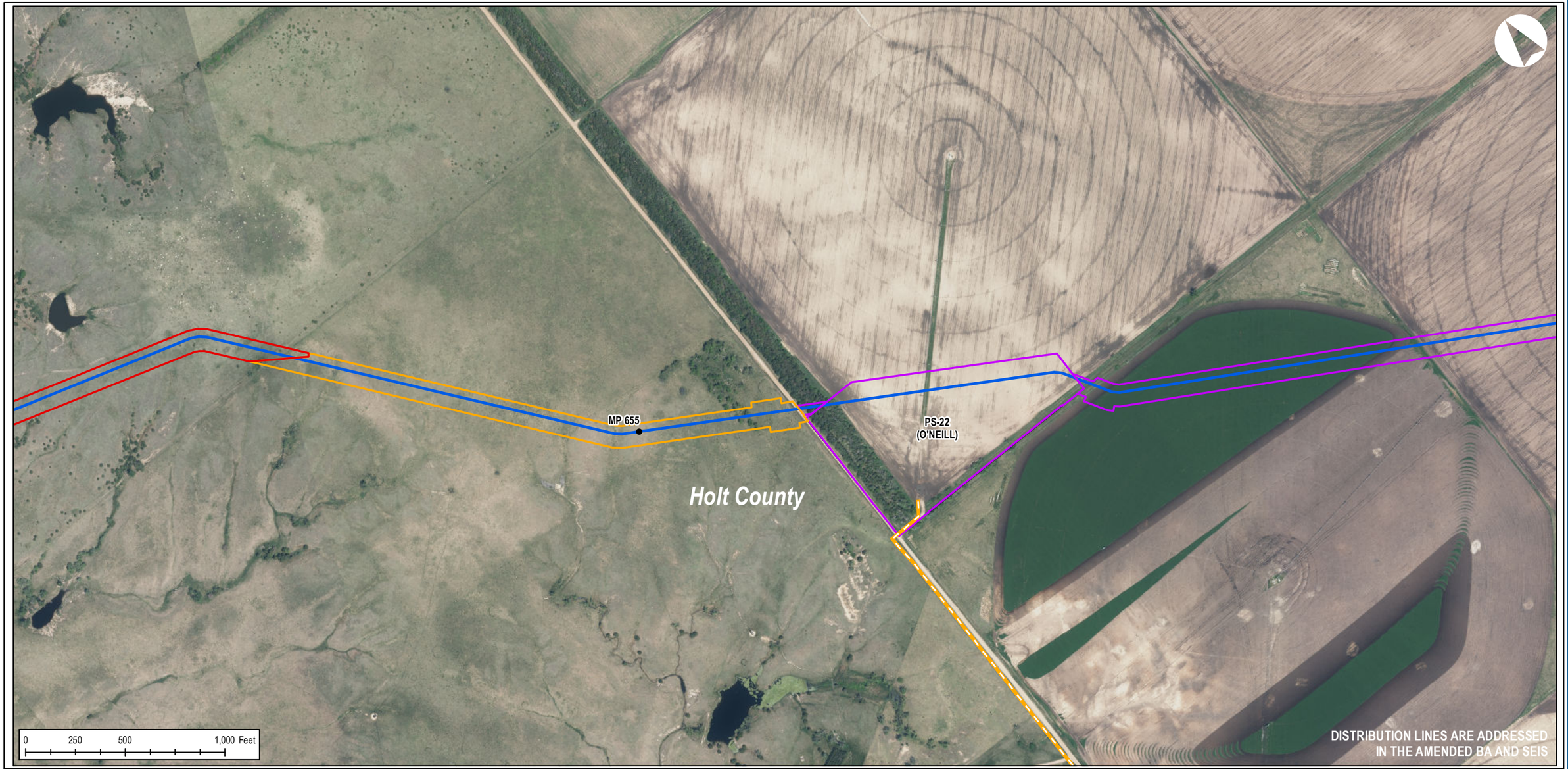
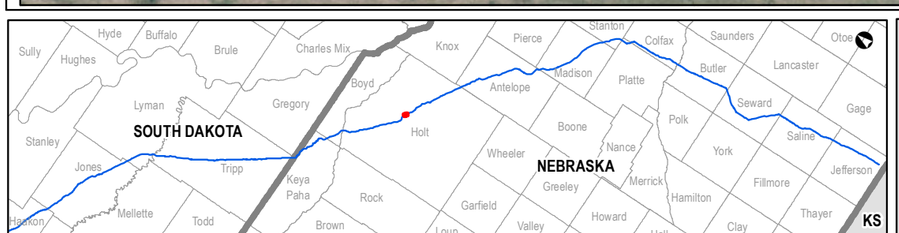
KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

DISTRIBUTION LINE

- NPPD

ABB HABITAT RATING

- PRIME
- GOOD
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
STATE:	NEBRASKA	CHECKED BY:	DH

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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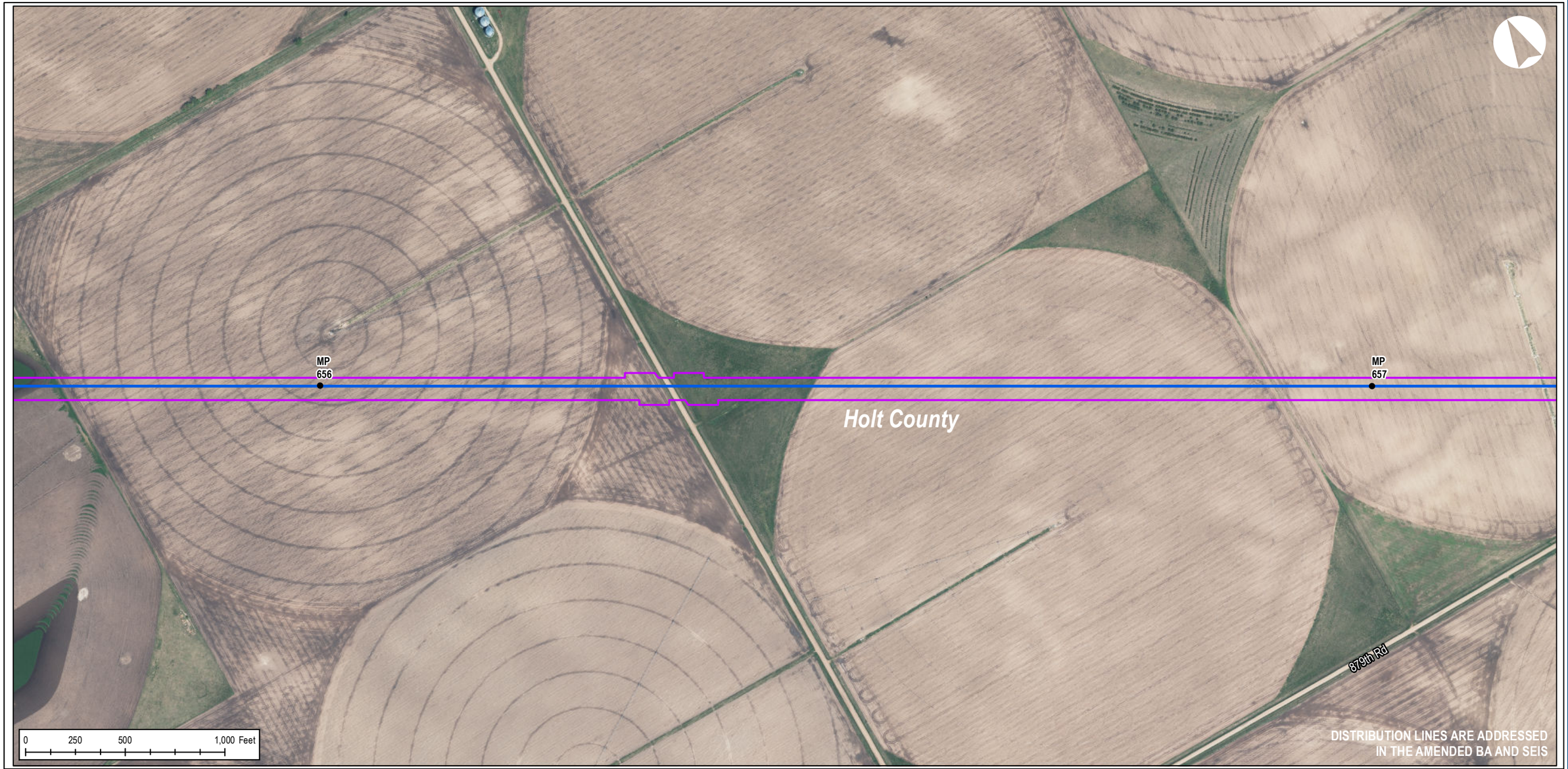

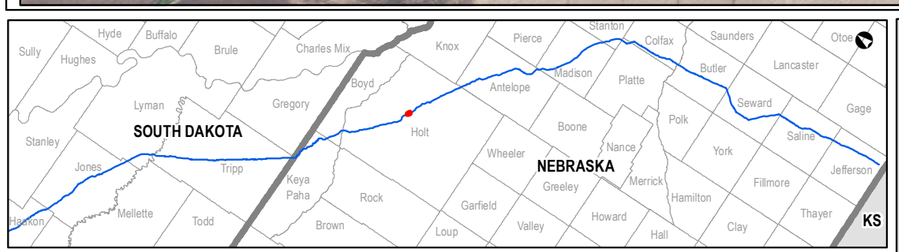

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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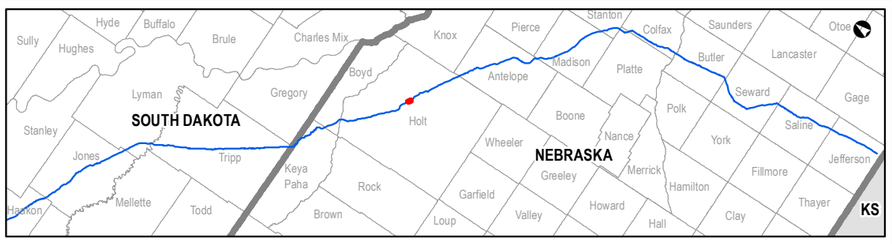

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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KEYSTONE XL PROJECT - ABB HABITAT RATING - CENTERLINE ROW

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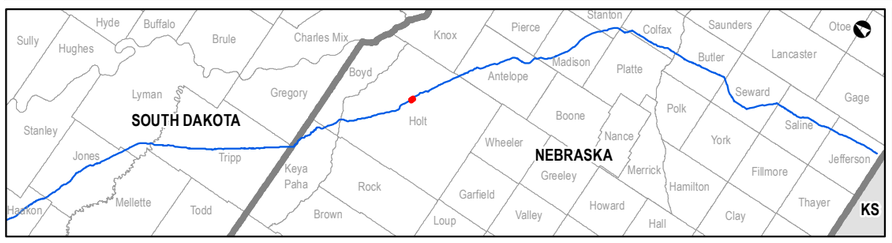

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

ABB HABITAT RATING

- GOOD
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

COUNTY:	HOLT	DRAWN BY:	ES
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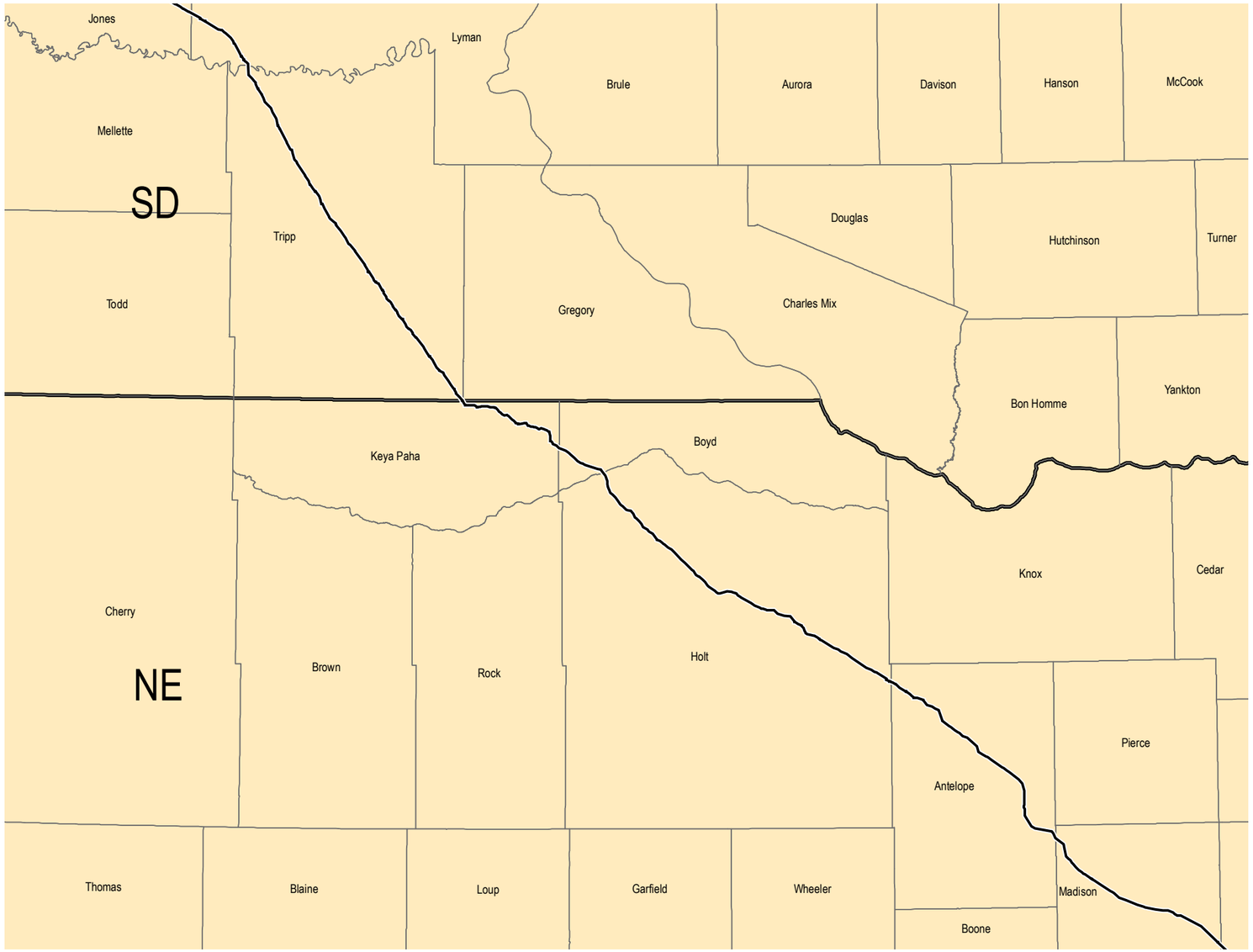
Keystone XL Project

ABB Habitat Rating Map Book
Transmission Lines



KEYSTONE XL PROJECT *ABB HABITAT RATING MAP BOOK* *TRANSMISSION LINES*			
COUNTY:	-	DRAWN BY:	ES
STATE:	SD/NE	CHECKED BY:	DH

REV. NO.:	REVISION	DATE
5	UPDATED PROJECT DATA TO 2019-12-06 DATA PACKAGE	2020-03-18

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DATE: 2020-03-18	PROJECTION: NAD83 | UTM14 N	DWG: 0801-03-026-TL-COVER	SHEET: COVER PAGE

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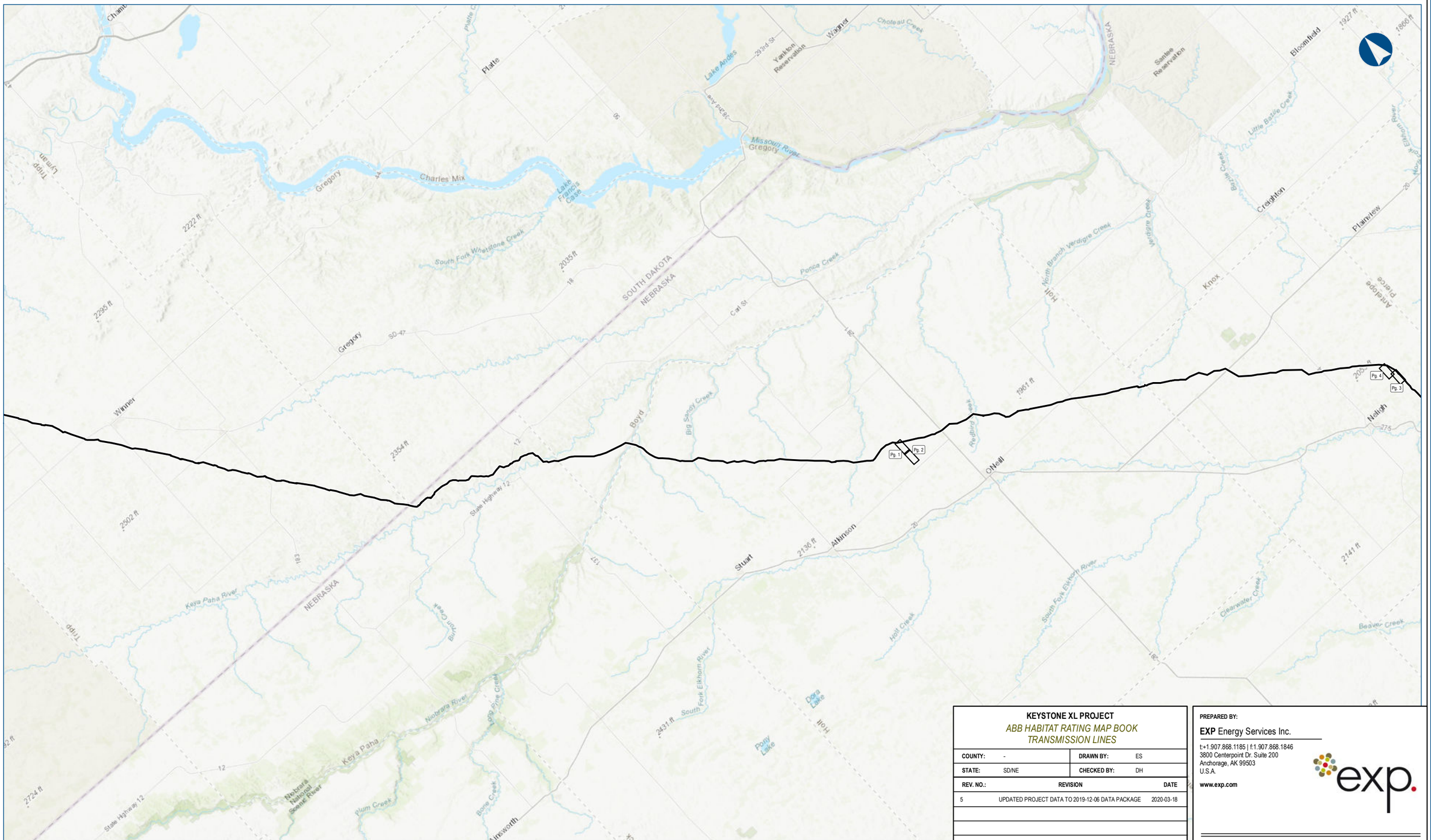

KEYSTONE XL PROJECT

ABB HABITAT RATING MAP BOOK
TRANSMISSION LINES

COUNTY:	-	DRAWN BY:	ES
STATE:	SD/NE	CHECKED BY:	DH

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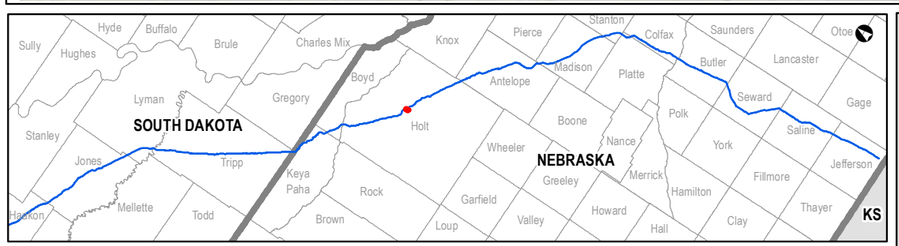
DATE: 2020-03-18	PROJECTION: NAD83 | UTM14 N	DWG: 0801-03-026-TL-INDEX	SHEET: INDEX

KEYSTONE XL PROJECT - ABB HABITAT RATING - DISTRIBUTION LINES

TC Energy



KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

DISTRIBUTION LINE

- NPPD

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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DWG:	0801-03-026-TLINES	SHEET:	1

KEYSTONE XL PROJECT - ABB HABITAT RATING - DISTRIBUTION LINES

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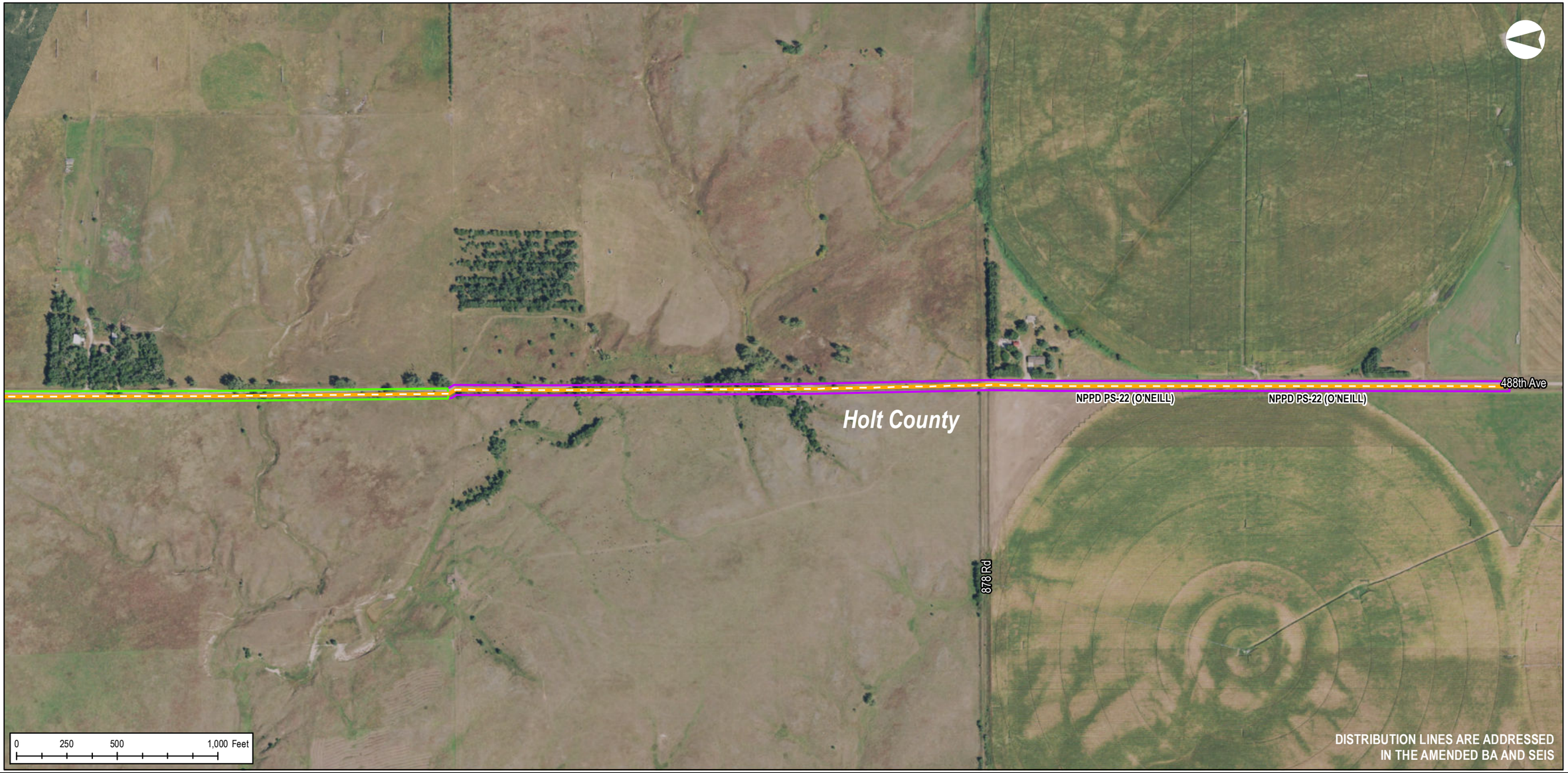

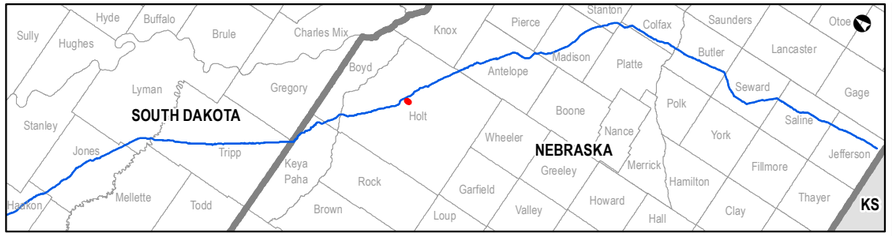

KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

DISTRIBUTION LINE

- NPPD

ABB HABITAT RATING

- MARGINAL
- POOR

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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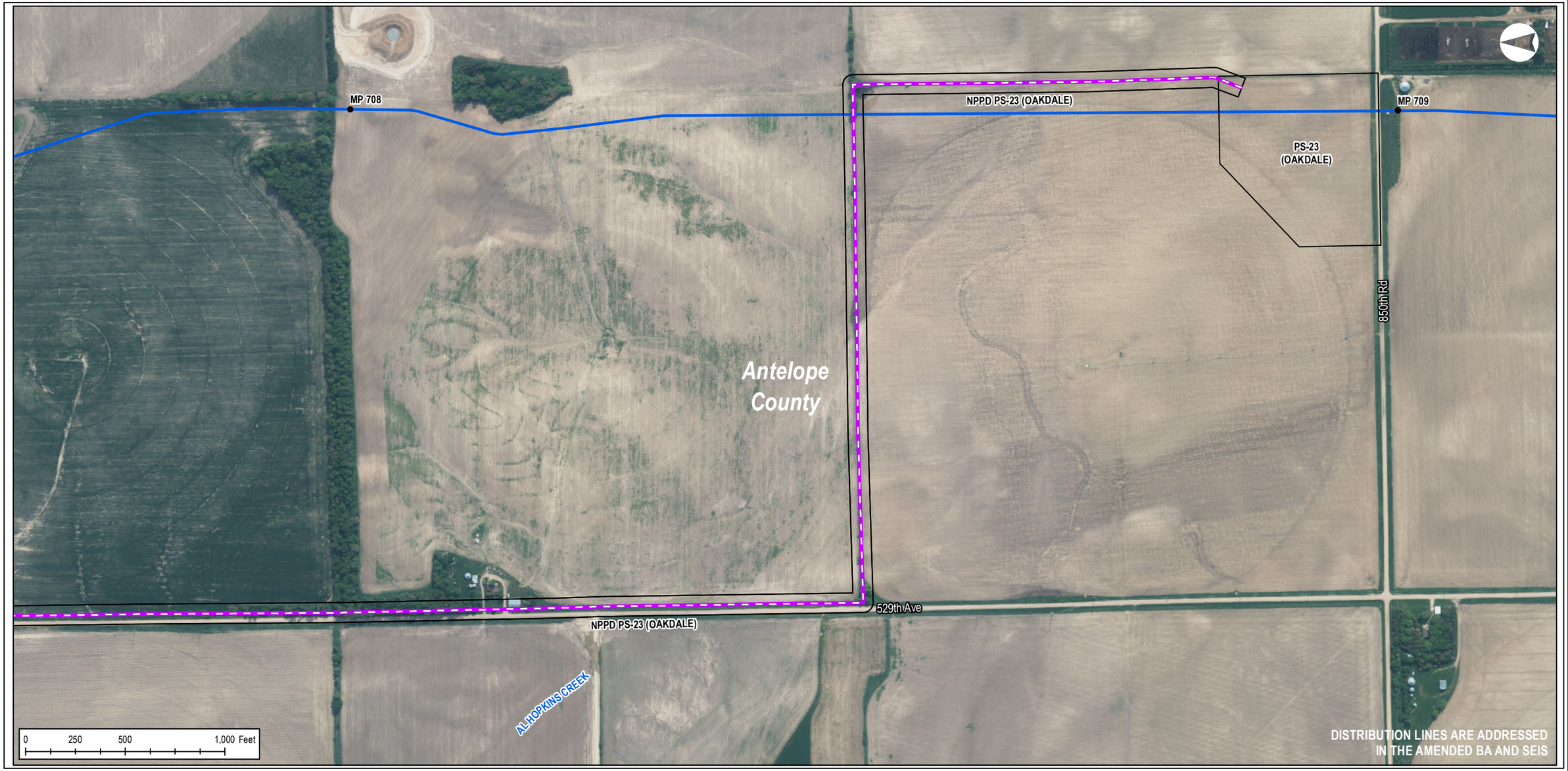
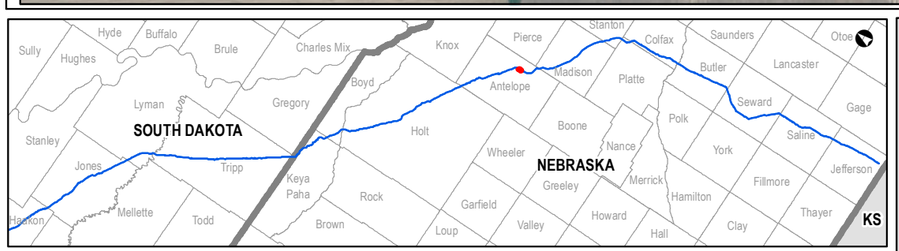
KEYSTONE XL PROJECT - ABB HABITAT RATING - DISTRIBUTION LINES

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

- MILEPOST
- KEYSTONE XL ROUTE

DISTRIBUTION LINE

- ERPPD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

ABB HABITAT RATING

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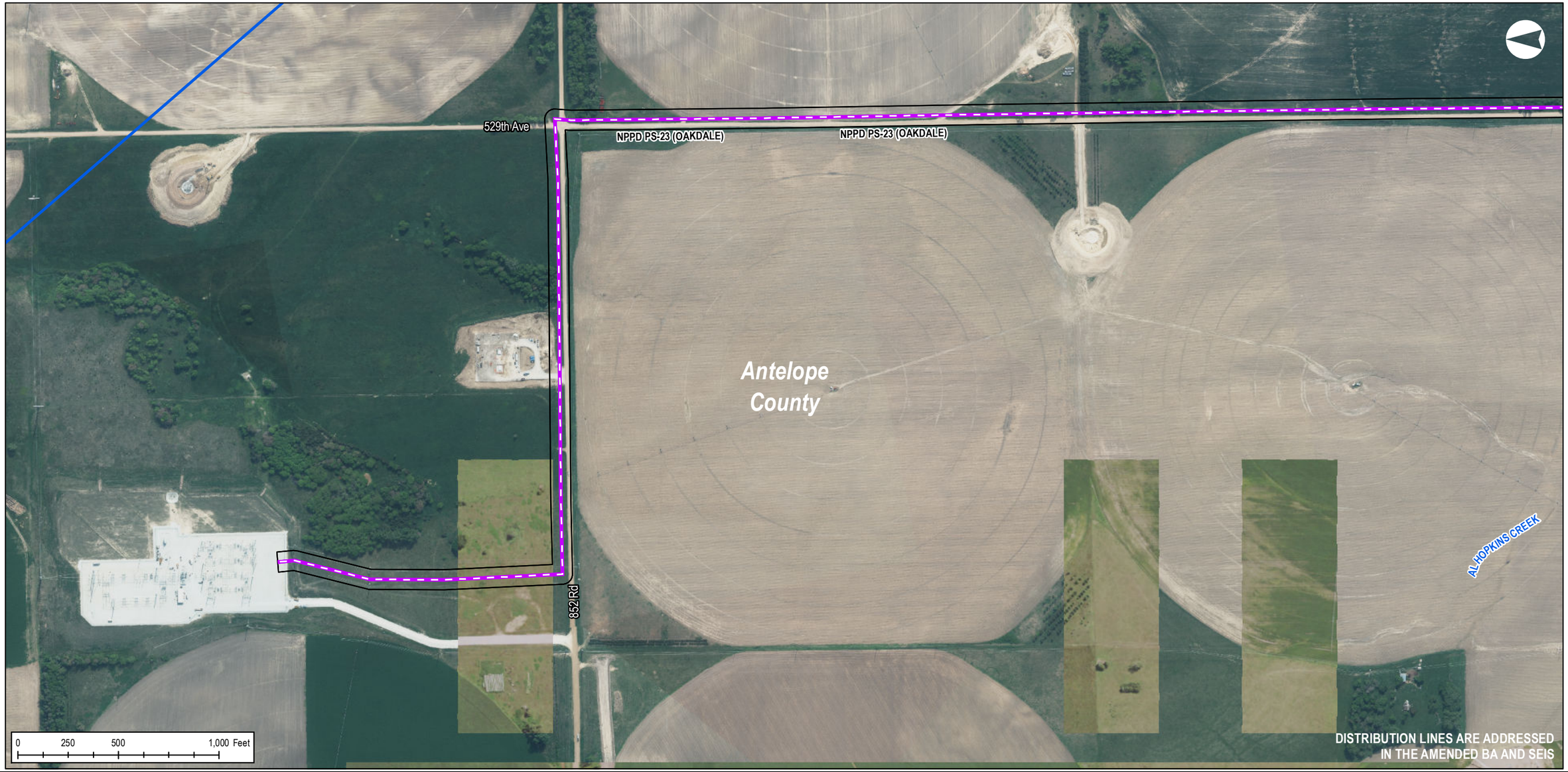
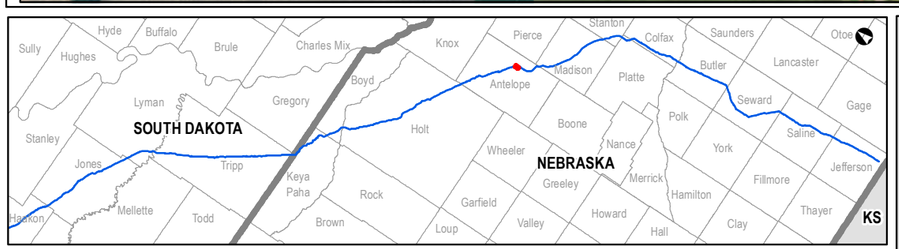
KEYSTONE XL PROJECT - ABB HABITAT RATING - DISTRIBUTION LINES

TC Energy





KEYSTONE XL PROJECT - VICINITY MAP

LEGEND

KEYSTONE XL ROUTE

DISTRIBUTION LINE

ERPPD

2018 FLOWN IMAGERY

KEYSTONE XL PROJECT

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Appendix B –
Draft Redacted Emergency Response Plan

APPENDIX I, continued

Emergency Response Plan Redaction Summary

Emergency Response Plan

Notice of Redaction of Confidential Information

The Emergency Response Plan has been made available for review by the general public. Accordingly, security sensitive, business confidential, personal, and otherwise confidential information has been removed. A summary of redacted information is presented on the following pages.

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KEYSTONE PIPELINE EMERGENCY RESPONSE PLAN – TABLE OF REDACTED INFORMATION

PAGE NO.	REDACTED MATERIAL	REASON FOR REDACTION	NOTES
6	Location of oil control center and backup oil control center	Security concerns	1
14	Discharge scenario barrels and planning volume barrels	Security concerns	2
21-23	Personnel names and telephone numbers	Security concerns / Privacy	3
69-71	Bomb threat info	Security concerns	4
72	Environmental sensitive areas	Security concerns	5
154	Environmental sensitive areas	Security concerns	5
155-173	High Consequence Area (HCA) / Other Environmentally sensitive areas and associated maps	HCA confidentiality / Security concerns / Canada	6
174	Drain tiles	Security and land owner privacy concerns	7
190-220	Agreements/Contracts	Commercial / Safety / Canada	8
223	Worst Case Discharge Volumes and Calculations	Security concerns / Canada	2
226	Worst Case Discharge Volumes and Calculations	Security concerns / Canada	2
227	Worst Case Discharge Volumes and Calculations	Security concerns / Canada	2
230	Worst Case Discharge Volumes and Calculations	Security concerns / Canada	2
231	Worst Case Discharge Volumes and Calculations	Security concerns	2
234	Worst Case Discharge Volumes and Calculations	Security concerns	2
235	Worst Case Discharge Volumes and Calculations	Security concerns	2
238	Worst Case Discharge Volumes and Calculations	Security concerns	2
239	Worst Case Discharge Volumes and Calculations	Security concerns	2
242	Worst Case Discharge Volumes and Calculations	Security concerns	2

REDACTION MATERIAL FOR TRANSCANADA (Cont'd)

PAGE NO.	REDACTED MATERIAL	REASON FOR REDACTION	NOTES
286-287	Keystone Commodities	Shipper confidentiality / Commercial	9
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295-302	MSDS	Shipper confidentiality / Commercial	9
304-310	MSDS	Shipper confidentiality / Commercial	9
312-318	MSDS	Shipper confidentiality / Commercial	9
320-325	MSDS	Shipper confidentiality / Commercial	9
327-338	MSDS	Shipper confidentiality / Commercial	9
340-350	MSDS	Shipper confidentiality / Commercial	9
352-362	MSDS	Shipper confidentiality / Commercial	9
364-373	MSDS	Shipper confidentiality / Commercial	9
375-385	MSDS	Shipper confidentiality / Commercial	9
387-388	MSDS	Shipper confidentiality / Commercial	9
390-391	MSDS	Shipper confidentiality / Commercial	9
393-394	MSDS	Shipper confidentiality / Commercial	9
396-405	MSDS	Shipper confidentiality / Commercial	9
407-412	MSDS	Shipper confidentiality / Commercial	9
414-415	MSDS	Shipper confidentiality / Commercial	9
417-426	MSDS	Shipper confidentiality / Commercial	9
428-436	MSDS	Shipper confidentiality / Commercial	9
438-439	MSDS	Shipper confidentiality / Commercial	9
441-447	MSDS	Shipper confidentiality / Commercial	9
449-456	MSDS	Shipper confidentiality / Commercial	9
458-469	MSDS	Shipper confidentiality / Commercial	9
471-474	MSDS	Shipper confidentiality / Commercial	9
476-481	MSDS	Shipper confidentiality / Commercial	9
483-489	MSDS	Shipper confidentiality / Commercial	9
491-498	MSDS	Shipper confidentiality / Commercial	9

REDACTION MATERIAL FOR TRANSCANADA (Cont'd)

PAGE NO.	REDACTED MATERIAL	REASON FOR REDACTION	NOTES
500-507	MSDS	Shipper confidentiality / Commercial	9
509-517	MSDS	Shipper confidentiality / Commercial	9
519-525	MSDS	Shipper confidentiality / Commercial	9
527-534	MSDS	Shipper confidentiality / Commercial	9
536-543	MSDS	Shipper confidentiality / Commercial	9
545-551	MSDS	Shipper confidentiality / Commercial	9
553-562	MSDS	Shipper confidentiality / Commercial	9
564-568	MSDS	Shipper confidentiality / Commercial	9
624-625	Personnel	Privacy concern / Canada	3
629-632	Personnel	Privacy concerns	3
635-636	Personnel	Privacy concern/ Canada	3
648-649	Personnel	Privacy concerns	3
664-665	Personnel	Privacy concerns	3
679-680	Personnel	Privacy concerns	3

Notes

1 The Oil Control Center and Backup Oil Control Center are both critical components when initiating an oil spill emergency response and, therefore, are included on the Emergency Response Plan's distribution list. However, the address of each location has been redacted to protect the safety of the employees that work there and the security of the critical facility.

2 In preparing the ERP, TransCanada performed calculations to determine the worst potential discharges from each of the line sections along the pipeline system in addition to the location of the calculated discharges. These volumes and locations were identified for purposes of establishing emergency response scenarios and for emergency response planning. These volumes and locations are redacted for homeland security purposes, as disclosure would make public potential target locations for terrorist attacks or other threats. Further, as indicated, some of these locations are in Canada and would have no impact on the United States.

3 TransCanada considers safety of our employees and their families to be a concern of utmost importance. Therefore, the names and contact information of company employees are being withheld for their safety and privacy. This information is not material to understanding the ERP.

4 In addition to addressing oil spills, the ERP contains emergency response actions that should be taken for other emergencies including bomb threats. Making public the details of our response procedures in the event of a bomb threat could compromise our efforts in reacting to such an event. Accordingly, this information is redacted.

5 While preparing the ERP, TransCanada researched and identified environmentally sensitive areas along the pipeline system to help develop appropriate planning considerations that are critical for responding to an oil spill in those areas. These pre-identified sensitive areas are being redacted to avoid disclosing locations for potential terrorist attacks or other threats.

6 High Consequence Areas (HCAs), as identified by PHMSA, include highly populated areas, drinking water sources, and unusually sensitive ecological areas. The specific locations of these HCAs are only available to pipeline operators due to the sensitive nature of their content. TransCanada obtains this information under a confidentiality commitment. Moreover, these locations are being redacted to avoid disclosing locations for potential terrorist attacks or other threats.

7 While preparing the ERP, TransCanada research field drain tiles as they can provide a conduit for spilled oil to reach environmentally sensitive areas. Therefore, the locations of these tiles are being redacted to avoid disclosing locations for potential terrorist attacks or other threats.

8 TransCanada has contracted with a nationally recognized Oil Spill Removal Organization (OSRO) to ensure that resources and personnel are available to TransCanada during an oil spill. The commercial terms of our contracts and key individuals for each party are redacted for proprietary reasons. In addition, names and contact information of individuals mobilizing response resources are redacted for their safety.

9 TransCanada is prohibited under contract to disclose proprietary information provided by its shippers regarding the commodities transported through the pipeline. This specifically includes Material Safety Data Sheets (MSDSs). In lieu of the MSDSs, TransCanada is providing a document that summarizes the range of information and considerations reflected on the MSDSs for the products expected to be shipped on the pipeline.

EMERGENCY RESPONSE PLAN

Keystone Pipeline System

Prepared for:

TransCanada
450 - 1st Street
Calgary, AlbertaT2P 5H1
(403)920-2033

Prepared by:

O'Brien's Response Management Inc.
818 Town & Country Blvd., Suite 200
Houston, TX 77024-4564
Phone: (281) 320-9796 I Fax: (281) 320-9700
www.obriensrm.com

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Executive Summary

The Keystone Pipeline is a 3,460-kilometre pipeline that transports crude oil from Hardisty, Alberta to markets in the American Midwest at Wood River and Patoka in Illinois, and at Cushing, Oklahoma. The Canadian portion of the pipeline runs from Hardisty, Alberta east into Manitoba where it turns south and crosses the border into North Dakota. From North Dakota, the pipeline runs south through South Dakota and Nebraska. At Steele City, Nebraska, one arm of the pipeline runs east through Missouri for deliveries into Wood River and Patoka, Illinois; another arm runs south through Oklahoma for deliveries into Cushing, Oklahoma.

Deliveries to Wood River and Patoka began in the summer of 2010, and deliveries to Cushing began in February of 2011. The pipeline system currently has the capacity to deliver up to 590,000 bpd of Canadian crude oil into these important North American refining markets.

A critical aspect of operating the Keystone Pipeline system is to have a comprehensive Emergency Management System. A key component of the system includes having an Emergency Response Plan. The Keystone emergency response plan was prepared to achieve a number of goals: ensure regulatory compliance, appropriate for all key stakeholders including field operations, include all emergencies and response measures, timely internal and external notification procedures, and training requirements. In addition, the plan contains information related to worst case discharge, company owned equipment, environmental sensitivities, contract resources, and public officials, and tactical control plans.

The plan is distributed to key internal and external stakeholders and delivered to TransCanada personnel through a secure internet portal hosted by one of TransCanada's emergency response providers and co-preparer of the plan. The plan has been submitted to the National Energy Board in Canada and the United States Department of Transportation's Pipeline and Hazardous Material safety Administration office. The plan will be updated annually and when substantial changes are made or when deemed necessary by either of the agencies.

The Keystone Emergency Response Plan is combined with a rigorous training program,, retention of and access to the industry's most known response experts, and a state of the art pipeline integrity and maintenance program making emergency response for the Keystone pipeline system a priority fully endorsed at all levels within TransCanada.

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ACKNOWLEDGMENT AND PLAN APPROVAL

The information and procedures in this Plan must be treated as guidelines only. The user should determine to what extent it is practical and advisable to follow them. This decision may involve considerations not discussed in this Plan.

The information and procedures contained herein are considered to be accurate as of this date and are consistent with the National Contingency Plan (NCP) and applicable Area Contingency Plans (ACP) as detailed in Section 1.5.

CERTIFICATION OF QUALIFIED INDIVIDUAL AND ALTERNATE QUALIFIED INDIVIDUAL

TransCanada hereby certifies that the individuals identified as Qualified Individual and Alternate Qualified Individual in this Plan have the full authority in accordance with the applicable United States Federal and State regulations and as detailed in this Plan to:

1. Activate and engage in contracting with oil spill removal organizations.

2. Act as a liaison with the pre-designated Federal On-Scene Coordinate (OSC), and

3. Obligate funds required to carry out response activities.

Plan Approved:

VP of Pipeline Operations in the U.S.

Signature	Title
Vern Meier	12/06/2012
Name (please type or print)	Date

NOTE: O'Brien's Response Management Inc. provided consulting and plan development services in the preparation of this Plan utilizing data provided by the owner/operator. O'Brien's assumes no liability for injury, loss, or damage of any kind resulting directly or indirectly from the use of the regulatory interpretation, response planning, or information contained in this plan.

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OPERATOR'S STATEMENT - SIGNIFICANT AND SUBSTANTIAL HARM AND CERTIFICATION OF RESPONSE RESOURCES

FACILITY NAME: Keystone Pipeline System

CORPORATE ADDRESS: 450 - 1st Street
Calgary, Alberta T2P 5H1

1.	Is the pipeline greater than 6 and 5/8 inches (168 mm) in outside nominal diameter, greater than 10 miles (16.1 km) in length? and	Yes ✓	No
2.	Has any line section experienced a release greater than 1,000 barrels (159 cubic meters) within the previous five years? or	Yes	No ✓
3.	Has any line section experienced two or more reportable releases, as defined in 49 CFR 195.50, within the previous five years? or	Yes ✓	No
4.	Does any line section contain any electric resistance welded pipe, manufactured prior to 1970 and operates at a maximum operating pressure established under 49 CFR 195.406 that corresponds to a stress level greater than 50 percent of the specified minimum yield strength of the pipe? or	Yes	No ✓
5.	Is any line located within a 5-mile (8 km) radius of potentially affected public drinking water intakes and could reasonably be expected to reach public drinking water intakes? or	Yes ✓	No
6.	Is any line located within a 1-mile (1.6 km) radius of potentially affected environmentally sensitive areas and could reasonably be expected to reach these areas?	Yes ✓	No

Based on the U.S. DOT PHMSA criteria above, the Keystone Pipeline System is considered "Significant and Substantial Harm".

TransCanada hereby certifies to the Pipeline and Hazardous Materials Safety Administration of the U.S. Department of Transportation that we have identified and ensured, by contract or by other means, the availability of personnel and equipment to respond, to the maximum extent practicable, to a worst case discharge.

VP of Pipeline Operations in the U.S.

Signature — Title

Vern Meier — 12/06/2012

Name (please type or print) — Date

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NOTE: It is the responsibility of the holder of this Plan to ensure that all changes and updates are made. The Plan Holder must:

- Remove and discard obsolete pages.
- Replace obsolete pages with the updated pages.

REVISION RECORD		
CHANGE DATE	**AFFECTED PAGE NUMBER(S)**	**DESCRIPTION OF CHANGE(S)**
May 2011	Section 2	Update Notification
December 2009	Appendix F	Updated Air Operations Checklist
March 2010	Appendix A	Added Location description to A.1
April 2010	FWD	Distribution List updated TSB contact
June 2011		Shared Contact has been updated.
October 2011	Section 6	Added Drain Tile
December 2011	Entire Plan	Qualified Individual Updated, Drain Tile Information Added, Air Monitoring Guideleins Updated, OSRO Updated, Activation Flowchart Updated, Emergency Response Contractors Updated, MSDS Updated,Misc. Forms Updated
February 2012		Contact Association has been updated.
February 2012		Contact Association has been updated.
February 2012		Shared Contact has been updated.
March 2012		Pipeline has been updated.
March 2012	Section 3	Added Range of Reported thicknesses table to Section 3
April 2012	Section 2, Glossary and Acronyms	Updated External Notifications and Glossary
July 2012		Shared Contact has been updated.
December 2012	Foreword, Sections 1 - 4, Section 6, Apps. C & D, App. G, App. I, Glossary, and Response Zones	Updated Approver, QI(s), other contacts & Distrib. List, Revised Notification Procedures and Response Actions, Revised and added new MSDS, Updated Environmental/Socio Economic Sensitivities, Updated Media Information, Updated Glossary, Updated 24-Hour Emergency Contact Number in all Response Zones, minor typo changes, Uploaded Guidelines for Creating and Maintaining Privilege US and Canada documents and the Oil Properties Composition List into "Other Documents" section

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DISTRIBUTION LIST	
COPY NUMBER	**PLAN HOLDER[1]**
1	TransCanada Dean Cowling - VP of Community Safety & Envir. 450 1st Street SW Calgary, Alberta T2P 5H1
2	TransCanada Senior Emergency Management Specialist 450 1st Street SW Calgary, Alberta T2P 5H1
3	TransCanada Corporate Emergency Operations Center 450 1st Street SW Calgary, Alberta T2P 5H1
4	TransCanada Alternate Corporate EOC 450 1st Street SW Calgary, Alberta T2P 5H1
5	TransCanada Emergency Response Analyst 450-1st Str. SW Calgary, T2P 5H1
6	TransCanada Central Region Emergency Prepar Coordinator 104 Terracon Place Winnipeg, Manitoba R2J 4G7
7	TransCanada Central Region Emergency Operations Center 104 Terracon Place Winnipeg, Manitoba R2J 4G7
8, 9, 10	National Energy Board Secretary 444 Seventh Avenue SW Calgary, Alberta T2P 0X8
11, 12 (electronic)	Office of Pipeline Safety - PHMSA Melanie Barber U.S. Department of Transportation 1200 New Jersey Avenue, SE-E-22-321 Washington, District Of Columbia 20590
13	O'Brien's Response Management ePlanPro Manager 818 Town & Country Blvd., Suite 200 Houston, Texas 77024
14	TransCanada Great Plains Emergency Operations Center 13710 FNB Parkway; Suite 300 Omaha, Nebraska 68154
15	TransCanada Incident Management Specialist

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	13710 FNB Parkway; Suite 300 Omaha, Nebraska 68154
16	TransCanada Oil Control Center [redacted]
17	TransCanada Alternate Oil Control Center [redacted]
18	Transportation Safety Board Larry Gales Transportation Safety Board of Canada Place du Center 4th Floor - Suite 481 200 Promenade du Portag Gatineau (Hull), Quebec K1A 1K8
19	TransCanada Director of Operations Central Region 104 Terracon Place Winnipeg, Manitoba R2J 4G7
20	TransCanada Director of Operations Great Plains Region 13710 FNB Parkway; Suite 300 Omaha, Nebraska 68154
21	TransCanada Incident Management Specialist 104 Terracon Place Winnipeg, Manitoba R2J 4G7
22	TransCanada Vern Meier - VP of US Pipeline Operations 717 Texas Street Houston, Texas 77002-2761
23	TransCanada Garnet Scaman - VP of Cdn Pipeline Operations 450 1st Street SW Calgary, Alberta T2P 5H1

NOTE[1]**:** The Distribution of this Plan is controlled by the Copy Number located on the front cover or CD label. The Plan Distribution Procedures provided in Section 1.3 and the Plan Review and Update Procedures provided in Section 1.4 should be followed when making any and all changes.

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1.0 INTRODUCTION AND PLAN CONTENT

1.1 Plan Purpose/Objectives
1.2 Scope of Plan
1.3 Controlled Plan Distribution Procedures
1.4 Plan Review and Update Procedures

1.5 Regulatory Compliance

Figure 1.1 Facility Information

Figure 1.2 Piping System Overview

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1.1 PLAN PURPOSE/OBJECTIVES

The purpose of this Emergency Response Plan (ERP) is to assist TransCanada personnel in preparing for and responding quickly and safely to emergencies originating from the pipelines and associated facilities. The Plan provides techniques and guidelines for achieving an efficient, coordinated, and effective response to emergencies which may occur along the pipeline.

The specific objectives of the Plan are to:

- Establish Response Teams, assign individuals to fill the positions on the teams, and define the roles and responsibilities of team members.
- Define notification, activation, and mobilization procedures to be followed when a discharge occurs.
- Define organizational lines of responsibility to be adhered to during a response operation.
- Document equipment, manpower, and other resources available to assist with the response.
- Ensure compliance with National Energy Board (NEB) Onshore Pipeline Regulations 1999 and the U.S. National Oil and Hazardous Substances Pollution Contingency Plan and associated Area Contingency Plan(s) for the area of operation.

1.2 SCOPE OF PLAN

This Plan has been developed in accordance with the regulation published in SOR/99-294, S. 32-354 – Emergency Procedures Manual and 49 CFR Part 194 - Response Plans for Onshore Oil Pipelines.

This Plan contains prioritized procedures for Company personnel to prevent or mitigate emergencies resulting from the operation of the pipeline. A description of the Pipeline's details is presented in Figure 1.1 with additional information provided in the sections, appendices and annexes.

1.3 CONTROLLED PLAN DISTRIBUTION PROCEDURES

Senior Emergency Response Analyst is responsible for maintenance and distribution of the Plan. Distribution will be handled in the following manner:

- Distribution of controlled Plans is determined by the copy number assigned to agency and designated corporate Plan Holders. A distribution list is included in the Foreword.
- Company personnel who may be called upon to provide assistance during discharge response activities will have access to a copy of the Plan for their use and training.
- Any person holding a controlled copy of the Plan shall ensure that the copy is transferred to their replacement in the event of reassignment or change in responsibility.
- Various regulatory agencies will also be distributed a controlled copy of the Plan. The list of agencies is detailed in the Distribution List located in the Foreword.

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1.4 PLAN REVIEW AND UPDATE PROCEDURES

Review/Update

The Plan resides as a web-based document, which permits authorized Corporate and field staff access to make:

- Appropriate revisions as required by operational or organizational changes.
- Appropriate revisions as required by changes in the names and phone numbers detailed in Section 2.0.
- Appropriate revisions as required by improved procedures or deficiencies identified during response team tabletop exercises or actual emergency responses.

Incorporation of Plan Revisions

Email notification allows Authorized Plan Holders to update hard copy Plans as changes occur.

The Individual Plan Holder shall:

- Review and insert the revised pages into the Plan.
- Discard or archive the obsolete pages.

Agency Revision Requirements

Company shall revise and resubmit changes to the Canadian National Energy Board (CA NEB) and the U.S. DOT/PHMSA Pipeline Response Plans Officer within 30 days of each change that would substantially affect the implementation of the Response Plan. Additionally, the South Dakota Department of Environment and Natural Resources shall be notified within 30 days of any change. Examples of changes in operating conditions that would cause a significant change to the Plan include:

Requiring Changes

- An extension of the existing pipeline or construction of a new pipeline in a response zone not covered by the previously approved Plan.
- Relocation or replacement of portions of the pipeline, which in any way substantially affect the information included in this Plan, such as a change in the Worst Case Discharge volume.
- A change in the type of oil handled, stored, or transferred that materially alters the required response resources.
- A change in the name of the Oil Spill Removal Organization (OSRO).
- A material change in capabilities of the OSRO that provides equipment and personnel.
- A change in emergency response procedures.
- A change in the Qualified Individual.
- A change in the NCP or an ACP that has significant impact on the equipment appropriate for response activities.

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- Any other changes that materially affect the implementation of the Plan.
- As a result of post incident or drill evaluations.

1.5 Regulatory Compliance

CA NEB and U.S. DOT/PHMSA must be provided such revisions. The Company must submit the U.S. DOT/PHMSA issued Facility Control Number with the changes (the PHMSA Control Number is listed in Figure 1.1). In addition to the required changes listed above,TransCanada will resubmit the Emergency Response Plan to U.S. DOT/PHMSA annually from the last approval date of the Plan.

Except as provided above, amendments to the following do not require approval by U.S. DOT/PHMSA:

- Personnel and telephone number lists included in the Plan.
- OSRO(s) change which does not result in a material change in support capabilities.

The development, maintenance, and use of this Plan implements Company policy and addresses the following regulatory requirements and guidelines:

The response zones have been reviewed for consistency with the following plans:

- Canada - United States Joint Inland Pollution Contingency Plan - Annex II CANUSCENT
- CA National Environmental Emergencies Contingency Plan
- Greater St. Louis Sub-Area Plan
- U.S. EPA Region 5 Oil and Hazardous Substances Integrated Contingency Plan
- U.S. EPA Region 6, Regional Integrated Contingency Plan
- U.S. EPA Region 7 Regional Contingency Plan
- U.S. EPA Region 8 Regional Contingency Plan
- U.S. National Oil and Hazardous Substances Pollution Contingency Plan (NCP)

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FIGURE 1.1

FACILITY INFORMATION

GENERAL INFORMATION		
Facility Name:	Keystone Pipeline System	
U.S. DOT/PHMSA Control:	TC59	
Owner Name:	(Canada)TransCanada (U.S.)	
Address:	***Physical Address*** 450 - 1st Street Calgary, Alberta T2P 5H1	***Operators Address*** 450 - 1st Street S.W. Calgary, Alberta T2P 5H1
Mainline Number:	(800) 447-8066 (24 Hours)	
Contact Person:	Niki Affleck Senior Emergency Management Specialist	
Primary NAICS Code:	486910	
Determination of Significant and Substantial Harm (U.S. DOT PHMSA):	All Response Zones meet the criteria for "Significant and Substantial Harm."	
Operator Statement of (U.S.DOT PHMSA) "Significant and Substantial Harm":	It is the Company's goal to respond as quickly as possible to all uncontrolled releases of crude oil, regardless of the source point location along the system. Based upon this goal, and the overbreadth of the definitions provided in 49 CFR 194.103 (c)(4) & (5), the Company is compelled to consider all the active line sections listed below in the Response Zone Annexes as capable of a release potentially causing "significant and substantial harm".	

PIPELINE LOCATION	
Provinces/States/Counties:	The System covers 5 specific Response Zones covering 3 Provinces, 7 States and 56 Counties specifically detailed in this Figure 1.1.
Provinces Traversed:	Alberta, Saskatchewan, Manitoba
States Traversed:	North Dakota, South Dakota, Nebraska, Kansas, Missouri, Illinois, Oklahoma
Pipeline System Overview Diagram:	**See Figure 1.2**

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PYSICAL DESCRIPTION - PIPELINE

Response Zone(s):

- The Keystone Pipeline transports crude oil from Hardisty, Alberta to U.S. Midwest markets at Wood River, Patoka, Illinois and Cushing, Oklahoma. The Canadian portion includes 232 miles (373 km) of pipeline, pump stations and terminal facilities at Hardisty, Alberta. The U.S. portion includes approximately 1,352 miles (2,846 km) of pipeline and pump stations.
- The Keystone Pipeline System is divided into 5 specific Pipeline Response Zones. The Response Zones are as follows (Specific information to Response Zones are provided later in the Response Zone Appendices):

    - Hardisty Pump Station/ Regina Pump Station
    - Regina Pump Station / Haskett Pump Station
    - North Dakota, South Dakota, Nebraska
    - Kansas, Missouri, Illinois
    - Cushing Extension

General:

- The Keystone Pipeline System includes pipeline sections of 30, 34 or 36-inch diameter as well as pump stations.

- This Plan is written in English and understood by personnel responsible for carrying out the Plan.

Pipeline Specifications:

- ***Products Type:***

  Crude Oil

- ***Pipe Detail:*** The pipeline system consists of several pipeline sections with the following diameters.

  30" - 0 km Point (KP) - 274.2 KP and 1148.3 KP to 1239.4 KP (CANADA, New Construction AB, SK, MB)
  34" - 274 KP - 1148 KP (CANADA, Line 1 Conversion, SK& MB, New Construction, MB)
  30" - 1239.4 KP - 2983.9 KP (USA, ND, SD, NE, KS, MO, IL)
  36" - 0 KP - 479.5 KP (initiates at 2268.5 KP, USA KS, OK)

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RESPONSE ZONE INFORMATION

Response Resources:

Facility spill mitigation procedures and response guidelines are provided in Section 3.0 for discharges that could result from any of the following scenarios:

- Pipeline rupture/leak
- Explosion and/or fire
- Failure of facility piping
- Equipment failure (e.g. pumping system failure, relief valve failure, etc.)

Response Zone	Discharge Scenario (Bbls.)	Provinces / Counties Traversed	Planning Volume (Bbls.)
Hardisty Pump Station/ Regina Pump Station	[redacted]	Alberta, Saskatchewan,Eastern Alberta, Western Saskatchewan, Eastern Saskatchewan	[redacted]
Regina Pump Station / Haskett Pump Station	[redacted]	Saskatchewan, Manitoba,Eastern Saskatchewan, Southwestern Manitoba, Western Saskatchewan	[redacted]
North Dakota, South Dakota, Nebraska	[redacted]	Barnes, Beadle, Butler, Cavalier, Cedar, Clark, Colfax, Day, Gage, Hanson, Hutchinson, Jefferson, Kingsbury, Marshall, McCook, Miner, Nelson, Pembina, Platte, Ransom, Saline, Sargent, Seward, Stanton, Steele, Walsh, Wayne, Yankton, Lincoln	[redacted]
Kansas, Missouri, Illinois	[redacted]	Audrain, Bond, Brown, Buchanan, Caldwell, Carroll, Chariton, Clinton, Doniphan, Fayette, Lincoln, Madison, Marion, Marshall, Montgomery, Nemaha, Randolph, St. Charles, Washington, Clay, Dickinson, Butler, Cowley	[redacted]
Cushing Extension	[redacted]	Butler, Clay, Cowley, Dickinson, Jefferson, Kay, Lincoln, Marion, Noble, Payne, Washington, Marshall, Nemaha, Brown, Doniphan, Cedar, Wayne, Stanton, Platte, Colfax, Seward, Saline, Gage	[redacted]

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FIGURE 1.2
PIPING SYSTEM OVERVIEW

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2.0 NOTIFICATION PROCEDURES

2.1 Internal Notifications

2.2 External Notifications

Figure 2.1 Emergency Activation Flowchart

Figure 2.2 Internal Notification References

Figure 2.3 Notification Data Sheet

Figure 2.4 External Notification Flowchart

Figure 2.5 External Notification References

Figure 2.6 Possible Command Post Locations

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This Section is a guide for notification procedures that should be implemented immediately after discovering a discharge incident and, if possible, securing the source. Internal and external notifications are described separately for clarification purposes only. All notifications are of extreme importance and must be completed in a timely manner.

2.1 INTERNAL NOTIFICATION

The following internal notifications should be made for each emergency incident to the extent that the incident demands (telephone reference is provided in Figure 2.2). In no event shall notification be delayed because the immediate supervisor is inaccessible. Authorization is given to bypass management levels if necessary to provide timely notification to appropriate management. The typical internal notification responsibilities for each person potentially involved in the initial response are as follows:

Employee Discovering Discharge

- Immediately notify the Keystone Oil Control Center (OCC) (contact information is listed in Figure 2.2).
- Notify the local fire department, police department, and rescue, as needed.
- Notify the Spill Response Contractor, Quantam Murray at (877) 378-7745 (Canada only).
- Notify the Spill Response Contractor, National Response Corporation at (800) 337-7455 (US only).
- Notify the contracted Spill Management Team, the O'Brien's Group at (985) 781-0804 if required (Canada & US).
- Notify Area Manager or Regional On-Call Manager.

Keystone Oil Control Center (OCC)

- Verify emergency.
- Immediately notify the Keystone Console Manager and Regional On-Call Manager.
- Notify the emergency response contractor if the employee that discovered the discharge has not already made the notification.
- Notify: U.S. National Response Center, the CA Transportation Safety Board National Response Center, CA National Energy Board, appropriate Federal agencies, County Emergency Management, Province/State Environmental Agency, and the Utilities One-Call, as needed (notification requirements and contact information are listed in Figure 2.5).

Calgary Emergency Operations Center (EOC) Manager

- Once the emergency has been verified by the Oil Control Center (OCC), request contact information for Regional On Call Manager.
- Contact the Regional On Call Manager to confirm activation of Regional EOC and inform that activation of the Corporate EOC will be completed.
- Notify the Corporate Emergency Response Team (CERT) and activate the Corporate Emergency Operations Center (EOC).
- Dial into Regional EOC conference line to establish communications with Regional EOC and Incident Management Team on site.
- Once Corporate EOC is activated, determine with Corporate Security whether emergency seems to meet "crisis" criteria.
- If yes, ensure Corporate Security activates TransCanada's Crisis Management Team.
- Continue to provide support to both Regional EOC and Incident Management Team throughout the emergency response phase.

Corporate Security

- Engage in Corporate Emergency Operations Center (EOC)
- Confirm emergency meets "crisis" criteria.
- Notify the Executive VP of Operations and Engineering.

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Regional Emergency Operations Center

- Activate Regional Emergency Operations Center (EOC).
- Set up Regional conference line to establish communications with Incident Management Team and Corporate Emergency Operations Center (EOC).
- Immediately provide support to Incident Management Team.
- Complete all local notifications.
- Facilitate ongoing communication between Incident Management Team and the Corporate EOC.
- Transmit appropriated MSDS to Incident Commander, local officials, and State Environmental Agencies.

Corporate Emergency Response Team (CERT)

- Attend Corporate Emergency Operations Center (EOC).
- Immediately notify senior management to inform about the emergency event.
- Fulfill profile of service and functional plan as required based on the type of emergency event.
- Continue to provide support to Incident Management Team and Regional EOC.

O'Brien's Response Management Command Center

- Email is received at the O'Brien's Command Center as well as by key Response Services personnel.
  - Primary - response@obriensrm.com
  - Secondary - ccenter@obriensrm.com

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FIGURE 2.1

EMERGENCY ACTIVATION FLOWCHART

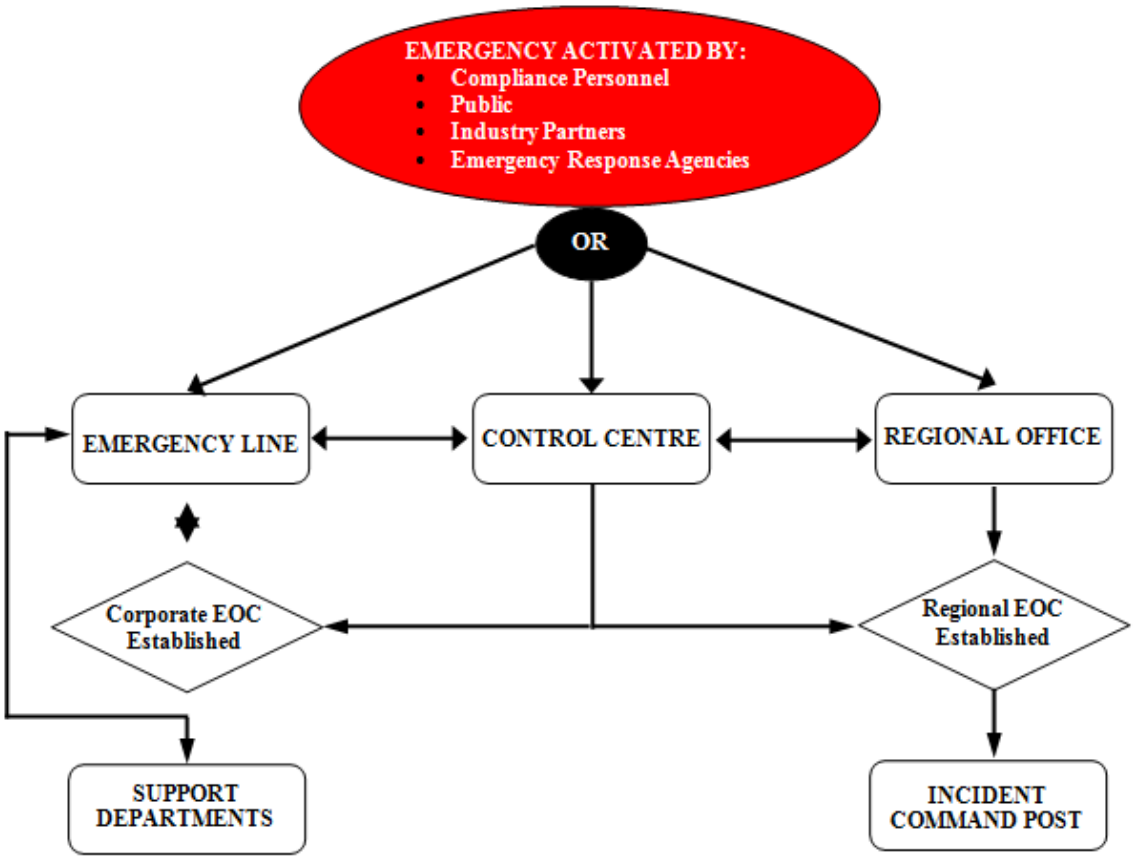

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FIGURE 2.2

INTERNAL NOTIFICATION REFERENCES

CORPORATE RESPONSE PERSONNEL / OTHER COMPANY CONTACTS INTERNAL NOTIFICATIONS					
POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER

Hardisty Pump Station/ Regina Pump Station					
POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER
Regina Pump Station / Haskett Pump Station					
POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER
North Dakota, South Dakota, Nebraska					
POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER

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Kansas, Missouri, Illinois

POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER

Cushing Extension

POSITION/TITLE	NAME	OFFICE	HOME	CELL	PAGER

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2.2 EXTERNAL NOTIFICATIONS

External notifications are those made to entities outside of the Company including Federal, Province/State and local regulatory agencies, as well as railroad and utility companies. These notifications include both verbal and written requirements.

Verbal Notification Requirements

Immediate internal notification is to be made in accordance with the Internal Notification Procedures found in Section 2.1 when a system operational failure or other type of incident occurs. This will allow immediate evaluation and classification of incidents and prompt immediate telephonic notification as detailed in Figure 2.4 and 2.5 to the Transportation Safety Board, National Response Center (NRC), Province/State agencies, local agencies, and other Federal agencies as required. The information found on the Notification Data Sheet, Figure 2.3, should be used to disseminate incident information to the appropriate agencies.

For the purpose of this procedure, immediate reporting means reporting the instant a person has knowledge of an actual or suspected leak, uncontrolled release of product, any unplanned spill or other pipeline system failure. Information that causes any employee to reasonably suspect a leak or uncontrolled release of product must be immediately reported, even when the actual existence or location of a leak or release cannot yet be confirmed.

Written Notification Requirements

In the United States, a written report is to be filed as soon as practical, but not later than 30 days after discovery of the incident to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, US Department of Transportation. Information concerning the event shall be reported on Pipeline and Hazardous Materials Safety Administration Form 7000-1 on-line on the Pipeline and Hazardous Materials Safety Administration website via log-in. Paper reports are not required. This report is to be filed for all incidents reported telephonically and other incidents required to be reported in accordance with the criteria listed below.

The information required for completing the 30-day written report will be furnished by the Area Offices to the Department of Transportation Regulatory Compliance Department for submission to the Department of Transportation. Any subsequent or additional information that was not reported on the initial written report must be reported to the Department of Transportation Regulatory Compliance Department by the Area Office. This information will be utilized in filing a supplemental written report to the Department of Transportation as soon as possible, but no later than 30 days after its discovery.

In Canada, a detailed written incident report is required as soon as practicable.

Transportation Safety Board (TSB)

The TSB's role is to advance transportation safety through the investigation of transportation occurrences in the marine, pipeline, rail and aviation modes.

TSB Classification System

The primary criterion for determining if an occurrence in any mode will be investigated is whether or not such analysis is likely to lead to a reduction of risk to persons, property, or the environment.

Class 1 Occurrences (Public Inquiry)

- the potential for reducing the risk to persons, property, or the environment;
- whether an inquiry would uncover facts that might not otherwise be made known;
- whether an inquiry would result in quicker remedial action;
- the actual or potential extent of injuries and/or loss of life;

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- the degree of public interest in and concern about public safety; or
- the possible involvement of an arm of government.

Class 2 Occurrence (Individual Occurrence Investigation)

- there is a high probability of advancing Canadian transportation safety in that there is significant potential for reducing the risk to persons, property, or the environment; or
- the Governor in Council so requests (pursuant to Section 14(1) of the CTAISB Act).

Class 3 Occurrences (Individual Occurrence Investigation)

- there is significant public expectation that the TSB should independently make findings as to cause(s) and contributing factors; or
- there is potential for better understanding the latent unsafe conditions contributing to a significant safety issue; or
- a government representative so requests (pursuant to Section 14(2) of the CTAISB Act); or
- the Board must do so to meet its obligations or commitments.

Class 4 Occurrences (Safety Issue Investigation)
Multiple occurrences, which the Board deems to be indicative of significant unsafe situations or conditions, will be subject to a safety issue investigation when:

- there is a high probability of advancing Canadian transportation safety by reducing the risk to persons, property, or the environment; or
- in the Board's opinion, there is widespread public expectation that the TSB should independently analyze a particular safety issue.

Class 5 Occurrences (Data Collection)

Data pertaining to occurrences that do not meet the criteria of classes 1 through 4 will be recorded in suitable scope and detail for possible safety analysis, statistical reporting, or archival purposes.

National Energy Board (NEB)

The NEB's role and responsibilities generally includes:

- The NEB's top priority in any emergency is to make sure that people are safe and secure, and that property and the environment are protected. Any time there is a serious incident, the NEB Inspectors may attend the site to oversee a company's immediate response. The NEB will require that all reasonable actions are taken to protect employees, the public and the environment. Further, the NEB will verify that the regulated company conducts adequate and appropriate clean-up and remediation of any environmental effects caused by the incident.

  And/or

As lead regulatory agency, the NEB:

- Monitors, observes and assesses the overall effectiveness of the company's emergency response in terms of:
  - Emergency Management
  - Safety
  - Security
  - Environment
  - Integrity of operations and facilities; and
  - Energy Supply.

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- Investigates the event, either in cooperation with the Transportation Safety Board of Canada, under the Canada Labour Code, or as per the National Energy Board Act or Canada Oil & Gas Operations Act (whichever is applicable)
- Inspects the pipeline or facility
- Examines the integrity of the pipeline or facility
- Requires appropriate repair methods are being used
- Requires appropriate environmental remediation of contaminated areas is conducted
- Coordinates stakeholder and Aboriginal community feedback regarding environmental clean-up and remediation
- Confirms that a company is following its Emergency Procedures Manual(s) commitments, plans, procedures, and NEB regulations and identifies non-compliances
- Initiates enforcement actions as required
- Approves the restart of the pipeline.

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Transportation Safety Board of Canada Pipeline Occurrence Reporting	
Citation	**Description**
Extracts from Transportation Safety Board Regulations Sections 5(1) and 5 (5)	When a reportable pipeline accident or incident takes place, the operator and any employee of the operator having direct knowledge of the accident or incident shall report to the Board as soon as possible and by the quickest means available. Where any person mentioned above makes a report, no other person referred to is required to make such a report.
Transportation Safety Board Regulations Section 2(1)	A "reportable pipeline accident" is an accident resulting directly from the operation of a pipeline, where (a) a person sustains a serious injury or is killed as a result of being exposed to i. a fire, ignition or explosion, or ii. a commonly released from the pipeline, or (b) the pipeline i. sustains damage affecting the safe operation of the pipeline as a result of being contacted by another object or as a result of a disturbance of its supporting environment, ii. causes or sustains an explosion, or a fire or ignition that is not associated with normal operating circumstances, or iii. sustains damage resulting in the release of any commodity.
Transportation Safety Board Regulations Section 2(1)	A "reportable pipeline incident" means an incident resulting directly from the operation of a pipeline where (a) an uncontained and uncontrolled release of a commodity occurs, (b) the pipeline is operated beyond design limits, (c) the pipeline causes an obstruction to a ship or to a surface vehicle owing to a disturbance of its supporting environment, (d) any abnormality reduces the structural integrity of the pipeline below design limits, (e) any activity in the immediate vicinity of the pipeline poses a threat to the structural integrity of the pipeline, or (f) the pipeline, or a portion thereof, sustains a precautionary or emergency shut-down for reasons that relate to or create a hazard to the safe transportation of a commodity.

NOTE: Refer to Figure 2.5 for any additional Province/State written reporting requirements.

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FIGURE 2.3

NOTIFICATION DATA SHEET

Date: ***Time:***

INCIDENT DESCRIPTION

Reporter's Full Name: ***Position:***
Day Phone Number: ***Evening Phone Number:***
Company: ***Organization Type:***
Facility Address: ***Owner's Address:***

Facility Latitude: ***Facility Longitude:***
Spill Location:
(if not at Facility)
Responsible Party's Name: ***Phone Number:***
Responsible Party's Address:
Source and/or cause of discharge:

Nearest City:
County: ***State:*** ***Zip Code:***
Section: ***Township:*** ***Range:***
Distance from City: ***Direction from City:***
Container Type: ***Container Storage Capacity:***
Facility Oil Storage Capacity:
Material:

Total Quantity Released	Water Impact (*YES or NO*)	Quantity into Water

RESPONSE ACTION(S)

Action(s) taken to Correct, Control, or Mitigate Incident:

Number of Injuries: ***Number of Deaths:***
Evacuation(s): ***Number Evacuated:***
Damage Estimate:
More information about impacted medium:

Possible hazards to human health or the environment outside of the Facility:

CALLER NOTIFICATIONS

National Response Center (NRC): 1-800-424-8802 ***Transportation Safety Board:*** 819-997-7887
Additional Notifications (Circle all applicable): ***USCG*** ***NEP*** ***EPA*** ***Province*** ***State*** ***Other***
National Response Center
Incident Assigned No.

ADDITIONAL INFORMATION

Any information about the incident not recorded elsewhere in this report including estimated quantity and disposition of recovered material:

NOTE: DO NOT DELAY NOTIFICATION PENDING COLLECTION OF ALL INFORMATION.

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FIGURE 2.4

EXTERNAL NOTIFICATION FLOWCHART

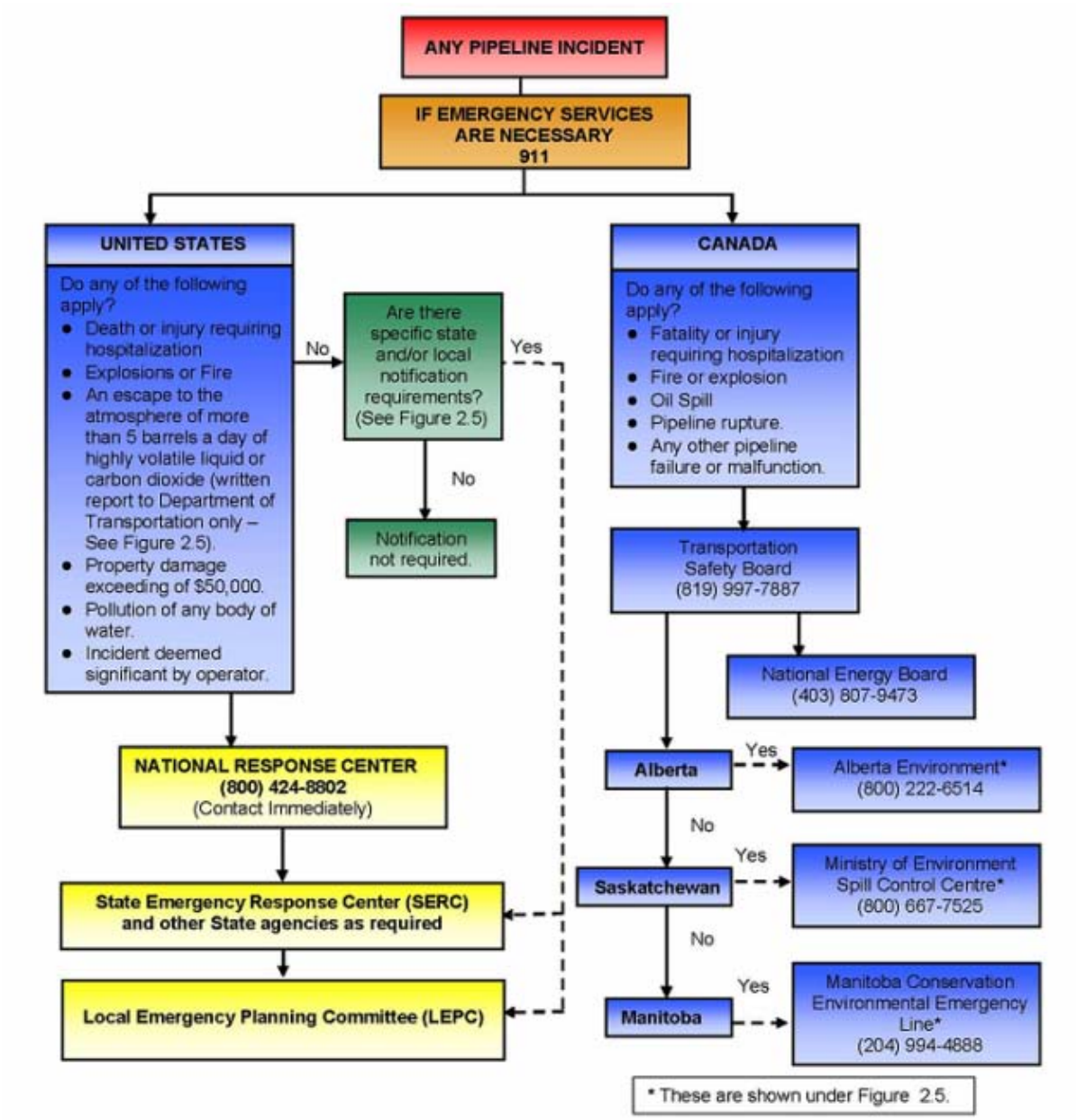

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FIGURE 2.5

EXTERNAL NOTIFICATION REFERENCES

REQUIRED NOTIFICATIONS	
National Response Center (NRC) c/o United States Coast Guard (CG-5335) - Stop 7581, 2100 2nd Street, SW Washington, District Of Columbia 20593-0001	(800) 424-8802 (202) 267-2675
REPORTING REQUIREMENTS TYPE: Any discharge or sighting of oil on navigable waters. VERBAL: Immediate notification required (within 2 hours). WRITTEN: If an RQ limit is reached, refer to state requirements for written report requirements. NOTE: A call to the NRC must also be made for spills or releases of hazardous substances that meet or exceed their RQ.	
Office of Pipeline Safety and Hazardous Materials U.S. Department of Transportation 1200 New Jersey Avenue SE-E-22-321 Washington, District Of Columbia 20590	(202) 366-4000
REPORTING REQUIREMENTS TYPE: In addition to the reporting of accidents to the NRC as noted below, a written accident report PHMSA Form 7000-1. VERBAL: Call to the NRC meets the required verbal notification under DOT reporting requirement. WRITTEN: Reported on PHMSA Form 7000-1 no later than 30 days, submit a report resulting from explosion/ fire/ hospitalization, death, property damage greater than $50,000, or above reportable quantity. NOTE:	
Saskatchewan Environment and Resource Management Box 3003, 800 Central Avenue. Prince Albert, Saskatchewan S5V 6G1	(800) 667-7525
REPORTING REQUIREMENTS TYPE: Any oil spill to water or oil spill greater than or equal to 50 L. to land. VERBAL: Immediately WRITTEN: Within 7 days. NOTE:	
Transportation Safety Board (TSB) of Canada 200 Promenade du Portage, Place du Centre, 4th Floor Gatineau, Quebec 1K8	(819) 997-7887 (800) 387-3557
REPORTING REQUIREMENTS TYPE: All pipeline accidents with fatality or serious injury, fire or explosion, oil spill, pipeline rupture or any other pipeline failure or malfunction. VERBAL: Immediately. WRITTEN: Within 30 days. NOTE:	

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Alberta Environment 9915 -108 Street 10th Floor, Petroleum Plaza South Tower Edmonton, Alberta T5K 2G8	(800) 222-6514
REPORTING REQUIREMENTS TYPE: All spills to water or exceeds a reportable quantity or emission level. VERBAL: Immediately. WRITTEN: Within 7 days. NOTE:	
Canadian National Energy Board (CA NEB) 444 Seventh Avenue SW Calgary, Alberta T2P OX8	(403) 807-9473 (800) 899-1265
REPORTING REQUIREMENTS TYPE: All pipeline incidents with fatality or serious injury, fire or explosion, oil spill or hyrocarbon release, or any operation beyond the design limits of the pipeline. VERBAL: Immediately. WRITTEN: As requested by the Agency. NOTE: For further definition of Incident see Glossary.	
Manitoba Water Stewardship Manitoba Water Stewardship Box 11 200 Saulteaux Crescent Winnipeg, Manitoba R3J 3W3	1-866-626-4862 1-204-945-6398
REPORTING REQUIREMENTS TYPE: VERBAL: WRITTEN: NOTE:	
Manitoba Conservation Environmental Emergency Line Winnipeg, Manitoba	(204) 994-4888
REPORTING REQUIREMENTS TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency. NOTE:	
South Dakota Department of Environment and Natural PMB 2020 Joe Foss Building, 523 East Capitol Pierre, South Dakota 57501-3182	(605) 773-3296 (605) 773-3231
REPORTING REQUIREMENTS TYPE: All spills or discharges VERBAL: Immediately. WRITTEN: As requested by the Agency. NOTE:	

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U.S. Environmental Protection Agency, Region 8 999 18th Street Suite 500 Denver, Colorado 80202-246	(303) 312-6312

REPORTING REQUIREMENTS

TYPE:	Immediately for spills that impact or threaten navigable water or adjoining shoreline.
VERBAL:	Notification to the EPA is typically accomplished by the call to the NRC.
WRITTEN:	In accordance with the applicable SPCC regulations, within 60 days for a spill in excess of 1,000 gallons (24 Bbls) in a single event or two spill events within a twelve month period into or upon nav
NOTE:	In accordance with the applicable SPCC regulations, within 60 days for a spill in excess of 1,000 gallons (24 Bbls) in a single event or two spill events within a twelve month period into or upon nav

Department of Environmental Quality 1200 N Street Suite 400 / PO Box 98922 Lincoln, Nebraska 68509-8922	(402) 471-2186 (402) 471-4545

REPORTING REQUIREMENTS

TYPE:	Any Discharge that leaves the Facility or threatens to impact navigable waters.
VERBAL:	Immediately, but not longer than 30 minutes.
WRITTEN:	As Requested by the Agency
NOTE:	

Department of Natural Resources Nebraska	(308) 697-3730

REPORTING REQUIREMENTS

TYPE:	
VERBAL:	Courtesy Reporting
WRITTEN:	
NOTE:	

Environmental Health Sect, Div. of Water Quality North Dakota	(701) 328-5210

REPORTING REQUIREMENTS

TYPE:	
VERBAL:	Courtesy Reporting
WRITTEN:	
NOTE:	

Game & Fish, Conservation and Communication Div North Dakota	(701) 328-6612 (701) 328-6300

REPORTING REQUIREMENTS

TYPE:	
VERBAL:	Courtesy Reporting
WRITTEN:	
NOTE:	

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Game, Fish and Parks South Dakota	(605) 223-7660
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Nebraska Emergency Management Agency Lincoln, Nebraska	(402) 499-1219
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
North Dakota Dept. of Health-Environmental Health 918 East Divide Avenue Bismarck, North Dakota 58501-1947	(701) 328-5150 (701) 328-5210
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Nebraska Game & Parks Commission Lincoln, Nebraska	(402) 471-5423 (402) 471-0641 (402) 271-5440
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
City of South Sioux Nebraska	(402) 494-7517 (402) 494-7500
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
North Dakota Division of Emergency Management PO Box 5511 Bismarck, North Dakota 58506-5511	(701) 328-8100
REPORTING REQUIREMENTS	

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TYPE: Any spill or discharge above RQ.
VERBAL: Immediately.
WRITTEN: Within 30 days.
NOTE:

North Dakota Industrial Commission State Capitol, 14th Floor, 600 E. Boulevard Ave., Dept 405 Bismarck, North Dakota 58505-0840	(701) 328-8020

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

City of Fargo Fargo, North Dakota	(701) 241-1310

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

Public Service Commission, Public Utilities Divisi North Dakota	(701) 328-4077

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

South Dakota DENR, Div of Environmental Services 523 East Capitol Ave. Pierre, South Dakota 57501-3182	(605) 773-3296 (605) 773-3231

REPORTING REQUIREMENTS
TYPE: Any Spill or discharge greater than reportable quantity.
VERBAL: Immediately.
WRITTEN: Within 30 days.
NOTE:

South Dakota DENR, Division of Oil and Gas South Dakota	(605) 394-2229

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

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South Dakota Department of Environment and Natural South Dakota	(605) 773-6035
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
South Dakota Department of Transportation, RR	(605) 773-3046 (605) 773-3921
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
South Dakota Department of Transportation, ROW South Dakota	(605) 773-3710 (605) 773-4249
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
South Dakota Office of Emergency Management South Dakota	(605) 773-3231
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
South Dakota Public Utilities Commission South Dakota	(605) 773-3201
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Tri-County Water District North Dakota	(701) 345-8240
REPORTING REQUIREMENTS	

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TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

Environmental Protection Agency - IL Office Illinois	(217) 524-3908 (217) 785-9250

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

U.S. Environmental Protection Agency, Region 5 77 W. Jackson Blvd., 5th Floor Chicago, Illinois 60604	(312) 353-2318 (312) 353-2000

REPORTING REQUIREMENTS
TYPE: Any oil discharge that has impacted or threatens to impact navigable waters or release of hazardous substances in an amount equal or greater than the reportable quantity.
VERBAL: Notification to the EPA is typically accomplished by the call to the NRC.
WRITTEN: For oil discharge within 60 days, in accordance with applicable SPCC RQ.
NOTE:

City of Troy Troy, Missouri	(636) 528-4712 x.227 (636) 528-7562

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

DeKalb County PWSD No 1 Missouri	(816) 393-5311

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

Douglas County Commission Missouri	(417) 683-4714

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

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Hickory County Commission Missouri	(417) 745-6450

REPORTING REQUIREMENTS
TYPE:
VERBAL: Courtesy Reporting
WRITTEN:
NOTE:

Illinois Department of Natural Resources (IDNR) 1 Natural Resources Way Springfield, Illinois 62702	(618) 462-1181 (Region 4) (217) 782-6302 (State of IL)

REPORTING REQUIREMENTS
TYPE: Wildlife Protection / Rehabilitation
VERBAL: Courtesy Reporting
WRITTEN: As the agency may request depending on circumstances.
NOTE:

Illinois Department of Transportation (IDOT) 2300 S. Dirksen Parkway Springfield, Illinois 62764	(217) 782-7820 (217) 782-2937

REPORTING REQUIREMENTS
TYPE: All spills or discharges.
VERBAL: Immediately.
WRITTEN: As requested by the Agency.
NOTE: As requested by the Agency.

Illinois Emergency Management Agency (SERC) 2200 South Dirksen Parkway Springfield, Illinois 62703	(800) 782-7860 (217) 782-7860

REPORTING REQUIREMENTS
TYPE: Any Discharge or sighting of oil, or hazardous substances exceeding a reportable quantity in Cook County, IL.
VERBAL: Immediately.
WRITTEN: As soon as practicable after the release.
NOTE:

Kansas Department of Health & Environment Curtis State Office Building 1000 SW Jackson Topeka, Kansas 66612	(785) 296-1679

REPORTING REQUIREMENTS
TYPE: All Spills that impact soil, surface water or groundwater.
VERBAL: Immediately, within one hour.
WRITTEN: As requested by Agency.
NOTE:

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Kansas Dept. of Transportation Dwight D. Eisenhower State Office Building, 700 S.W. Harrison Street Topeka, Kansas 66603-3754	(785) 296-3566
REPORTING REQUIREMENTS TYPE: All spills or discharges. VERBAL: Immediately. WRITTEN: As requested by the Agency. NOTE:	
Kansas Dept. of Wildlife and Parks Kansas	(620) 672-5911 (620) 672-0795
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
McDonald County Commission Missouri	(417) 223-4717
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Missouri DNR, Environmental Improvement and Energy PO Box 176 Jefferson City, Missouri 65102	(573) 751-4919
REPORTING REQUIREMENTS TYPE: Any Spill or discharge that meets or exceeds the Federal reportable quantity. VERBAL: Immediately, within 30 minutes WRITTEN: As requested by Agency. NOTE:	
Missouri U.S. Fish and Wildlife Service Columbia, Missouri	(573) 234-2132
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
New Madrid County Commission New Madrid, Missouri	(573) 748-2524

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REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Nodaway County Commission Maryville, Missouri	(660) 582-2251
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Pike County Commission Missouri	(573) 324-2412
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Polk County Commission Missouri	(417) 326-4031
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Taney County Missouri	(417) 546-7200
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
U.S. Army Corps of Engineers, Missouri Office Missouri	(573) 634-5667
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	

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U.S. Corps of Engineers - Illinois Illinois	(309) 794-5351
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Vernon County Commission Missouri	(417) 448-2500
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
Oklahoma Department of Environmental Quality 707 N Robinson Oklahoma City, Oklahoma 73102	(405) 702-1000
REPORTING REQUIREMENTS TYPE: VERBAL: Courtesy Reporting WRITTEN: NOTE:	
U.S. Environmental Protection Agency, Region 6 1445 Ross Avenue, Suite 1200 Dallas, Texas 75202	(214) 665-6595 (866) 372-7745
REPORTING REQUIREMENTS TYPE: Immediately for all spills that impact or threaten navigable water or adjoining shoreline. VERBAL: Notification to the EPA is typically accomplished by the call to the NRC. WRITTEN: As the agency may request depending on circumstances. NOTE: N/A	

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ADDITIONAL RESPONSE RESOURCES		
Planning and Incident Support		
COMPANY	**LOCATION**	**TELEPHONE**
National Response Corporation	3500 Sunrise Hwy Ste. T103 Great River, New York 11739	(800) 899-4672
O'Brien's Response Management Inc.	Slidell, Louisiana	(985) 781-0804
ENSR	Fort Collins, Colorado	(800) 722-2440
Western Canadian Spill Services	Calgary, Alberta	(403) 250-9606
Saskatchewan Co-op Area 1 Chairman	Saskatchewan	(780) 573-7350
Saskatchewan Co-op Area 1 Alt. Chairman	Saskatchewan	(306) 387-6449
Saskatchewan Co-op Area 2 Chairman	Box 1132 Kindersley, Saskatchewan S0L 1S0	(306) 968-2503
Saskatchewan Co-op Area 2 Co-Chairman	Box 5 Coleville, Saskatchewan S0L 0K0	(306) 965-2731
Saskatchewan Co-op Area 2 Custodian	Saskatchewan	(306) 834-7898
Saskatchewan Co-op Area 3 Chairperson	Saskatchewan	(306) 773-0234
Saskatchewan Co-op Area 3 Secretary	Saskatchewan	(306) 773-9381
Saskatchewan Co-op Area 3 Custodian	Saskatchewan	(306) 672-3723
Saskatchewan Co-op Area 4&5 Chair	Saskatchewan	(306) 842-1818
Saskatchewan Co-op Area 4&5 Vice-Chair	Saskatchewan	(306) 842-3088
Saskatchewan Co-op Area 6 Call-out	Saskatchewan	(306) 791-5058
Aberdeen Flying Service	Aberdeen, South Dakota	(605) 225-1384
Advantage Flight Solutions	Reno, Nevada	(775) 852-3512
Aero Air, LLC	Hillsboro, Oregon	(503) 640-3711
Air Services Inc	Traverse City, Michigan	(888) 922-0406
Airwest Helicopters,	Glendale, Arizona	(623) 516-2790
American Jet Charter	Oklahoma City, Oklahoma	(405) 495-5453
Aviation Charter Inc	Duluth, Michigan	(800) 486-5387
Bemidji Aviation	Bimidji, Minnesota	(218) 751-1880
Blatti Aviation, Elwood, IL	Elwood, Illinois	(815) 423-5659
Brainerd Helicopter Service	Brainard, Minnesota	(218) 829-5484
Charter First	Marshall, Minnesota	(866) 776-6261
Concrod Helicopter Charters	Concord, New Hampshire	(800) 615-1655
Crow Executive Air	Millbury, Ohio	(800) 972-2769
Custom Air Charter	Greenville, Mississippi	(662) 334-6444
Duncan Aviation	Lincoln, Nebraska	(402) 475-2611
Elliott Aviation - Des Moines	Des Moines, Iowa	(800) 447-6711
Elliott Aviation - Moline	Moline, Illinois	(800) 447-6711
Encore FBO, Sioux Falls, SD	Sioux Falls, South Dakota	(800) 888-1646

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Executive Air	Bismark, North Dakota	(701) 258-5024
Executive Airaft Charter	Lafayette, Louisiana	(866) 343-9940
Fargo Jet Center	Fargo, North Dakota	(701) 235-3600
Felts Field Aviation	Spokane, Washington	(509) 535-9011
First Wing Executive Air	Indianapolis, Indiana	(317) 293-6935
Frontline Aviation	Green Bay, Wisconsin	(800) 379-3359
Helimotion, LLC	Joliet, Illinois	(815) 725-9300
Hillsboro Aviation	Hillsboro, Oregon	(503) 648-2831
JBI Helicopter Service	Pembroke, New Hampshire	(603) 225-3134
Jet Linx	Omaha, Nebraska	(402) 422-0393
Leading Edge Aviation	Bend, Oregon	(541) 383-8825
MaxAir Inc	Appleton, Wisconsin	(800) 833-1544
Midwest Corporate Aviation	Wichita, Kansas	(316) 636-9738
North Country Aviation	Gaylord, Michigan	(800) 959-1829
North Country Heliflite	North Clarendon, Vermont	(518) 361-1380
PHI Helicopters	Lafayette, Louisiana	(337) 235-2452
Rhinelander Flying Service	Wausau, Wisconsin	(715) 365-3456
Sharkeys Helicopters	West Lebanon, New Hampshire	(603) 298-8728
Silver Hawk Aviation	Lincoln, Nebraska	(800) 479-5851
Tri State Aero	Evansville, Indiana	(800) 473-2904
Tulip City Air Service	Holland, Michigan	(800) 748-0515
Ultra Air, LLC	Omaha, Nebraska	(402) 345-7372
Vermont Helicopter Charters	Burlington, Vermont	(866) 224-8830
Worcester Helicopter Charters	Worcester, Massachusetts	(800) 226-1116
Quantam Murray	100-3600 Viking Way Richmond, B.C., V6V1N6	1-877-378-7745
Alberta Coop Area 2U Custodian	Hardisty, Alberta	(780) 888-3845
Albert Coop Area 1S Regional Custodian	Lethbridge, Alberta	(403) 329-0427
Alberta Coop Area 1S Equip. Custodian	Brooks, Alberta	(403) 362-6551
Quantam Murray	100-3600 Viking Way Richmond, B.C., V6V1N6	1-877-378-7745
Euroway Industrial Svc Co. Ltd	Winnipeg, Manitoba	(204) 661-0500

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FIGURE 2.6

POSSIBLE COMMAND POST LOCATIONS

TRANSCANADA COMMAND POSTS			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Hardisty PS/Lakesend PS	R&R Hotel 4744-49th Street Hardisty, Alberta Canada Box 251 Hardisty AB TOB 1VO	(780) 888-0004	Meeting Room Accomodates 40 people
Lakesend PS/Monitor PS	La Biche Inn PO Box 321 Lac La Biche, AB T0A 2C0, Canada	(780) 623-4427	Meeting Room accommodates 30 people
Monitor PS/Oyen PS	Super 8 - Provost 3611 57th Avenue Provost, AB T0B 3S0, Canada	(780) 753-2255	Meeting Room accommodates 55 people
Monitor PS/Oyen PS	Lucky Lake Hotel Main St Lucky Lake, SK S0L 1Z0, Canada	(306) 858-2008	Meeting Room accommodates 40 people
Oyen PS/Bindloss PS	None Available		
Blindloss PS/Cabri PS	Super 8 Motel Junction of Hwy 9 & 41 Oyen, AB T0J 2J0, Canada	(403) 664-3010	Meeting Room accommodates 65 people
Blindloss PS/Cabri PS	Swift Current Travelodge 605 North Service Road, East Swift Current, SK S9H 3T8, Canada	(306) 773-3101	Meeting Room accommodates 20 people
Cabri PS/Herbert PS	Super 8 Motel 405n Service Rd E Swift Current, SK S9H 0A1, Canada	(306) 778-6088	Meeting Room accommodates 20 people
Cabri PS/Herbert PS	Best Western Inn 105 George St W Swift Current, SK S9H 0K4, Canada	(306) 773-4660	Meeting Room accommodates 35 people
Herbert PS/Caron PS	Howard Johnson Inn - Swift Current 1150 South Service Road East Swift Current, SK S9H 3X6, Canada	(306) 773-2033	Meeting Room accommodates 55 people
Herbert PS/Caron PS	Days Inn Hwy 1 E Swift Current, SK S9H 3X6, Canada	(306) 773-4643	Meeting Room accommodates 250 people
	Comfort Inn & Suites		

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Caron PS/Regina PS	155 Thatcher Drive W. Moose Jaw, SK S6J 1M1, Canada	(306) 692-2100	Meeting Room accommodates 40 people
Caron PS/Regina PS	Hotel Saskatchewan Radisson Plaza 2125 Victoria Avenue Regina, SK S4P 0S3, Canada	(306) 522-7691	Meeting Room accommodates 100-800 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Regina PS/Kendal PS	Best Western 7 Oaks Inn 777 Albert St Regina, SK S4R 2P6, Canada"	(306) 757-0121	Meeting Room accommodates 150 people
Regina PS/Kendal PS	Holiday Inn Express Hotel & Suites Regina 1907 11th Avenue Regina, SK S4P 0J2, Canada"	(877) 863-4780	Meeting Room accommodates 50 people
Kendal PS/Grenfell PS	The Prince William Suites Hotel Box 1030 21 Mall Road, Melville, SK S0A 2P0, Canada	(306) 728-4546	Meeting Room accommodates 300 people
Kendal PS/Grenfell PS	Holiday Inn Hotel & Suites Regina 1800 Prince Of Wales Drive Regina, SK S4Z 1A4, Canada	(877) 863-4780	Meeting Room accommodates 80 people
Grenfell PS/Moosomin PS	Katepwa Beach Resort Hotel Lebret, SK S0G 2Y0 Canada	(306) 332-4696	Meeting Room accommodates 30 people
Grenfell PS/Moosomin PS	Whitewood Inn Hwy 1 & 9 Whitewood, SK S0G 5C0, Canada	(306) 735-2651	Meeting Room accommodates 250 people
Moosomin PS/Rapid City PS	The Russell Inn Hwy 16 & 83 MB R0J 1W0, Canada	(204) 773-2186	Meeting Room accommodates 150 people
Moosomin PS/Rapid City PS	Royal Oak Inn & Suites Brandon 3130 Victoria Avenue Brandon, MB R7B 0N2, Canada	(204) 728-5775	Meeting Room accommodates 50 people
Rapid PS/Portage La Prairie PS	Canadian Inn 150 5th Street Brandon, MB R7A 3K4, Canada	(204) 727-6404	Meeting Room accommodates 200 people
Rapid PS/Portage La Prairie PS	Super 8 Portage La Prairie MB Saskatchewan Avenue West Portage la Prairie, MB R1N, Canada	(204) 857-8883	Meeting Room accommodates 20 people
Portage La Prairie PS/Carman PS	Days Inn Highway 1 Quill Trail Portage la Prairie, MB R1N 3C3, Canada	(204) 857-9791	Meeting Room accommodates 50 people
Portage La Prairie PS/Carman PS	Days Inn & Suites-Winkler 395 Boundary Trail Winkler, MB R6W 4B1, Canada	(204) 325-8888	Meeting Room accommodates 40 people
Carman PS/Haskett PS	Super 8 Motel 400 Main St S MB R0G 1K0, Canada	(204) 746-6879	Meeting Room accommodates 30 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Carman PS/Haskett PS	Heartland Inn 851 Main St Winkler, MB R6W 2L8, Canada	(204) 325-4381	Meeting Room accommodates 300 people
Haskett PS/Edinburg PS	Holiday Mountain Ski Resort & Golf Course Holiday Mountain La Riviere, MB R0G 1A0, Canada	(204) 242-2172	Meeting Room accommodates 70 people
Haskett PS/Edinburg PS	Cedar Inn Steak House & Motel 502 Division Ave S Cavalier, ND 58220	(701) 265-8341	Meeting Room accommodates 50 people
Edinburg PS/Niagara PS	Forestwood Inn 504 Sunset Ave Walhalla, ND 58282	(701) 549-2651	Meeting Room accommodates 30 people
Niagara PS/Luverne PS	Holiday Inn Express Hotel & Suites Grand Forks 4051 32nd Ave South Grand Forks, ND 58201	(877) 863-4780/ (701) 772-7700	Meeting Room accommodates 30 people
Niagara PS/Luverne PS	Quality Inn & Suites 507 25th St. SW Jamestown, ND 58401	(701) 252-3611	Meeting Room accommodates 325 people
Luverne PS/Fort Ransom PS	Governors Inn & Conference Center 2050 Governors Dr Casselton, ND 58012	(701) 347-4524	Meeting Room accommodates 450 people
Luverne PS/Fort Ransom PS	America Inn 280 Wintershow Rd SW Valley City, ND 58072	(701) 845-5551	Meeting Room accommodates 60 people
Fort Ransom PS/Ludden PS	Holiday Inn Express Jamestown 803 20th St. S.W. Jamestown, ND 58401	(701) 251-2131	Meeting Room accommodates 25 people
Fort Ransom PS/Ludden PS	Ramada Aberdeen 2727 6th Avenue SE Aberdeen, SD 57401	(605) 225-3600	Meeting Room accommodates 25 people
Ludden PS/Ferney PS	Best Western-Ramkota Hotel 1400 8th Ave NW Aberdeen, SD 57401-2602	(605) 229-4040	Meeting Room accommodates 150 people
Ludden PS/Ferney PS	Ramada 2727 6th Ave SE Aberdeen, SD 57401 US	605-225-3600	Meeting Room accommodates 400 people
Ferney PS/Carpenter PS	Holiday Inn Express Hotel & Suites Aberdeen 1330-1399 7th Ave SE Aberdeen, SD 57401	(877) 863-4780/ (605) 725-4000	Meeting Room accommodates 100 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Ferney PS/Carpenter PS	Country Inn Suites Watertown Reviews 100 S Maple Watertown, SD 57201	(605) 886-8900	Meeting Room accommodates 70 people
Carpenter PS/Roswell PS	Best Western Of Huron 2000 Dakota Ave S Huron, SD 57350-4027	(605) 352-2000	Meeting Room accommodates 50 people
Carpenter PS/Roswell PS	Super Deluxe Inn & Suites 288 US Highway 14 W De Smet, SD 57231	(605) 854-9388	Meeting Room accommodates 100 people
Roswell PS/Freeman PS	Days Inn Mitchell 1506 South Burr St. Mitchell, SD 57301	(605) 996-6208	Meeting Room accommodates 50 people
Roswell PS/Freeman PS	Best Western Ramkota Hotel Sioux Falls 3200 West Maple Street Sioux Falls, SD 57107	(605) 336-0650	Meeting Room accommodates 700-1500 people
Freeman PS/Hartington PS	Cameron Inn 131 E Main St Canistota, SD 57012	(605) 296-3555	Meeting Room accommodates 25 people
Freeman PS/Hartington PS	Best Western Kelly Inn 1607 East Highway 50 Route Yankton, SD 57078	(605) 665-2906	Meeting Room accommodates 125 people
Hartington PS/Stanton PS	Holiday Inn Express Hotel & Suites Vermillion 1200 N. Dakota St. Vermillion, SD 57069	(877) 863-4780/ (605) 624-7600	Meeting Room accommodates 100 people
Hartington PS/Stanton PS	Holiday Inn Express Hotel & Suites Norfolk 920 South 20th Street Norfolk, NE 68701	(877) 863-4780/ (402) 379-1524	Meeting Room accommodates 200 people
Stanton PS/David City PS	New World Inn & Conference Center 265 33rd Ave Columbus, NE 68601	(402) 564-1492	Meeting Room accommodates 1000 people
Stanton PS/David City PS	Holiday Inn Express Hotel & Suites Columbus 524 E 23rd St Columbus, NE 68601	(877) 863-4780/ (402) 564-2566	Meeting Room accommodates 200 people
David City PS/Wilber PS	Sleep Inn & Suites 303 23rd St Columbus, NE 68601	(402) 562-5200	Meeting Room accommodates 35 people
David City PS/Wilber PS	Holiday Inn Lincoln-Downtown 141 N. 9th St. Lincoln, NE 68508	(877) 863-4780/ (402) 475-4011	Meeting Room accommodates 500-1000 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Wilbur PS/Steele City PS	Embassy Suites Hotel Lincoln 1040 P Street Lincoln, NE 68508	(402) 474-1111	Meeting Room accommodates 500-1000 people
Wilbur PS/Steele City PS	Hotel Wilber 203 S Wilson St Wilber, NE 68465	(402) 821-2020	Meeting Room accommodates 30 people
Steele City (to State Line)	Travelers Lodge 3500 North 6th Street Beatrice, NE 68310	(402) 223-4074	Meeting Room accommodates 30 people
Steele City (to State Line)	Holiday Inn Express Hotel & Suites Beatrice 4005 N 6th Street Beatrice, NE 68310	(402) 228-7000	Meeting Room accommodates 350 people
State Line to Seneca	Hiawatha Lodge 101 Lodge Rd Hiawatha, KS 66434	(785) 742-7401	Meeting Room accommodates 50 people
State Line to Seneca	Oak Tree Inn 1127 Pony Express Hwy # A Marysville, KS 66508	(785) 562-1234	Meeting Room accommodates 40 people
Seneca PS/Severance PS	Marysville Surf Motel 2105 Center Street Marysville, KS 66508	(785) 562-2354	Meeting Room accommodates 30 people
Seneca PS/Severance PS	Big Lake Resort Big Lake State Park 200 Lake Shore Drive Big Lake, MO 64437-4477	(660) 442-5432	Meeting Room accommodates 35, can use dining hall which adds an additional 100 people
Severance PS/Turney PS	Days Inn - St. Joseph 4312 Frederick Ave. Saint Joseph, MO 64506	(816) 279-1671	Meeting Room accommodates 40 people
Severance PS/Turney PS	Crowne Plaza Hotel Kansas City Downtown 1301 Wyandotte St. Kansas City, MO 64105	(888) 444-0401/ (816) 474-6664	Meeting Room accommodates 200-250 people
Turney PS/Tina PS	Radisson Hotel Kansas City Airport 11828 NW Plaza Cir Kansas City, MO 64153	(816) 464-2423	Meeting Rooms accommodates 200 people
Turney PS/Tina PS	Comfort Inn 1803 Comfort Lane Cameron, MO 64429	(816) 632-5655	Meeting Room accommodates 30 people
Tina PS/Salisbury PS	Comfort Inn Marshall Station 1356 W. College Ave. Marshall, MO 65340	(660) 886-8080	Meeting Room accommodates 25 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Tina PS/Salisbury PS	Holiday Inn Express Hotel & Suites 1801 West Outer Road Moberly, MO 65270	(877) 863-4780/ (660) 269-9700	Meeting Room accommodates 30 people
Salisbury PS/Centralia PS	Country Inns & Suites 817 N Keene St Columbia, MO 65201	(573) 445-8585	Meeting Room accommodates 50 people
Centralia PS/Middletown PS	Holiday Inn - Wentzville 1175 Technology Drive O'Fallon, MO 63368	(636) 300-4844	5 Meeting Rooms accommodates 10-250 people
Centralia PS/Middletown PS	Days Inn Conference Center Columbia 1900 I-70 Drive SW Columbia, MO 65203	573-445-8511	Accommodates 400 people
Middletown PS/Saint Paul PS	Comfort Inn 425 E. Veterans Memorial Pkw Warrenton, MO 63383	(636) 456-6000	Meeting Room accommodates 25 people
Middletown PS/Saint Paul PS	Comfort Inn & Suites - O'Fallon/St Charles 100 Comfort Inn Court O'Fallon, MO 63366	(636) 696-8000	Meeting Room accommodates 35 people
Saint Paul PS/Hartford PS	Holiday Inn Express St. Louis Airport - Riverport 13735 Riverport Drive St. Louis, MO 63043	(314) 298 3400	Meeting 120 Classroom Style
Saint Paul PS/Hartford PS	Best Western Airport Plaza Inn & Conf. Center 4530 N. Lindbergh Blvd. Bridgeton, MO 63044	314-731-3800	Accommodates 300 people
Hartford PS/Pierron PS	Mariners Village Resort 1 Resort Dr Carlyle, IL 62231	618-594-7666	TBD
Hartford PS/Pierron PS	Holiday Inn Express Highland 20 Central Blvd. Highland, IL 62249	(877) 786-9480/ (618) 651-1100	TBD
Pierron PS/Patoka Terminal	Holiday Inn Express Hotel & Suites 21 Mattes Ave Vandalia, IL 62471	618-283-0010	Meeting Room
Pierron PS/Patoka Terminal	Ramada 2707 Veterans Ave. Vandalia, IL, 62471	618-283-1400	Meeting Room accommodates 30 people
Steel City PS/ Hope PS	Herington Inn & Suites 565 Highway 77 Herington, KS 67449	785-258-3300	Meeting Room accommodates 20 people

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TRANSCANADA COMMAND POSTS (Cont'd)			
Pump Station to Pump Station	**Hotel Name**	**Contact Numbers**	**Accommodations**
Steel City PS/ Hope PS	Holiday Inn Express Hotel & Suites 110 E. Lafayette Abilene, KS 67410	(877) 863 4780/ (325) 675-9800	Meeting Room accommodates 20 people
Hope PS/ Rock PS	Hampton Inn Derby 1701 Cambridge Street Derby, KS 67037	316-425-7900	Meeting Room accommodates 30 people
Hope PS/ Rock PS	Holiday Inn Express Hotel & Suites Andover East 54 Wichita 600 S Allen St. Andover, KS 67002	(877) 863-4780/ (316) 733-8833	Meeting Room accommodates 40 people
Rock PS/ Ponca City PS	Comfort Inn & Suites 3101 N. 14th Street Ponca City, OK 74604	(580) 765-2322	Meeting Room accommodates 30 people
Rock PS/ Ponca City PS	Holiday Inn Express Hotel & Suites Ponca City 2809 North 14th St. Ponca City, OK 74601	(877) 863-4780/ (580) 762-3700	Meeting Room accommodates 100 people
Noosomin PS/Rapid City PS	Canalta Hotel 405 Mtn. Street Moosomin, SK Canada	(306) 435-3044	Meeting Room Accomodates 40 ppl
Severence PS/Turney PS	Stoney Creek Inn 1201 North Woodbine Road St. Joseph, MO 64506	(816) 901-9600	TBD

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3.0 RESPONSE ACTIONS

3.1 Initial Response Actions

Figure 3.1 Spill Classification

Initial Response
Line Break Or Leak
Fire
Severe Thunderstorm/Flash Flooding/Landslide
Tornadoes
Earthquake
Winter Storm
Volcanic Eruptions
Bomb Threat
Release To Groundwater
Abnormal Operations

3.2 Documentation of initial Response Actions

3.3 Oil Containment, Recovery and Disposal/Waste Management

Figure 3.2 Product Specific Response Considerations

3.4 Storage/Disposal

3.5 Sampling and Waste Analysis Procedures

3.6 Safety Awareness

3.7 Emergency Medical Treatment and First Aid

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3.1 INITIAL RESPONSE ACTIONS

Initial response actions are those taken by local personnel immediately upon becoming aware of a discharge or emergency incident, before the Initial Response Team (described in Section 4.0) is formed and functioning. Timely implementation of these initial steps is of the utmost importance because they can greatly affect the overall response operation.

The pages that follow discuss initial response actions for a variety of emergencies that have the possibility of occurring. These emergencies are discussed in the order listed below:

- Initial Response
- Line Break or Leak
- Fire
- Severe Thunderstorm/Flash Flooding/Landslide
- Tornadoes
- Earthquake
- Winter Storm
- Volcanic Eruptions
- Bomb Threat
- Release to Groundwater
- Abnormal Operations

It is important to note that **these actions are intended only as guidelines** . The appropriate response to a particular incident may vary depending on the nature and severity of the incident and on other factors that are not readily addressed. Note, that **without exception, employees and public safety is first priority.**

The first Company person on scene will function as the Incident Commander (IC) until relieved by an authorized supervisor who will assume the IC position. Transfer of command will take place as more senior management respond to the incident. The role of IC will typically be assumed and retained by area management.

The person functioning as **Incident Commander** during the initial response period **has the authority to take the steps necessary to control the situation and must not be constrained by these general guidelines.**

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INITIAL RESPONSE ACTIONS - SUMMARY PERSONNEL AND PUBLIC SAFETY IS FIRST PRIORITY

RESPONSE TIMES*

US DOT Tier	1	2	3
High Volume Area	6 HR	30 HR	54 HR
All Other Areas	12 HR	36 HR	60 HR

CONTROL

- Eliminate sources of ignition
- Isolate the source of the discharge, minimize further flow

NOTIFY

- Make internal and external notifications
- Activate local Company personnel as necessary
- Activate response contractors and other external resources as necessary

CONTAIN

- Begin spill mitigation and response activities
- Monitor and control the containment and clean-up effort
- Protect the public and environmental sensitive areas

* Response resources and personnel available to respond within time specified after discovery of a worst case discharge per US DOT 49 CFR Part 194.115

In addition to the potential emergency events outlined in this Section, the Company has identified several "abnormal operations" that could be expected in the pipeline facilities. The Company has defined the events and established procedures to identify, eliminate or mitigate the threat of a worst case discharge due to these events. In compliance with 49 CFR 195.402(d), these procedures are defined in the Company's Operations Manual.

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Company First Responder / On Scene

- Verify emergency exists.
- Notify the Keystone Oil Control Center of the incident.
- Follow the appropriate steps outlined in the "Specific Incident Response Checklist" (Figure 3.1) and the "Product Specific Response Considerations" (Figure 3.2).
- Notify the Keystone Oil Control Center of the incident.
- Contact / Utilize local emergency services, as necessary (police, fire, medical).
- Follow TransCanada's Working Alone Procedures (EDMS No. 003743627).

Regional Emergency Operation Center

- Ensure local emergency agencies have been contacted (police, fire, medical).
- Assign personnel immediately to the discharge site to assist with emergency response (QI) and spill containment.
- Activate additional company and response contractors to site as situation demands.
- Confirm safety aspects at site, including need for Personal Protective Equipment (PPE), sources of ignition, and potential need for evacuation.
- Evaluate the severity, potential impact, safety concerns and response requirements based on the initial data provided by the First Person On-scene. Refer to the spill response evaluation Flowchart in this section.
- Establish communications with the Corporate Emergency Operations Center
- Perform notifications using Figure 2.1, as appropriate.

Area Management

- Proceed to spill site and coordinate response and clean-up operations.
- Assume the role of Incident Commander.
- Coordinate/perform activation of additional spill response contractors, as the situation demands (telephone reference is provided in Figure 2.5).
- Direct containment, dispersion, and/or clean-up operations in accordance with the "Product Specific Response Considerations" provided in Figure 3.2.
- Complete the "Product Release Report" provided in Appendix F.

Local Company Personnel

- Assigned personnel will immediately respond to a discharge from the Pipeline or Facility, as the situation demands.
- Assist as directed at the spill site.
- Assume Incident Management Team roles as deemed by Incident Commander

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Range of Reported Oil Thicknesses Tool

	Barely Discernible	Silvery Sheen	Rainbow Colors	Darkening Bands of Color	Dull Colors	Light Brown
Reported average threshold, Microns	**0.09**	**0.1**	**0.6**	**0.9**	**2.7**	**8**
Range, microns	**0.04 - .016**	**0.05 - 0.18**	**0.1 - 1.0**	**0.1 - 2.5**	**1.0 - 5.5**	**2.0 - 15.0**

Source ExxonMobil Research and Engineering Company, Oil Spill Response Field Manual. Revised 2008

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FIGURE 3.1

[redacted]

Spills/Releases to Environment:

Minor

- A spill/release, onsite, that poses no adverse affect to the environment nor impact neither to a water body nor to groundwater. The spill may or may not be reportable to a regulatory agency.

Serious

- A spill/release, onsite or off-site/off-right-of-way, that poses an adverse affect to the environment but no impact to a water body nor to groundwater.

Major

- A spill/release, onsite or off-site/off ROW, that poses an adverse affect to the environment including an impact to a water body or to groundwater.

Critical

- Emergency response for containment or clean up is required. A spill/release, onsite or off-site/off ROW, that poses an adverse affect to the environment including an impact to a water body or to groundwater.

Complaints - Health & Safety:

Minor

- Unverified community complaint from a Landowner, Police, Fire, Municipality, or a Ministry.
- Verified employee complaint where an investigation is required to obtain resolution.

Serious

- Verified community complaint likely to cause danger/risk to the public, employees or TransCanada facilities.

Major

- Employee work refusal based on belief of unhealthy or unsafe work conditions.

Critical

- Regulatory body notified of employee complaint (by employee) and investigates employee work refusal.

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SPECIFIC INCIDENT RESPONSE CHECKLIST

INITIAL RESPONSE

- Take appropriate personal protective measures.
- Conduct vapour monitoring
- Complete hazard assessment
- Secure site.
- Call for medical assistance if an injury has occurred.
- Notify Keystone Oil Control Center and area management of the incident.
- Eliminate possible sources of ignition in the near vicinity of the spill.
- Advise personnel or public in the area of any potential threat and/or initiate evacuation procedures.
- Identify/isolate the source and minimize the loss of product.
- Restrict access to the spill site and adjacent area as the situation demands. Take additional steps necessary to minimize any threat to health and safety.
- Verify the type of product and quantity released. (Material Safety Data Sheet(s) are provided in Appendix G).

All personnel are reminded that outsiders other than emergency services will not be allowed in the area during the time of an emergency and that statements issued to the media or other interested parties should be given by designated Company Management. Be courteous with media representatives and direct them to the designated spokesperson.

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LINE BREAK OR LEAK, SPECIFIC RESPONSE (Including Piping Rupture/ Leak Valve Rupture/Leak and Manifold Failure)

Oil Control Center (OCC)

- Shut down pipeline.
- Close upstream and downstream block valves.
- Notify On-call regional designate to attend site as a First Responder.
- Initiate Regional EOC Manager Notification once incident is confirmed by First Responder.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Oil Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - (403) 920-7859
    - (800) 608-7859

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FIRES (MINOR, MAJOR, EXPLOSION) SPECIFIC RESPONSE

Oil Control Procedures

Be aware of Fire Weather conditions.

- Watch - Critical fire weather conditions are forecast to occur.
- Red Flag Warning - Critical Fire weather conditions are either occurring or will shortly.

Individual Discovering the Fire - (All Employees)

- Call the Local Emergency Response Agency (911).
- Notify Oil Control Center (this should be the 1st notification completed in the event that it is a remote location with no immediate impacts to life safety).
- Notify Area Management.
- Complete all First Responder responsibilities and initially assume the role of TransCanada's Incident Commander.
- Ensure ongoing communications with Keystone Oil Control Center.
- Follow the instructions outlined in section 3.1 Initial Response and the Responsibilities outlined in TransCanada's First Responder checklist.

Note: Pipeline right-of-ways are used by Firefighters as a fire break (barrier) to isolate fires and prevent them from growing in size. Right-of-ways are commonly used to access to fire areas. Many times Firefighters will need to increase the size of the cleared space over the Pipeline right-of-way to prevent the fire from leaping from tree top to tree top. To do this, heavy equipment may be used to quickly increase the amount of cleared space between the fire area and unignited forest. The following are steps to consider when working with the local authority on creating these fire breaks.

- Use your best judgment to ensure the safety of staff, fire ground workers and the public when determining if this activity is safe to perform;
- Call and confirm with Asset Reliability if this activity is safe and implement any instructions provided by Asset Reliability. Asset Reliability's role is to provide directions to protect the health and safety of those involved as well as pipeline integrity;
- Be physically on site to coordinate the activities related to any pipeline crossings;
- Stake the pipeline to identify the location of the pipe(s) in the right-of-way.
- First preference is to use already existing pipeline crossing areas;
- Gather the appropriate information to complete a formal pipeline crossing agreement. In Canada, send required information to the Land Department in Calgary.
- Notify Keystone Console and area management.
- Shut off pumps.
- Coordinate with the Keystone Oil Control Center to close appropriate valves to isolate in the vicinity of the fire, if necessary.
- Isolate Pump Station from Mainline.
- Evacuate site as safety considerations dictates.
- Notify Keystone Console of evacuation route and final destination.
- Notify Keystone Console of safe arrival.

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- Inspect pump station, equipment and controls after the fire is extinguished and safe to return.
- Evaluate pipeline, monitoring or control systems for evidence of heat damage.
- Notify engineering to conduct further investigation if damage is found.
- Make appropriate repairs and return Pipeline to service.

Third Party Call In Confirmation of Fire

This procedure applies to a pipeline facility integrity threat identified received via third party thru TransCanada Emergency Line (PDL 800-447-8066) or direct call to Keystone Oil Control reporting a fire at or adjacent to Keystone Pipeline Facilities or ROW.

If the third party indicates a pipeline facility (Pump Station/QMU Building/ESB Building etc.) is on fire or in jeopardy of catching fire the controller will do the following:

- Should the call come from PDL, confirm receipt of third party call-in contact information. If third party call-in comes direct to console please fill out third party call-in form Third Party Template
- Once confirming all information with the caller and it is clear that the pipeline facilities are at risk, implement the following steps:
- Shutdown and Isolate the affected pump station OR
- Confirm, checking with leak triggers and discussion with third party, that the fire is not due to a pipeline failure.
- Once confirmed that the source is not us, keep the pipeline running.
- Notify On-call regional designate to investigate as a First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by First Responder.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Oil Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - (403) 920-7859
    - (800) 608-7859

Aerial Pipeline Patrol Confirmation of Fire

If the Oil Control Center receives a call from the Aerial Pipeline Patrol indicating a fire on or adjacent to Keystone Pipeline ROW/Facilities, the controller's response will be as follows:

If the pilot/observer indicates a pipeline facility (Pump Station/QMU Building/ESB Building etc.) is on fire or in jeopardy of catching fire the controller will do the following:

- Once confirming all information from the pilot/observer is clear that the pipeline facilities are at risk.
- Shutdown and Isolate the affected pump station.
- Notify On-call regional designate to investigate as a First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by First Responder.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.

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- Notify Oil Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database

If the pilot/observer indicates a fire on or adjacent to our Pipeline ROW, the controller will do the following:

- Confirm, checking with leak triggers and discussion with third party, that the fire is not due to a pipeline failure.
- Once confirmed that the source is not us keep the pipeline running.
- Notify On-call regional designate to investigate as a First Responder and provide further guidance.
- Initiate Regional EOC Manager Notification once incident is confirmed by First Responder.
- Initiate Calgary EOC Manager Notification and pass on Regional EOC contact Information.
- Notify Oil Control Center On-call designate.

Company Employee Confirmation of Fire

If the integrity threat is confirmed by a TransCanada Employee that has been dispatched as a First Responder to a third party call-in of a fire, at or adjacent to Keystone Pipeline Facilities or ROW, the controller's response will be as follows:

- Confirm isolation of affected area, including valve positions with Regional personnel and commence further isolation or pipeline shutdown strategy with Regional personnel as required.
- Should the recommendation from the field be to shutdown the pipeline, the controller is to do a controlled shutdown and isolate as per Pipeline Isolation and Segmentation Standards
- Confirm EMS has been initiated and Calgary EOC is active. Continue Monitoring pressure profiles using SCADA/LDS.
- Ensure all receipt and delivery interconnects are notified and updated as required.
- Notify Oil Control Center On-call designate.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - (403) 920-7859
    - (800) 608-7859

TRANSCANADA GAS PIPELINE RUPTURE/FIRE - KEYSTONE CONVERSION PIPE ROW

This procedure applies to a Keystone Pipeline integrity threat from an adjacent TransCanada Gas Pipeline rupture/fire in the conversion Pipeline ROW. The Conversion Pipeline ROW extends from Burstall Pigging Station to Elm Creek Pigging Station.

In the Event that the controller receives a suspected or a confirmed notification of a TransCanada Gas Pipeline rupture/fire adjacent to Keystone Oil Pipeline, the controller is to do the following:

- Confirm thru SCADA/LDS that pressures and flow rates are steady and that no other leak triggers are present.
- If no other leak triggers are present, the controller is to drive Keystone Pipeline to safe discharge limits and continue running.
- Notify On-call designate/first responder that the Keystone Pipeline is still running and we will await their direction once they arrive on scene.

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- First responder will instruct the controller to shutdown or continue running once on scene and the integrity of Keystone Pipeline has been assessed.
- Notify Oil Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
  - (403) 920-7859
  - (800) 608-7859

If one or more leak triggers exist, the controller is to initiate an Emergency Pipeline Shutdown and isolate as per Pipeline Isolation and Segmentation Standards

- Notify On-call designate/first responder that the Keystone Pipeline has been shutdown and we will await their direction once they arrive on scene.
- Notify Oil Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Notify Oil Movements Scheduling.
  - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
  - (403) 920-7859
  - (800) 608-7859

TRANSCANADA GAS PIPELINE RUPTURE/FIRE - KEYSTONE CONVERSION PIPE SHARED PUMP STATION

This procedure applies to a Keystone Pipeline integrity threat from an adjacent TransCanada Gas Pipeline rupture/fire at a shared pump station . The Shared Pump Stations include Cabri, Herbert, Caron, Regina, Kendall, Grenfell, Moosomin, Rapid City and Portage La Prairie.

In the event that the suspected or confirmed TransCanada Gas Pipeline rupture/fire occurs at a shared pump station facility, the controller is to do the following:

- Confirm thru SCADA/LDS that pressures and flow rates are steady and that no other leak triggers are present.
- If no other leak triggers are present, the controller is to isolate the pump station from the mainline and drive Keystone Pipeline to safe discharge limits and continue running.
- Notify On-call designate/first responder that the Keystone Pipeline is still running and we will await their direction once they arrive on scene.
- First responder will instruct Keystone Pipeline Operator to shutdown or continue running once on scene and the integrity of Keystone Pipeline has been assessed.
- Notify Oil Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
  - (403) 920-7859
  - (800) 608-7859

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If one or more leak triggers exist, the controller is to initiate an Emergency Pipeline Shutdown and isolate as per Pipeline Isolation and Segmentation Standards

- Notify On-call designate/first responder that the Keystone Pipeline has been shutdown and the pump station has been isolated and we will await their direction once they arrive on scene.
- Notify Oil Control Center On-call designate.
- Confirm EMS has been initiated and Regional/Calgary EOC is active. Continue monitoring pressure profiles using SCADA/LDS.
- Notify Oil Movements Scheduling.
    - During Business /After hours - Callout Database
- Should media inquiries be received directly in the Oil Control Center, inform callers that all media inquiries are to be referred to our Media Relations Representative at the following Phone Numbers:
    - (403) 920-7859
    - (800) 608-7859

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SEVERE THUNDERSTORM (Flash Flooding/Landslide) SPECIFIC RESPONSE

Severe Thunderstorm/Flash Flooding/Landslide

Thunderstorms are a year round occurrence with lightning a major threat. The potential of flash flooding is also possible when one area is affected for an extended period.

- Be aware of changing weather conditions.
  - Severe Thunderstorm Watch - Conditions are favorable to the development of thunderstorms.
  - Severe Thunderstorm Warning - A severe thunderstorm has been observed or is imminent.
  - Flash Flood Watch- Flash flooding is possible within 6 hours after heavy rains have ended.
  - Flash Flood Warning - Flash flooding is occurring or imminent.
- Terminate outdoor work when lightning is occurring and move to shelter.
- Avoid areas subject to sudden flooding until the thunderstorm passes.
- Evaluate the situation after weather event.
  - Does standing water prevent visual inspection?
  - Have flood waters damaged the Pipeline?
  - Have flood waters exposed buried piping?
  - Has soil shifted that could lead to a landslide?
- Initiate appropriate pipeline patrol by the most expedient means possible to determine extent of damage.
- Make all necessary repairs.

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TORNADO/STRAIGHT LINE WINDS SPECIFIC RESPONSE

Tornadoes

Although many disasters cannot be prevented or predicted, preparation can significantly reduce losses. In the event of a severe weather condition or a natural disaster, the Area Manager or assigned designee will be the Emergency Coordinator.

- **Be Aware of Changing Weather Conditions**
  - Tornado watch - Conditions are right for the formation of a tornado.
  - Tornado warning - A tornado has been sighted but is not in the area at this time.
  - Tornado alert - A tornado has been sighted in the immediate area, take cover immediately.

- **If Severe Weather Conditions Threaten**
  - Carry a battery operated portable radio and monitor conditions.
  - If a tornado is observed and time permits, evacuate the area.
  - If the tornado is approaching a pump station, notify the Keystone Console to remotely isolate the station.
  - In vehicle, drive away from tornado at right angle. Get out of car and seek shelter if tornado cannot be avoided.
  - If outdoors, shelter in ditch, excavation or other low spot and lie flat, face down.
  - Make certain that all personnel are aware of the condition.
  - Stay in shelter until conditions are safe.

- **Immediately After the Storm**
  - Account for all personnel.
  - Survey for damages.
  - Initiate team for any repairs.
  - Refer to this Plan for additional response guidance regarding fires, spills, etc., as needed.

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EARTHQUAKE SPECIFIC RESPONSE

Earthquake

The actual movement of the ground in an earthquake is rarely the direct cause of death or injury. Most casualties result from falling objects and debris because the shocks can shake, damage or demolish buildings and other structures.

- **Stay calm. Don't panic.**
- If you are indoors, stay there. Do not run outside.
- If you are in a building, take cover under a heavy furniture or stand in an inside doorway away from windows. (A door frame or the inner core of a building is its strongest point and least likely to collapse.)
- Exit building as situation determines.
- If you are outside, stay there. Move away from buildings to avoid falling debris. Avoid damaged utility lines.
- If you are driving, stop quickly and stay in your car. If possible, do not stop on a bridge, overpass or where buildings can fall on you. Your car can provide protection from falling debris.
- Do not reenter damaged buildings. Walls may collapse after the original shaking has ceased.
- Evaluate the situation and initiate appropriate pipeline patrol by the most expedient means possible to determine extent of damage.
- Make all necessary repairs as resources and conditions allow.

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SEVERE WINTER STORM SPECIFIC RESPONSE

Winter Storm

- Be aware of Changing Weather Conditions
  - Winter Storm Watch - Conditions are expected but not imminent.
  - Winter Storm Warning - A significant winter storm is occurring, imminent, or likely.
  - Blizzard Warning - Winds at least 35 mph, blowing snow frequently reducing visibility to 0.25 miles or less, and dangerous wind chills are expected.
- Listen to local radio stations for weather advisory and road condition reports, carry a survival kit, and start the trip with a full tank of gasoline.
- Inspect pump station, equipment, and controls after storm for damage.
- Make any repairs as necessary.

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VOLCANIC ERUPTIONS SPECIFIC RESPONSE

Volcanic Eruptions

If a volcanic eruption ejects a large ash plume and the wind carries the ash to the pipeline facilities, this may cause a disruption of operations by making travel difficult or impossible due to reduced visibility.

- Begin gathering information from news media, field personnel, etc. to assess any ash cloud size, location, heading and speed as soon as news of an eruption breaks.
- Consider recalling crews prior to the expected arrival of the ash cloud while it is still clear to travel. If a crew is at a station when an ash fall begins, they should probably stay there for the duration and not travel until it is determined to be safe after the event.
- Advise contract aerial patrol service of the situation if contacted for the beginning of a pipeline patrol or if an aerial patrol is in progress.
- Inspect pump station, equipment and controls after eruption for damage.
- Make any repairs as necessary.

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[redacted]

Bomb Threats

The following pages provide guidelines for actions to be taken in the event a bomb threat is received. A bomb threat to the pipeline system or personnel may present itself in any of several ways:

- Phone
- E-mail
- Fax
- Radio
- Mail
- Word-of-mouth
- Increase in the Homeland Defense Status

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RELEASE TO GROUNDWATER SPECIFIC RESPONSE

The following procedure has been prepared in the event of a release of crude oil from the pipeline into a hydraulically sensitive groundwater resource area, but may not be currently identified as a high consequence area by PHMSA. Specific areas of concern have been evaluated for their sensitivity and plans to effect cleanup have been discussed. These specific areas include:

- [redacted]
- [redacted]
- [redacted]

RESPONSE PROCEDURE

- Evaluate the topography and evidence of surface contamination.
- Establish containment, accounting for public safety, spill volume, terrain, and presence of surface water.
- Notify landowner and appropriate public agencies of potential groundwater contamination.
- Immediately retain an independent consultant with expertise in this area to evaluate impacts and remediation options.
- Consult with appropriate agencies regarding remediation, including water and soil cleanup levels, and need for groundwater monitoring.
- Notify and procure additional response equipment and personnel as necessary to address site-specific conditions.
- Dig intercept trench downgradient of release point.
- Line trench and stage vacuum truck to remove contaminated oil/water mixture.
- Excavate surface catchment upgradient of the intercept trench and near leading edge of visible contamination.
- Excavate until contaminated soil is completely removed and clean soil is encountered or conditions prohibit continued digging.
- Line the catchment to limit or prohibit further groundwater contamination.
- Move vacuum truck from intercept trench to catchment to recover oil and/or oily water.
- Line drop down area to stage contaminated soil as excavated.
- Segregate waste streams to minimize later disposal.
- Based on anticipated release, stage temporary storage and additional vacuum trucks to ensure recovery efforts continue without interruption.

  <u>Options for Long term Remediation:</u>

  - Air sparging
  - Vacuum extraction
  - Conventional pump and treat
  - Bioslurping
  - Excavation
  - Enhanced biodegradation/bioremediation
  - Chemical addition/oxidation

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    - Natural Attenuation
- Enlist additional experts, as appropriate, for continuing remediation and coordination with appropriate agencies.

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ABNORMAL OPERATIONS SPECIFIC RESPONSE

Abnormal Operations Specific Response

- If operating design limits have been exceeded (increase or decrease pressure or flow) and no emergency condition exists, stop operations and immediately investigate the pipeline.
- Verify whether a true safety problem, equipment malfunction, or operator error is present. Note: In all cases, safety to operations, the general public, and property will govern actions taken.
- Make appropriate repairs before continuing operations. Note: Corrective action will only be done by qualified personnel to perform the type of work involved.
- Monitor affected systems until normal operations are resumed.
- Complete follow-up and written reporting, as the situation demands.

Note: It is the responsibility of the pipeline operator to carry out the response procedures for abnormal pipeline operations as outlined in their respective O&M Manual.

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3.2 DOCUMENTATION OF INITIAL RESPONSE ACTIONS

It is difficult, particularly during the first few minutes of an initial response operation, to think about the importance of documentation. A log should be maintained which documents the history of the events and communications that occur during the response. When recording this information, it is important to remember that the log may become instrumental in legal proceedings, therefore:

- Record only facts, do not speculate.
- Do not criticize the efforts and/or methods of other people/operations.
- Do not speculate on the cause of the spill.
- Do not skip lines between entries or make erasures. If an error is made, draw a line through it, add the correct entry above or below it, and initial the change.
- Record the recommendations, instructions, and actions taken by government/regulatory officials.
- Document conversations (telephone or in person) with government/regulatory officials.
- **Request that government/regulatory officials document and sign their recommendations or orders (especially if company personnel do not agree with the suggestions, instructions, or actions).**

3.3 OIL CONTAINMENT, RECOVERY AND DISPOSAL/WASTE MANAGEMENT

After initial response has been taken to stop further spillage and notifications made to the required agencies, the Company will begin spill containment, recovery, and disposal operations.

The Incident Commander will assess the size and hazards of the spill (see Figure 3.2). The type of product, the location of the spill, and the predicted movement of the spill will be considered.

Based on this assessment, additional clean-up personnel and equipment will be dispatched to the site and deployed to control and contain the spill. Boom may be deployed in waterways to contain the spill and to protect socio-economic and environmentally sensitive areas. Booms may also be used in waterways to deflect or guide the spill to locations where it can more effectively be cleaned up using skimmers, vacuum trucks, or sorbent material. Clean-up equipment and material will be used in the manner most effective for rapid and complete clean-up of all spilled product.

Response and clean-up will continue until all recoverable product is removed, the environment is returned to its pre-spill state, and the Unified Command of the Company Incident Commander and the Federal and/or State On-Scene Coordinators determine that further response and cleanup is no longer necessary.

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FIGURE 3.2

FLAMMABLE LIQUIDS
(Non-Polar/Water-Immiscible)

The following information is intended to provide the initial responder(s) with data that may be useful in making quick decisions and executing prompt response actions. The information is intended for guideline purposes only.

PRODUCTS: **Crude Oil**

HAZARD IDENTIFICATION / RECOGNITION

GUIDE NO. 128

DANGERS

1. HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
2. Vapors may form explosive mixtures with air.
3. Vapors may travel to source of ignition and flash back.
4. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
5. Vapor explosion hazard indoors, outdoors or in sewers.
6. Those substances designated with a "P" may polymerize explosively when heated or involved in a fire.
7. Runoff to sewer may create fire or explosion hazard.
8. Containers may explode when heated.
9. Many liquids are lighter than water.
10. Substance may be transported hot.
11. If molten aluminum is involved, refer to Emergency Response Guide No. 169.

HEALTH

1. Move victim to fresh air. Call 911 or emergency medical service.
2. Apply artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
3. Remove and isolate contaminated clothing and shoes.
4. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
5. Wash skin with soap and water.
6. Keep victim warm and quiet.
7. Ensure that medical personnel are aware of the material(s) involved, and take precautions.

PUBLIC SAFETY

1. Isolate spill or leak area immediately for at least 50 meters (150 feet) in all directions.
2. Keep unauthorized personnel away.
3. Stay upwind.
4. Keep out of low areas.
5. Ventilate closed spaces before entering.

EVACUATION

Large Spill 1. Consider initial downwind evacuation for at least 300 meters (1,000 feet). Fire 1. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Information provided by the Emergency Response Guidebook 2008.

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3.4 STORAGE/DISPOSAL

Strict rules designed to ensure safe and secure handling of waste materials govern the Company waste disposal activities. To ensure proper disposal of recovered oil and associated debris, the following guidelines should be considered:

- In the event of a product spill, Facilities have limited capacity to store recovered product and water. Separated product is pumped to frac tanks or to trucks to be carried to the Facility for processing.
- Oily debris will be segregated on site and containerized for temporary storage prior to disposal in accordance with hazardous waste regulations.
- Transportation of waste material will be performed in accordance with all applicable Federal and State Regulations.
- Waste associated with the spill will be disposed at sites that have the necessary permits to accept the type of waste to be discharged.

The Company's Community, Safety and Health Administration Dept. will coordinate activities and secure the permits to ensure proper disposal or recycling of recovered product and debris.

3.5 SAMPLING AND WASTE ANALYSIS PROCEDURE

The Company's sampling and waste analysis practices are governed by the regulations for the applicable Province/State and Federal agency. These regulations outline methods and procedures for determining the chemical and physical characteristics of wastes generated by the Facility, including waste associated with spills, so that they may be properly stored, treated, or disposed.

3.6 SAFETY AWARENESS

It is the corporate policy of the Company to provide a safe workplace for all workers. All employees and contractors are responsible for maintaining the safety and health of all workers on the pipeline and the response operations.

Prior to engaging in any spill response activity:

- All employees/contractors must have received orientation from the Company Safety Plan.
- All U.S. contractor response personnel must be in compliance with Occupational Safety and Health Administration training requirements.
- All other personnel will have completed appropriate training for their position as outlined in Section 4.0.
- No employee/contractor shall engage in activities which place them at risk without the appropriate protective equipment and training.

Response Safety

All Company and contractor personnel are expected to comply with the Site Safety Plan for each spill incident.

- Any concern regarding health or safety issues should be immediately addressed.
- The First Responder must consider the spill site as dangerous and the local atmosphere explosive until air monitoring procedures prove that the area is safe.

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- The First Responder must exit the area against or across the wind, if possible, and must also evacuate others who are working in the area.
- All injuries, no matter how minor, must be reported to the Incident Commander in a timely manner.
- Prior to entering a spill area, a qualified person must perform an initial safety and health evaluation of the site.

Air Monitoring

A Safety Monitor shall be designated who is trained in the operation of air monitoring equipment. The Incident Commander must ensure that Safety Monitors are trained and that their equipment is maintained and ready for use.

- The air monitoring equipment shall be activated and checked at the location in which it is stored.
- Calibration of instruments should be performed before use.
- Air monitoring measurements which are to be made prior to entry into the spill area include:
  - Oxygen content
  - Lower Explosive Limit (LEL) with a pentane calibrated instrument
  - Benzene level

H2S

- Lower Explosive Limit readings above 10% require immediate evacuation of the area and elimination of ignition sources.
- Oxygen readings below 19.5% require the use of air supplied respiratory protection.
- After assuring that there are no hazards relating to explosion or oxygen depletion, sampling for benzene or total petroleum hydrocarbons shall dictate the appropriate respiratory devices to be used by persons entering the area.
- Benzene levels must be below 0.5 ppm to work without respiratory protection. At a level of greater the 0.5 but less than 5 ppm a half face respirator may be used. When the level is between 5.0 and 25 ppm a full face respirator must be used. Anything readings higher than 25 ppm, a supplied air or SCBA must be used.

If H2S is present in low concentrations respiratory protective equipment may be used following the following criteria based on approved protection factors. Using the approved protection factors of 10 for ½ face respirators and 50 for full face and the most stringent OEL which is 1 ppm (Canadian Federal COHSR) the corresponding maximum use concentrations would be 10 ppm for ½ face and 50 ppm for full face. The use of respirators however should be limited to areas with concentrations less than 10 ppm. If concentrations are higher workers should immediately leave the area.

- Hydrogen Sulfide is an extremely hazardous toxic compound that is present in most crude oils that are transported through the pipeline.
- Air monitoring for Hydrogen Sulfide will be done by all personnel working on or near the pipeline and during any cleanup operation.

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- Hydrogen Sulfide is characterized by a rotten egg smell at low level concentrations.
- The gas causes rapid temporary paralysis of the olfactory system leading to the loss of the sense of smell.
- Permissible exposure limits in many countries is 10 ppm. In Canada the occupational exposure level is 1 ppm.

Symptoms of exposure to Hydrogen Sulfide are:

- 0-10 ppm no known health effects for most people
- 10-100 ppm can cause headache, dizziness, nausea (100 ppm is the immediately dangerous to life and health level)
- 100-500 ppm above mentioned effects within a short time and more severe. Loss of breathing and death is possible within minutes.
- 500-700 ppm affects the central nervous system. Symptoms could include a loss of balance and a loss of reasoning. You could become unconscious and stop breathing within seconds
- 700 and greater would result in immediate loss of consciousness and permanent brain damage due to hypoxia or death if not rescued immediately
- The Incident Commander is responsible for arranging industrial hygiene monitoring in the post discovery period.

Decontamination

Through training programs, Facility personnel know and understand the importance of the removal of hazardous substances from their person if they are contaminated. Eyewash stations and safety showers provide a means to quickly remove gross contamination of harmful agents, including gasoline. Personnel must immediately shower and remove any clothing which is wet or otherwise contaminated. Showers in the change room are to be used for thorough cleansing. Persons should inspect themselves thoroughly before donning a fresh change of clothing.

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Contaminated clothing should be properly disposed. Contaminated personal protective equipment must be washed and sanitized before re-using. The washing of contaminated equipment is performed in a "contained area" to assure that the disposal of the wash water can be handled properly.

Establishing "Exclusion - Hot", "Decontamination - Decon", and "Support - Safe" Zones are required to prevent the removal of contaminants from the contaminated area as well as unauthorized entry into contaminated areas.

- Regardless of the decontamination facilities available, all efforts to minimize personnel exposure should be taken.
- Decontamination facilities should be positioned prior to employee/ contractor entrance to areas where the potential for exposure to contamination exists. The appropriate Material Safety Data Sheets (MSDS) are available to aid health professionals treating the injured parties. Material Safety Data Sheets are located in Appendix G.
- Decontamination facilities should be designed to prevent further contamination of the environment and should have a temporary storage area for items that will be reused in the contaminated area.
- Particular attention should be paid to personal hygiene prior to eating, drinking, or smoking.

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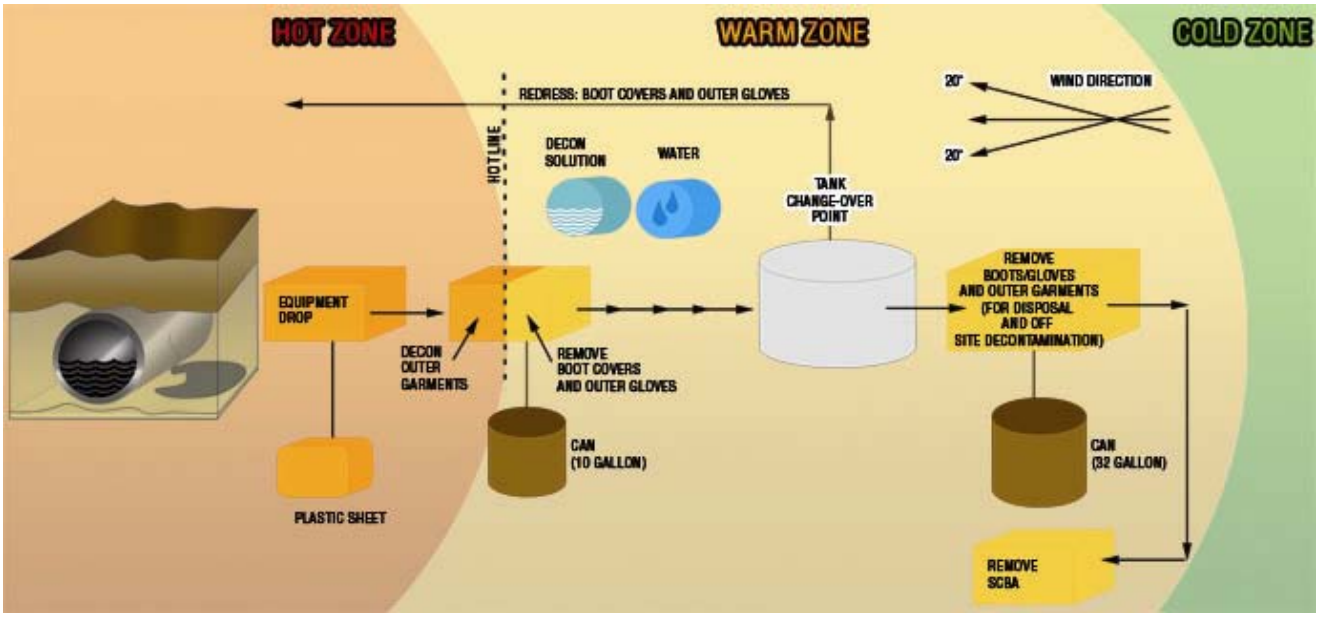
MINIMUM DECONTAMINATION LAYOUT
LEVELS A & B PROTECTION



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Personal Protective Equipment (PPE)

The following represents OSHA/USEPA designated PPE levels for responding to emergencies, post emergency cleanup sites, and/or Temporary Storage and Disposal (TSD) sites. The responder's PPE should be chosen based on his/her level of training and assigned job duties.

LEVEL A • Self Contained Breathing Apparatus (SCBA) (worn inside suit) • Encapsulated Chemical Protective Suit • Chemical Protective Gloves • Chemical Protective Boots • Hard Hat • Safety Toe Footwear • Safety Glasses	To be selected when the greatest level ok skin, respiratory, and eye protection is required.
LEVEL B • SCBA (worn outside suit) • Chemical Protective Suit w/Hood • Chemical Protective Boots • Chemical Protective Gloves • Hard Hat • Safety Toe Footwear • Safety Glasses	To be selected when the highest level of respiratory protection is necessary but a lesser level ok skin is needed.
LEVEL C • Air Purifying Respirator (APR) • APR a½ Face / Full Face • Hard Hat • Glasses (worn with a½ face APR) • Chemical Protective Boots • Chemical Protective Gloves • Chemical Protective Suit/Tyvek • Safety Toe Footwear • Safety Glasses	To be selected when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met.
MODIFIED LEVEL C Same as level C except no APR requirements.	To be selected when the concentration and type of airborne substances is known and the criteria for using air purifying respirators are met.
LEVEL D • Hard Hat • Safety Glasses • Work Uniform / Clothes • Leather Gloves • Safety Boots • Nomex (if required by the Company)	The atmosphere contains no known hazard and work functions preclude the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

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3.7 EMERGENCY MEDICAL TREATMENT AND FIRST AID

Call 911 immediately. On-site emergency medical response requires the same rapid assessment of the patient as any other situation, but requires the responders to be aware of other considerations that may affect the way they handle the patient. These considerations include the following:

- The potential for contamination of the patient, responders, and equipment should be addressed. Responders should arrange to treat all patients AFTER the injured party has been decontaminated according to the Site Safety Plan.
- Site personnel should make the initial assessment of the patient and determine the severity of the injury/illness.
- If the treatment needed is critical care or "life saving" treatment, rapid decontamination of the injured/ill party should be started. Refer to the Site Safety Plan for steps to be taken in an "abbreviated" decontamination for medical treatment.
- The need for full decontamination should be carefully weighed against the need for prompt medical treatment.
- The ambulance responding to medical emergencies shall be contacted as soon as possible and instructed exactly where to respond when needed and the nature of the contaminant. Telephone reference is provided in Annexes.
- Material Safety Data Sheet information will be available from the Incident Commander and should be provided to medical personnel to alert them of decontamination requirements.
- Report all injuries, incidents or close calls.
- If emergency medical treatment is needed, the Incident Commander, or his designated representatives, will request assistance from trained medical personnel.

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4.0 RESPONSE TEAMS

4.1 Introduction

4.2 Qualified Individual

4.3 Initial Response Team (IRT)

4.4 Regional Emergency Preparedness Team (REPT)

4.5 Incident Command System (ICS)

4.6 Unified Command

Figure 4.1 Incident Command System

4.7 ICS Roles and Responsibilities

Figure 4.2 Operational Period Planning Cycle

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4.1 INTRODUCTION

This Section describes organizational features and duties of the local responders, the Regional Emergency Preparedness Team (EPT), and the broader Emergency Management Team (EMT) as defined in TransCanada's Incident Management System (IMS). The Incident Management System integrates Incident Management, Emergency Management and Crisis Management and is maintained separately.

The key to an effective emergency response is a rapid, coordinated, tiered response by the affected Facility, the Regional Emergency Operations Center, and the Corporate Emergency Operations Center, consistent with the magnitude of an incident.

First response to an incident at the Facility will be provided by the local responders. The Regional EOC will respond, to the degree necessary, to incidents exceeding local capability.

Our response teams will use the National Incident Management System (NIMS) Incident Command System (ICS) to manage the emergency response activities. Because the Incident Command System is a management tool that is readily adaptable to incidents of varying magnitude, it will typically be used for all emergency incidents. Staffing levels will be adjusted to meet specific response team needs based on incident size, severity, and type of emergency.

An explanation of Incident Command System and the roles and responsibilities for primary members of the response teams are provided in Section 4.7 per CAN/CSA-2731-03. The USCG Incident Management Handbook (IMH) contains an in-depth description of all Incident Command System positions, Incident Command System development, response objectives and strategies, command responsibilities, Incident Command System specific glossary/acronyms, resource typing, the Incident Action Plan process, and meetings. The IMH can be located on the USCG's Homeport Website.

4.2 QUALIFIED INDIVIDUAL

It is the responsibility of the Qualified Individual (QI) or his/her designee to coordinate with the Federal On-Scene Coordinator (FOSC) and State On-Scene Coordinator (SOSC) throughout the response, if applicable.

Vital duties of the Qualified Individual (QI) include:

- Notify all response personnel, as needed.
- Identify the character, exact source, amount, and extent of the release, as well as the other items needed for notification.
- Assess the interaction of the spilled substance with water and/or other substances stored at the Facility and notify response personnel at the scene of that assessment.
- Assess the possible hazards to human health and the environment due to the release. This assessment must consider both the direct and indirect effects of the release (i.e., the effects of any toxic, irritating, or asphyxiating gases that may be generated, or the effects of any hazardous surface water runoffs from water or chemical agents used to control fire and heat-induced explosion).
- Assess and implement prompt removal actions to contain and remove the substance released.
- Coordinate rescue and response actions as previously arranged with all response personnel.
- Activate and engage in contracting with oil spill removal organizations.

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- Use authority to immediately access Company funding to initiate cleanup activities.
- Direct cleanup activities until properly relieved of this responsibility.
- Arrangements will be made to ensure that the Qualified Individual (QI) or the Alternate Qualified Individual (AQI) is available on a 24-hour basis and is able to arrive at the Facility in a reasonable time.
- The AQI shall replace the QI in the event of his/her absence and have the same responsibilities and authority.

4.3 INITIAL RESPONSE TEAM (IRT)

The first Company person on scene (First Responder) will function as the Incident Commander and person-in-charge until relieved by an authorized supervisor who will then assume the position of Incident Commander (IC). Transfer of command will take place as more senior management contract support respond to the incident. For response operations within the control of the Initial Response Team, the role of IC will typically be assumed and retained by the Qualified Individual.

The number of positions/personnel required to staff the Incident Management Team will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands. The IC is always responsible for directing the response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel.

A complete functional ICS organization is shown in Figure 4.1. The Incident Commander should try to fill the necessary positions within the Incident Management Team and request additional support from both the Regional and Corporate Emergency Operations Centers to fill/back up all the positions as the incident may dictate. Detailed job descriptions of the primary response team positions are provided in Section 4.7.

4.4 REGIONAL EMERGENCY PREPAREDNESS TEAM (EPT)

The Emergency Preparedness Team (EPT) will activate a Regional Emergency Operations Center (EOC) to support the Initial Response Team/Incident Management Team. The number of positions/personnel required to staff the Regional EOC will depend on the size and complexity of the incident.

The Regional EOC is staffed by personnel from various Regional locations. The Regional EOC provides necessary information to the appropriate Federal, State/Province, and Local authorities with designated response roles, including the National Response Center (NRC), the Canadian National Energy Board (NEB), if necessary, State Emergency Response Commission (SERC) Provincial Ministry, and local response agencies.

4.5 INCIDENT COMMAND SYSTEM (ICS)

The Incident Command System is intended to be used as an emergency management tool to aid in mitigating all types of emergency incidents. This system is readily adaptable to very small emergency incidents as well as more significant or complex emergencies. The Incident Command System utilizes the following criteria as key operational factors:

- Assigns overall authority to one individual
- Provides structured authority, roles and responsibilities during emergencies

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- The system is simple and familiar, and is used routinely at a variety of incidents
- Communications are structured
- There is a structured system for response and assignment of resources
- The system provides for expansion, escalation, and transfer/transition of roles and responsibilities
- The system allows for "Unified Command" where agency involvement at the command level is required

Effective establishment and utilization of the Incident Command System during response to all types of emergencies can:

- Provide for increased safety
- Shorten emergency mitigation time by providing more effective and organized mitigation
- Cause increased confidence and support from local, State, Federal, and public sector emergency response personnel
- Provide a solid cornerstone for emergency planning efforts

Section 4.7 provides a comprehensive list of every response team member's duty assignment.

4.6 UNIFIED COMMAND

As a component of an Incident Command System, the Unified Command (UC) is a structure that brings together the Incident Commanders of all major organizations involved in the incident to coordinate an effective response while still meeting their own responsibilities. The Unified Command links the organizations responding to the incident and provides a forum for the Responsible Party and responding agencies to make consensus decisions. Under the Unified Command, the various jurisdictions and/or agencies and responders may blend together throughout the organization to create an integrated response team. The Incident Command System process requires the Unified Command to set clear objectives to guide the on-scene response resources.

Multiple jurisdictions may be involved in a response effort utilizing Unified Command. These jurisdictions could be represented by any combination of:

- Geographic boundaries
- Government levels
- Functional responsibilities
- Statutory responsibilities

The participants of Unified Command for a specific incident will be determined taking into account the specifics of the incident and existing response plans and/or decisions reached during the initial meeting of the Unified Command. The Unified Command may change as an incident progresses, in order to account for changes in the situation.

The Unified Command is responsible for overall management of an incident. The Unified Command directs incident activities and approves and releases resources. The Unified Command structure is a vehicle for coordination, cooperation and communication which is essential to an effective response.

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Unified Command representatives must be able to:

- Agree on common incident objectives and priorities
- Have the capability to sustain a 24-hour-7-day-per-week commitment to the incident
- Have the authority to commit agency or Company resources to the incident
- Have the authority to spend agency or Company funds
- Agree on an incident response organization
- Agree on the appropriate Command and General Staff assignments
- Commit to speak with "one voice" through the Public Information Officer or Joint Information Center
- Agree on logistical support procedures
- Agree on cost-sharing procedures

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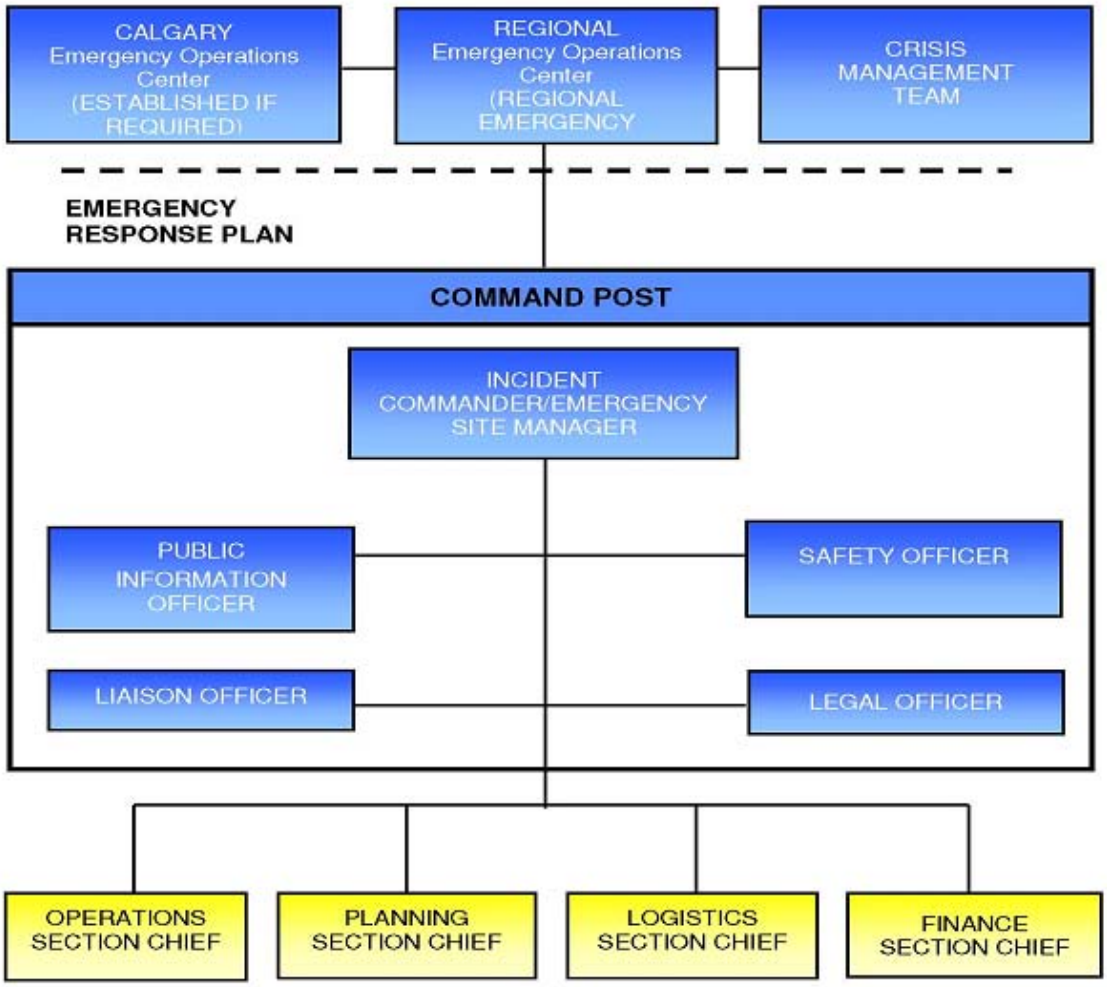
FIGURE 4.1

INCIDENT COMMAND SYSTEM

INCIDENT MANAGEMENT SYSTEM



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4.7 ICS ROLES AND RESPONSIBILITIES

COMMON RESPONSIBILITIES

The following is a checklist applicable to all personnel in an Incident Command System organization:

- Receive assignment, including:
  - Job assignment
  - Resource order number and request number
  - Reporting location
  - Reporting time
  - Travel instructions
  - Special communications instructions
- Upon arrival, check-in at designated check-in location.
- Receive briefing from immediate supervisor.
- Acquire work materials.
- Supervisors maintain accountability for assigned personnel.
- Organize and brief subordinates.
- Know your assigned radio frequency(s) and ensure communications equipment is operating properly.
- Use clear text and Incident Command System terminology (no codes) in all communications.
- Complete forms and reports required of the assigned position and send to Documentation Unit.
- Maintain unit records, including Unit Log (ICS Form 214).
- Respond to demobilization orders and brief subordinates regarding demobilization.

UNIT LEADER RESPONSIBILITIES

In Incident Command System, a Unit Leader's responsibilities are common to all units in all parts of the organization. Common responsibilities of Unit Leaders are listed below.

- Review common responsibilities.
- Receive briefing from Incident Commander, Section Chief or Branch Director, as appropriate.
- Participate in incident planning meetings, as required.
- Determine current status of unit activities.
- Order additional unit staff, as appropriate.
- Determine resource needs.
- Confirm dispatch and estimated time of arrival of staff and supplies.
- Assign specific duties to staff; supervise staff.
- Develop and implement accountability, safety and security measures for personnel and resources.
- Supervise demobilization of unit, including storage of supplies.
- Provide Supply Unit Leader with a list of supplies to be replenished.
- Maintain unit records, including Unit Log (ICS Form 214).

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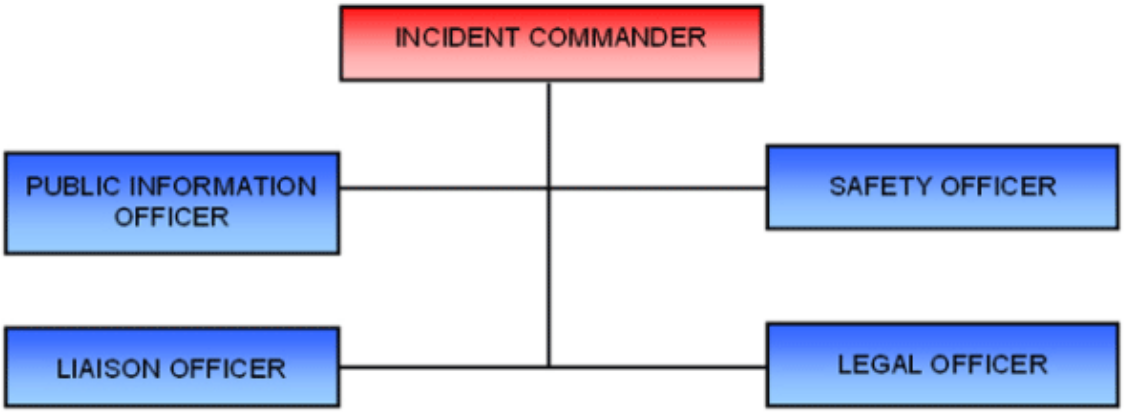
COMMAND



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INCIDENT COMMANDER

- Assess the situation and/or obtain a briefing from the prior Incident Commander.
- Determine Incident Objectives and strategy.
- Establish the immediate priorities.
- Establish an Incident Command Post.
- Brief Command Staff and Section Chiefs.
- Review meetings and briefings.
- Establish an appropriate organization.
- Ensure planning meetings are scheduled as required. (Refer to Figure 4.2 "Operational Period Planning Cycle" for assistance).
- Approve and authorize the implementation of an Incident Action Plan.
- Ensure that adequate safety measures are in place.
- Coordinate activity for all Command and General Staff.
- Coordinate with key people and officials.
- Approve requests for additional resources or for the release of resources.
- Keep agency administrator informed of incident status.
- Approve the use of trainees, volunteers, and auxiliary personnel.
- Authorize release of information to the news media.
- Ensure incident Status Summary (ICS Form 209-CG) is completed and forwarded to appropriate higher authority.
- Order the demobilization of the incident when appropriate.
- Assign any of the Incident Commander roles and responsibilities to a Deputy Incident Commander as needed.

Incident Commander's Checklist

PUBLIC INFORMATION OFFICER

- Determine from the Incident Commander if there are any limits on information release.
- Develop material for use in media briefings.
- Obtain Incident Commander approval of media releases.
- Inform media and conduct media briefings.
- Arrange for tours and other interviews or briefings that may be required.
- Obtain media information that may be useful to incident planning.
- Maintain current information summaries and/or displays on the incident and provide information on the status of the incident to assigned personnel.

Public Information Officer's Checklist

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LIAISON OFFICER

- Be a contact point for Agency Representatives.
- Maintain a list of assisting and cooperating agencies and Agency Representatives. Monitor check-in sheets daily to ensure that all Agency Representatives are identified.
- Assist in establishing and coordinating interagency contacts.
- Keep agencies supporting the incident aware of incident status.
- Monitor incident operations to identify current or potential inter-organizational problems.
- Participate in planning meetings, providing current resource status, including limitations and capability of assisting agency resources.
- Coordinate response resource needs for Natural Resource Damage Assessment and Restoration (NRDAR) activities with the Operations during oil and HAZMAT responses.
- Coordinate response resource needs for incident investigation activities with the Operations.
- Ensure that all required agency forms, reports and documents are completed prior to demobilization.
- Coordinate activities of visiting dignitaries.

Liaison Officer's Checklist

SAFETY OFFICER

- Participate in planning meetings.
- Identify hazardous situations associated with the incident.
- Review the Incident Action Plan for safety implications.
- Exercise emergency authority to stop and prevent unsafe acts.
- Investigate accidents that have occurred within the incident area.
- Review and approve the medical plan.
- Develop the Site Safety Plan and publish Site Safety Plan summary (ICS Form 208) as required.

Safety Officer's Checklist

LEGAL OFFICER

- Participate in planning meetings, if requested.
- Advise on legal issues relating to in-situ burning, use of dispersants, and other alternative response technologies.
- Advise on legal issues relating to differences between Natural Resource Damage Assessment Restoration (NRDAR) and response activities.
- Advise on legal issues relating to investigations.
- Advise on legal issues relating to finance and claims.
- Advise on legal issues relating to response.

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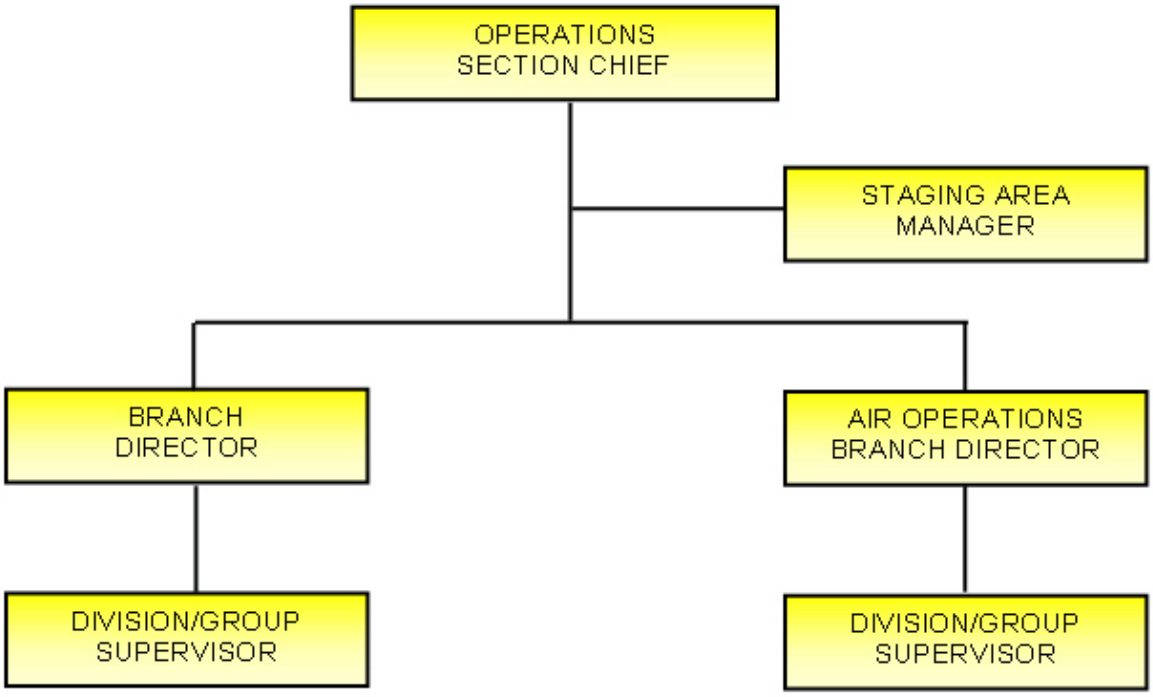
OPERATIONS



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OPERATIONS SECTION GENERAL FUNCTIONS

- Responsible for managing tactical operations at the incident site directed toward reducing the immediate hazard, saving lives and property, establishing situational control, and restoring normal operations.
- Directs and coordinates all incident tactical operations.
- Executes the Incident Action Plan.

OPERATIONS SECTION CHIEF

- Develop operations portion of Incident Action Plan.
- Brief and assign Operations Section personnel in accordance with the Incident Action Plan.
- Supervise Operations Section.
- Determine need and request additional resources.
- Review suggested list of resources to be released and initiate recommendation for release of resources.
- Assemble and disassemble strike teams assigned to the Operations Section.
- Report information about special activities, events, and occurrences to the Incident Commander.
- Respond to resource requests in support of National Resource Damage Assessment and Restoration activities.

Operations Section Chief's Checklist

BRANCH DIRECTOR

- Develop with subordinates alternatives for Branch control operations.
- Attend planning meetings at the request of the Operations.
- Review Assignment List (ICS Form 204-CG) for Divisions/Groups within the Branch. Modify lists based on effectiveness of current operations.
- Assign specific work tasks to Division/Group Supervisors.
- Supervise Branch operations.
- Resolve logistic problems reported by subordinates.
- Report to Operations when: the Incident Action Plan is to be modified; additional resources are needed; surplus resources are available; or hazardous situations or significant events occur.
- Approve accident and medical reports originating within the Branch.

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DIVISION/GROUP SUPERVISOR

- Implement Incident Action Plan for Division/Group.
- Provide the Incident Action Plan to Strike Team Leaders, when available.
- Identify increments assigned to the Division/Group.
- Review Division/Group assignments and incident activities with subordinates and assign tasks.
- Ensure that the Incident Commander and/or Resources Unit is advised of all changes in the status of resources assigned to the Division/Group.
- Coordinate activities with adjacent Division/Group.
- Determine need for assistance on assigned tasks.
- Submit situation and resources status information to the Branch Director or the Operations.
- Report hazardous situations, special occurrences, or significant events (e.g., accidents, sickness, discovery of unanticipated sensitive resources) to the immediate supervisor.
- Ensure that assigned personnel and equipment get to and from assignments in a timely and orderly manner.
- Resolve logistics problems within the Division/Group.
- Participate in the development of Branch plans for the next operational period.

STAGING AREA MANAGER

- Establish Staging Area layout.
- Determine any support needs for equipment, feeding, sanitation and security.
- Establish check-in function as appropriate.
- Post areas for identification and traffic control.
- Request maintenance service for equipment at Staging Area as appropriate.
- Respond to request for resource assignments.
- Obtain and issue receipts for radio equipment and other supplies distributed and received at Staging Area.
- Determine required resource levels from the Operations.
- Advise the Operations when reserve levels reach minimums.
- Maintain and provide status to Resource Unit of all resources in Staging Area.
- Demobilize Staging Area in accordance with the Incident Demobilization Plan.

Staging Area Manager's Checklist

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AIR OPERATIONS BRANCH DIRECTOR

- Organize preliminary air operations.
- Request declaration (or cancellation) of restricted air space
- Participate in preparation of the Incident Action Plan through the Operations. Insure that the air operations portion of the Incident Action Plan takes into consideration the Air Traffic Control requirements of assigned aircraft.
- Perform operational planning for air operations.
- Prepare and provide Air Operations Summary (ICS Form 220) to the Air Support Group and Fixed-Wing Bases.
- Determine coordination procedures for use by air organization with ground Branches, Divisions, or Groups.
- Coordinate with appropriate Operations Section personnel.
- Supervise all air operations activities associated with the incident.
- Evaluate helibase locations.
- Establish procedures for emergency reassignment of aircraft.
- Schedule approved flights of non-incident aircraft in the restricted air space area.
- Coordinate with the Operations Coordination Center (OCC) through normal channels on incident air operations activities.
- Inform the Air Tactical Group Supervisor of the air traffic situation external to the incident.
- Consider requests for non-tactical use of incident aircraft.
- Resolve conflicts concerning non-incident aircraft.
- Coordinate with Federal Aviation Administration.
- Update air operations plans.
- Report to the Operations on air operations activities.
- Report special incidents/accidents.
- Arrange for an accident investigation team when warranted.

Air Operation Branch Director's Checklist

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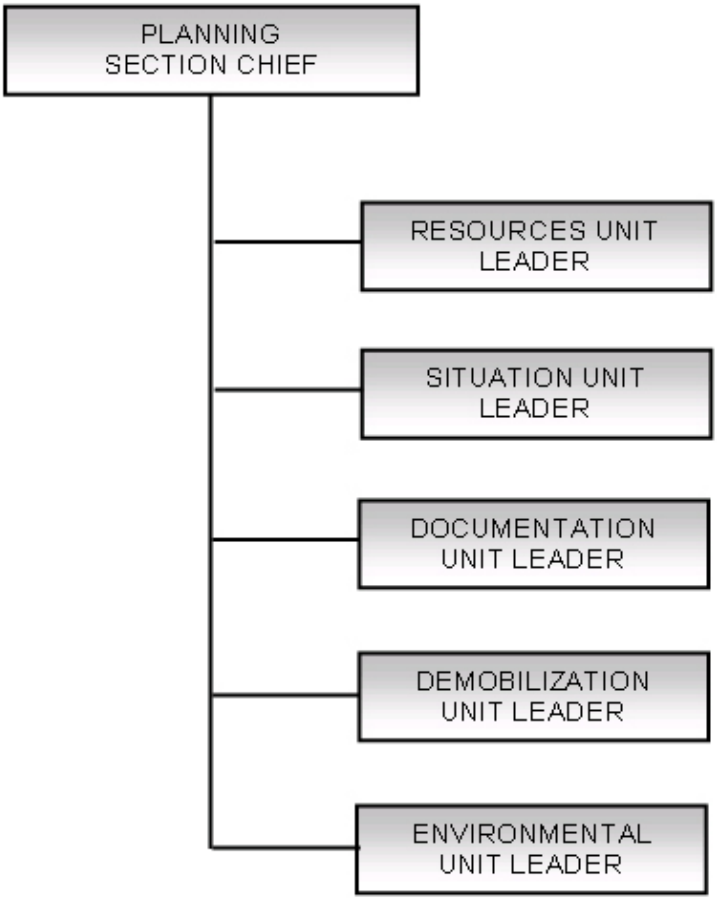
PLANNING



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PLANNING SECTION GENERAL FUNCTIONS

- Responsible for gathering, evaluating, and disseminating tactical information and intelligence critical to the incident.
- Maintaining incident documentation and providing documentation services.
- Preparing and documenting Incident Action Plans.
- Conducting long-range and/or contingency planning.
- Developing alternative strategies.
- Tracking resources assigned to the incident.
- Developing plans for waste disposal.
- Developing plans for demobilization.

PLANNING SECTION CHIEF

- Collect and process situation information about the incident.
- Supervise preparation of the Incident Action Plan.
- Provide input to the Incident Commander and the Operations in preparing the Incident Action Plan.
- Chair planning meetings and participate in other meetings as required. (Refer to Figure 4.2 "Operational Period Planning Cycle" for assistance).
- Reassign out-of-service personnel already on-site to Incident Command System organizational positions as appropriate.
- Establish information requirements and reporting schedules for Planning Section Units (e.g., Resources, Situation Units).
- Determine the need for any specialized resources in support of the incident.
- If requested, assemble and disassemble Strike Teams and Task Forces not assigned to Operations.
- Establish special information collection activities as necessary (e.g., weather, environmental, toxics, etc.).
- Assemble information on alternative strategies.
- Provide periodic predictions on incident potential.
- Report any significant changes in incident status.
- Compile and display incident status information.
- Oversee preparation and implementation of the Incident Demobilization Plan.
- Incorporate plans (e.g., Traffic, Medical, Communications, Site Safety) into the Incident Action Plan.

Planning Section Chief's Checklist

RESOURCES UNIT LEADER

- Establish the check-in function at incident locations.
- Prepare Organization Assignment List (ICS Form 203-CG) and Incident Organization (ICS Form 207-CG).
- Prepare appropriate parts of Assignment List (ICS Form 204).
- Prepare and maintain the Incident Command Post display (to include organization chart and resource allocation and deployment).
- Maintain and post the current status and location of all resources.
- Maintain master roster of all resources checked in at the incident.

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SITUATION UNIT LEADER

- Begin collection and analysis of incident data as soon as possible.
- Prepare, post, or disseminate resource and situation status information as required, including special requests.
- Prepare periodic predictions or as requested by the Planning Section Chief.
- Prepare the Incident Status Summary (ICS Form 209-CG).
- Provide photographic services and maps if required.

DOCUMENTATION UNIT LEADER

- Set up work area; begin organization of incident files.
- Establish duplication service; respond to requests.
- File all official forms and reports.
- Review records for accuracy and completeness; inform appropriate units of errors or omissions.
- Provide incident documentation as requested.
- Store files for post-incident use.

Documentation Unit Leader's Checklist

DEMOBILIZATION UNIT LEADER

- Participate in planning meetings as required.
- Review incident resource records to determine the likely size and extent of demobilization effort.
- Based on the above analysis, add additional personnel, workspace, and supplies as needed.
- Coordinate demobilization with Agency Representatives.
- Monitor the on-going Operations Section resource needs.
- Identify surplus resources and probable release time.
- Develop incident check-out function for all units.
- Evaluate logistics and transportation capabilities to support demobilization.
- Establish communications with off-incident facilities, as necessary.
- Develop an Incident Demobilization Plan detailing specific responsibilities and release priorities and procedures.
- Prepare appropriate directories (e.g., maps, instructions, etc.) for inclusion in the demobilization plan.
- Distribute demobilization plan (on and off-site).
- Provide status reports to appropriate requestors.
- Ensure that all Sections/Units understand their specific demobilization responsibilities.
- Supervise execution of the Incident Demobilization Plan.
- Brief the Planning Section Chief on demobilization progress.

Demobilization Unit Leader's Checklist

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ENVIRONMENTAL UNIT LEADER

- Participate in Planning Section meetings.
- Identify sensitive areas and recommend response priorities.
- Following consultation with natural resource trustees, provide input on wildlife protection strategies (e.g., removing oiled carcasses, pre-emptive capture, hazing, and/or capture and treatment).
- Determine the extent, fate and effects of contamination.
- Acquire, distribute and provide analysis of weather forecasts.
- Monitor the environmental consequences of cleanup actions.
- Develop shoreline cleanup and assessment plans. Identify the need for, and prepare any special advisories or orders.
- Identify the need for, and obtain, permits, consultations, and other authorizations including Endangered Species Act (ESA) provisions.
- Following consultation with the Federal OnScene Commander's Historical/Cultural Resources Technical Specialist identify and develop plans for protection of affected historical/cultural resources.
- Evaluate the opportunities to use various response technologies.
- Develop disposal plans.
- Develop a plan for collecting, transporting, and analyzing samples.

Environmental Unit Leader's Checklist

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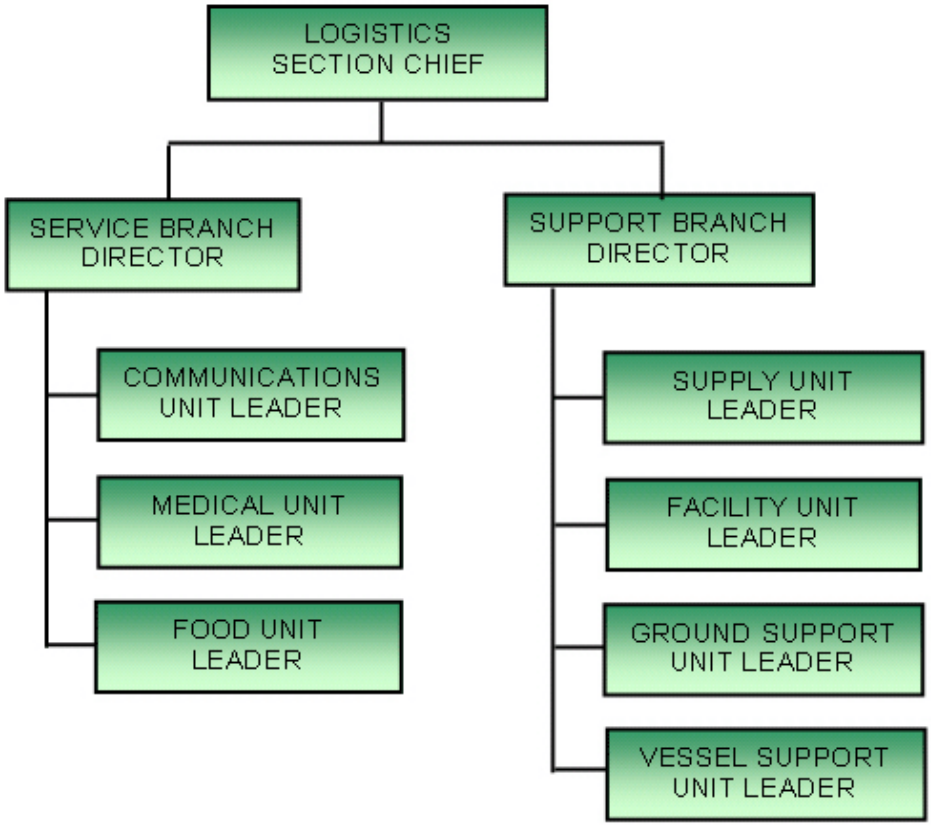
LOGISTICS



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LOGISTICS SECTION GENERAL FUNCTIONS

- Responsible for all support requirements needed to facilitate effective and efficient incident management, including ordering resources from off-incident locations.
- Ordering, obtaining, maintaining, and accounting for essential personnel, equipment, and supplies.
- Providing communication planning and resources.
- Setting up food services.
- Setting up and maintaining incident facilities.
- Providing support transportation.
- Providing medical services to incident personnel.

LOGISTICS SECTION CHIEF

- Plan the organization of the Logistics Section.
- Assign work locations and preliminary work tasks to Section personnel.
- Notify the Resources Unit of the Logistics Section units activated including names and locations of assigned personnel.
- Assemble and brief Branch Directors and Unit Leaders.
- Participate in preparation of the Incident Action Plan.
- Identify service and support requirements for planned and expected operations.
- Provide input to and review the Communications Plan, Medical Plan and Traffic Plan.
- Coordinate and process requests for additional resources.
- Review the Incident Action Plan and estimate Section needs for the next operational period.
- Advise on current service and support capabilities.
- Prepare service and support elements of the Incident Action Plan.
- Estimate future service and support requirements.
- Receive Incident Demobilization Plan from Planning Section.
- Recommend release of Unit resources in conformity with Incident Demobilization Plan.
- Ensure the general welfare and safety of Logistics Section personnel.

Logistics Section Chief's Checklist

SERVICE BRANCH DIRECTOR

- Determine the level of service required to support operations.
- Confirm dispatch of Branch personnel.
- Participate in planning meetings of Logistics Section personnel.
- Review the Incident Action Plan.
- Organize and prepare assignments for Service Branch personnel.
- Coordinate activities of Branch Units.
- Inform the Logistics Section Chief of Branch activities.
- Resolve Service Branch problems.

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COMMUNICATIONS UNIT LEADER

- Prepare and implement the Incident Radio Communications Plan (ICS Form 205-CG).
- Ensure the Incident Communications Center and the Message Center is established.
- Establish appropriate communications distribution/maintenance locations within the Base/Camp(s).
- Ensure communications systems are installed and tested.
- Ensure an equipment accountability system is established.
- Ensure personal portable radio equipment from cache is distributed per Incident Radio Communications Plan.
- Provide technical information as required on:
    - Adequacy of communications systems currently in operation.
    - Geographic limitation on communications systems.
    - Equipment capabilities/limitations.
    - Amount and types of equipment available.
    - Anticipated problems in the use of communications equipment.
- Supervise Communications Unit activities.
- Maintain records on all communications equipment as appropriate.
- Ensure equipment is tested and repaired.
- Recover equipment from Units being demobilized.

Communication's Unit Leader's Checklist

MEDICAL UNIT LEADER

- Participate in Logistics Section/Service Branch planning activities.
- Prepare the Medical Plan (ICS Form 206-CG).
- Prepare procedures for major medical emergency.
- Declare major emergency as appropriate.
- Respond to requests for medical aid, medical transportation, and medical supplies.
- Prepare and submit necessary documentation.

Medical Unit Leader's Checklist

FOOD UNIT LEADER

- Determine food and water requirements.
- Determine the method of feeding to best fit each facility or situation.
- Obtain necessary equipment and supplies and establish cooking facilities.
- Ensure that well-balanced menus are provided.
- Order sufficient food and potable water from the Supply Unit.
- Maintain an inventory of food and water.
- Maintain food service areas, ensuring that all appropriate health and safety measures are being followed.
- Supervise caterers, cooks, and other Food Unit personnel as appropriate.

Food Unit Leader's Checklist

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SUPPORT BRANCH DIRECTOR

- Determine initial support operations in coordination with the Logistics Section Chief and Service Branch Director.
- Prepare initial organization and assignments for support operations.
- Assemble and brief Support Branch personnel.
- Determine if assigned Branch resources are sufficient.
- Maintain surveillance of assigned units work progress and inform the Logistics Section Chief of their activities.
- Resolve problems associated with requests from the Operations Section.

SUPPLY UNIT LEADER

- Participate in Logistics Section/Support Branch planning activities.
- Determine the type and amount of supplies en route.
- Review the Incident Action Plan for information on operations of the Supply Unit.
- Develop and implement safety and security requirements.
- Order, receive, distribute, and store supplies and equipment.
- Receive and respond to requests for personnel, supplies, and equipment.
- Maintain an inventory of supplies and equipment.
- Service reusable equipment.
- Submit reports to the Support Branch Director.

Supply Unit Leader's Checklist

FACILITY UNIT LEADER

- Review the Incident Action Plan.
- Participate in Logistics Section/Support Branch planning activities.
- Determine requirements for each facility, including the Incident Command Post (See Figure 2.6 for list of hotels).
- Prepare layouts of incident facilities.
- Notify Unit Leaders of facility layout.
- Activate incident facilities.
- Provide Base and Camp Managers and personnel to operate facilities.
- Provide sleeping facilities.
- Provide security services.
- Provide facility maintenance services (e.g., sanitation, lighting, clean up).
- Demobilize Base and Camp facilities.
- Maintain facility records.

Facility Unit Leader's Checklist

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GROUND SUPPORT UNIT LEADER

- Participate in Support Branch/Logistics Section planning activities.
- Develop and implement the Traffic Plan.
- Support out-of-service resources.
- Notify the Resources Unit of all status changes on support and transportation vehicles.
- Arrange for and activate fueling, maintenance, and repair of ground resources.
- Maintain Support Vehicle Inventory and transportation vehicles (ICS Form 218).
- Provide transportation services, in accordance with requests from the Logistics Section Chief or Support Branch Director.
- Collect information on rented equipment.
- Requisition maintenance and repair supplies (e.g., fuel, spare parts).
- Maintain incident roads.
- Submit reports to Support Branch Director as directed.

Ground Support Unit Leader's Checklist

VESSEL SUPPORT UNIT LEADER

- Participate in Support Branch/Logistics Section planning activities.
- Coordinate development of the Vessel Routing Plan.
- Coordinate vessel transportation assignments with the Protection and Recovery Branch or other sources of vessel transportation.
- Coordinate water-to-land transportation with the Ground Support Unit, as necessary.
- Maintain a prioritized list of transportation requirements that need to be scheduled with the transportation source.
- Support out-of-service vessel resources, as requested.
- Arrange for fueling, dockage, maintenance and repair of vessel resources, as requested.
- Maintain inventory of support and transportation vessels.

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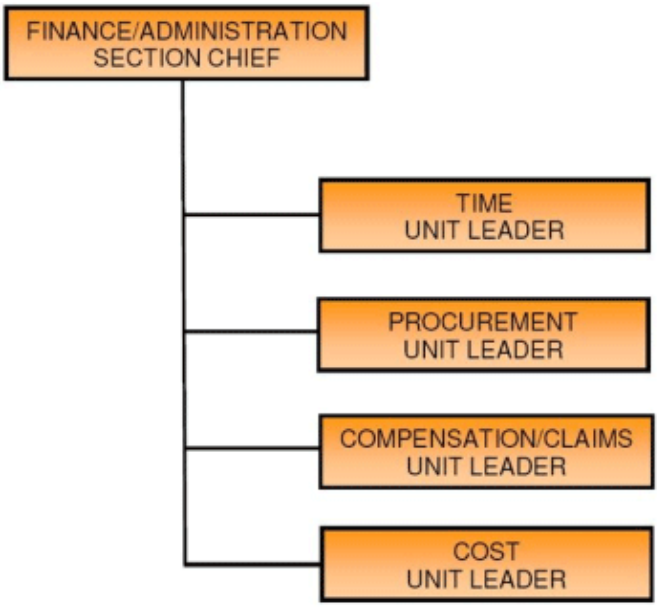
FINANCE/ADMINISTRATION



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FINANCE/ADMINISTRATION SECTION GENERAL FUNCTIONS

- Responsible for all financial and cost analysis aspects of an incident. (Note: Not all incidents will require a separate Finance/Administration Section. In cases that require only one specific function (e.g., cost analysis), this service may be provided by a member of the Planning Section.)
- Administering any contract negotiation.
- Providing cost analysis as it pertains to the Incident Action Plan.
- Maintaining cost associated with the incident.
- Tracking personnel and equipment time.
- Addressing compensation for injury or damage to property issues.

FINANCE/ADMINISTRATION SECTION CHIEF

- Attend planning meetings as required.
- Manage all financial aspects of an incident.
- Provide financial and cost analysis information as requested.
- Gather pertinent information from briefings with responsible agencies.
- Develop an operating plan for the Finance/Administration Section; fill supply and support needs.
- Determine the need to set up and operate an incident commissary.
- Meet with assisting and cooperating agency representatives, as needed.
- Maintain daily contact with agency(s) administrative headquarters on Finance/ Administration matters.
- Ensure that all personnel time records are accurately completed and transmitted, according to policy.
- Provide financial input to demobilization planning.
- Ensure that all obligation documents initiated at the incident are properly prepared and completed.
- Brief administrative personnel on all incident-related financial issues needing attention or follow-up prior to leaving incident.

Finance/Administration Section Chief's Checklist

TIME UNIT LEADER

- Determine incident requirements for time recording function.
- Determine resource needs.
- Contact appropriate agency personnel/representatives.
- Ensure that daily personnel time recording documents are prepared and in compliance with policy.
- Establish time unit objectives.
- Maintain separate logs for overtime hours.
- Establish commissary operation on larger or long-term incidents as needed.
- Submit cost estimate data forms to the Cost Unit, as required.
- Maintain records security.
- Ensure that all records are current and complete prior to demobilization.
- Release time reports from assisting agency personnel to the respective Agency Representatives prior to demobilization.
- Brief the Finance/Administration Section Chief on current problems and recommendations, outstanding issues, and follow-up requirements.

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PROCUREMENT UNIT LEADER

- Review incident needs and any special procedures with Unit Leaders, as needed.
- Coordinate with local jurisdiction on plans and supply sources.
- Obtain the Incident Procurement Plan.
- Prepare and authorize contracts and land-use agreements.
- Draft memoranda of understanding as necessary.
- Establish contracts and agreements with supply vendors.
- Provide for coordination between the Ordering Manager, agency dispatch, and all other procurement organizations supporting the incident.
- Ensure that a system is in place that meets agency property management requirements. Ensure proper accounting for all new property.
- Interpret contracts and agreements; resolve disputes within delegated authority.
- Coordinate with the Compensation/Claims Unit for processing claims.
- Coordinate use of impress funds, as required.
- Complete final processing of contracts and send documents for payment.
- Coordinate cost data in contracts with the Cost Unit Leader.
- Brief the Finance/Administration Section Chief on current problems and recommendations, outstanding issues, and follow-up requirements.

COMPENSATION/CLAIMS UNIT LEADER

- Establish contact with the incident Security Officer and Liaison Officer (or Agency Representatives if no Liaison Officer is assigned).
- Determine the need for Compensation for Injury and Claims Specialists and order personnel as needed.
- Establish a Compensation for Injury work area within or as close as possible to the Medical Unit.
- Review Medical Plan (ICS Form 206-CG).
- Ensure that Compensation/Claims Specialists have adequate workspace and supplies.
- Review and coordinate procedures for handling claims with the Procurement Unit.
- Brief the Compensation/Claims Specialists on incident activity.
- Periodically review logs and forms produced by the Compensation/Claims Specialists to ensure that they are complete, entries are timely and accurate and that they are in compliance with agency requirements and policies.
- Ensure that all Compensation for Injury and Claims logs and forms are complete and routed appropriately for post-incident processing prior to demobilization.
- Keep the Finance/Administration Section Chief briefed on Unit status and activity.
- Demobilize unit in accordance with the Incident Demobilization Plan.

COST UNIT LEADER

- Coordinate cost reporting procedures.
- Collect and record all cost data.
- Develop incident cost summaries.
- Prepare resources-use cost estimates for the Planning Section.
- Make cost-saving recommendations to the Finance/Administration Section Chief.
- Ensure all cost documents are accurately prepared.
- Maintain cumulative incident cost records.
- Complete all records prior to demobilization.
- Provide reports to the Finance/Administration Section Chief.

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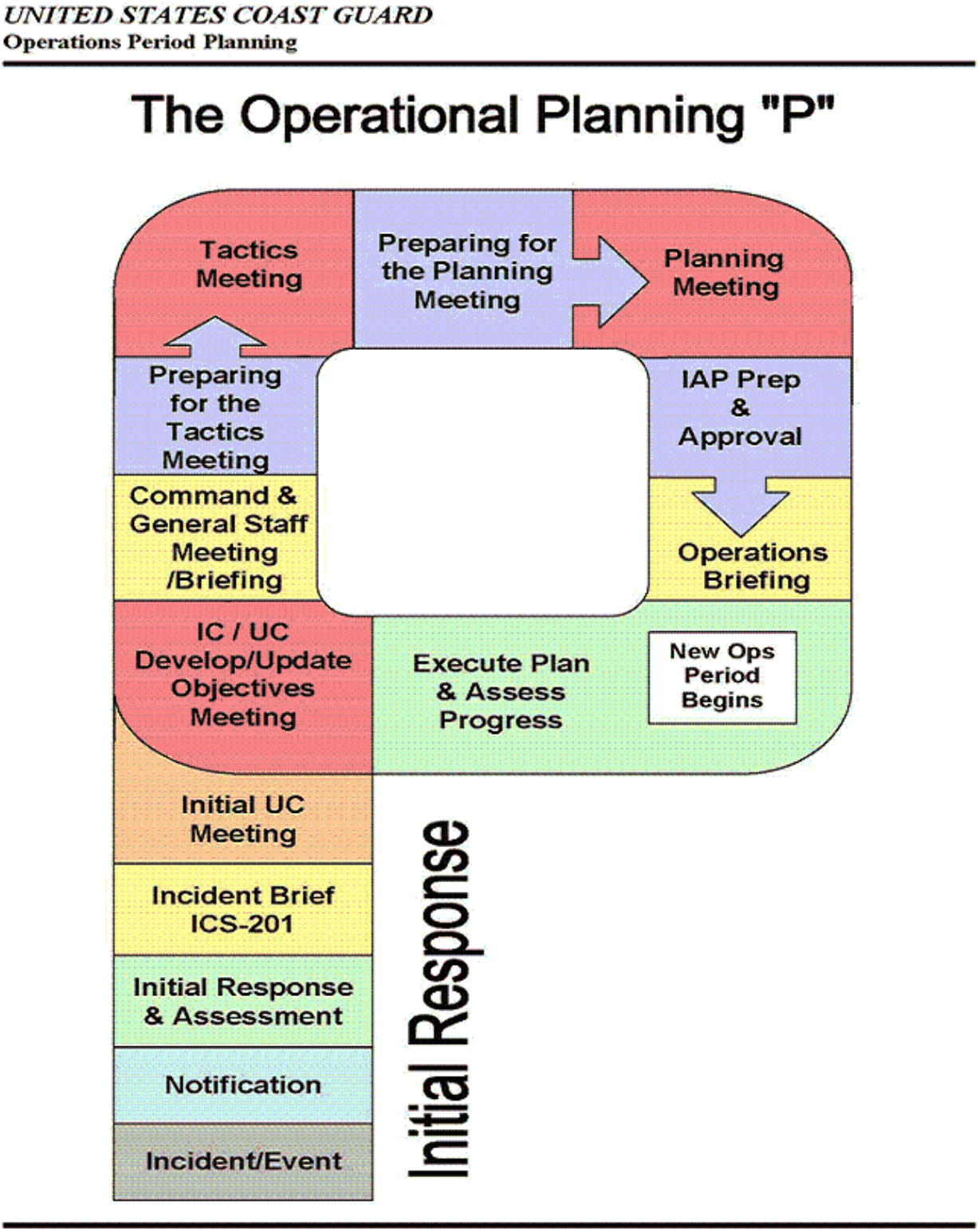
FIGURE 4.2



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5.0 RESPONSE PLANNING

5.1 **Incident Action Plan**

5. 2 **Site Safety Plan**

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5.1 INCIDENT ACTION PLAN

Emergency response activities are planned and coordinated through the use of an Incident Action Plan (IAP), which is developed for each Operational Period of a response by the Initial Response Team. For small responses, an ICS 201 may be used as the Incident Action Plan and, for all incidents, the ICS 201 will serve as the initial Incident Action Plan.

For larger or more complex incidents, a more complete Incident Action Plan will be necessary. These Incident Action Plans are generally created through the completion and compilation of several standard Incident Command System forms. These forms include, but are not limited to:

ICS FORM NUMBER	FORM TITLE	PREPARED BY
IAP Cover Sheet	ICS IAP Cover Sheet	**Planning Section** - Situation Unit Leader
201-CG	Incident Briefing	**Command Section** - Initial Response Incident Commander
202-CG	Incident Objectives	**Planning Section** - Planning Section Chief
203-CG	Organization Assignment List	**Planning Section** - Resources Unit Leader
204-CG	Assignment List	**Operations Section** - Chief & Resources Unit Leader
204a-CG	Assignment List Attachment	**Operations Section** - Chief & Resources Unit Leader
205-CG	Incident Radio Communication Plan	**Logistics Section** - Communication Unit Leader
205a-CG	Communications List	**Logistics Section** - Communication Unit Leader
206-CG	Medical Plan	**Logistics Section** - Medical Unit Leader
207-CG	Incident Organization	**Planning Section** - Resources Unit Leader
209-CG	Incident Status Summary	**Command Section** - Incident Commander
211-CG	Check-In List	
213-RR CG	Resource Request Message	
214-CG	Unit Log	**Planning Section** - Situation Unit Leader
215-CG	Operational Planning Worksheet	
215A-CG	Incident Action Plan Safety Analysis	
218	Support Vehicle Inventory	**Logistics Section** - Ground Support Unit Leader
220-CG	Air Operations Summary	**Operations Section** - Air Operations Branch Director
230-CG	Daily Meeting Schedule	
232-CG	Resources at Risk Summary	**Planning Section** - Situation Unit Leader
232a-CG	ACP Site Index	
233-CG	Incident Open Action Tracker	
234-CG	Work Analysis Matrix	
235-CG	Facility Needs Assessment Worksheet	

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	Site Safety Plan	**Command Section** - Safety Officer
	Employee Certification Page	
	Media Statement	

Depending on the nature and severity of the emergency, additional documents may be included in the Incident Action Plan. These may include:

- Sensitivity Maps (Provided in Section 6)
- Waste Management and Disposal Plans (Provided in Appendix E)
- Plans for use of Alternative Technologies (Dispersant/In-situ Burning/ Bioremediation)
- Security Plans
- Decontamination Plans
- Traffic Plans

5.2 SITE SAFETY PLAN

Site Safety Plans (SSPs) are required by United States Occupational Safety and Health Administration (29 CFR 1910.120(b)(4)) for all hazardous waste operations. The Site Safety Plan should address all on-site operations and hazardous as well as on-site emergency procedures.

The Site Safety Plan is typically prepared by the Safety Officer and approved by the Incident Commander. All personnel must be familiar with the contents of the Site Safety Plan and the Site Safety Plan must be updated as conditions, operations and hazards associated with the response change.

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1. Incident Name	2. Operational Period to be covered by IAP (Date/Time) From: To:	IAP COVER SHEET

3. Approved by:

FOSC

SOSC

RPIC

INCIDENT ACTION PLAN

The items checked below are included in this Incident Action Plan:

- ☐ ICS 202-OS (Response Objectives)
- ☐ ICS 203-OS (Organization List) – OR – ICS 207-OS (Organization Chart)
- ☐ ICS 204-OSs (Assignment Lists)
  One Copy each of any ICS 204-OS attachments:
  - ☐ Map
  - ☐ Weather forecast
  - ☐ Tides
  - ☐ Shoreline Cleanup Assessment Team Report for location
  - ☐ Previous day's progress, problems for location
- ☐ ICS 205-OS (Communications List)
- ☐ ICS 206-OS (Medical Plan)
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

4. Prepared by: Date/Time

IAP COVER SHEET June 2000

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1. Incident Name	2. Prepared by: (name) Date: Time:	INCIDENT BRIEFING ICS 201-CG

3. Map/Sketch (include sketch, showing the total area of operations, the incident site/area, overflight results, trajectories, impactec shorelines, or other graphics depicting situational and response status)

4. Current Situation:

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1. Incident Name	2. Prepared by: (name) Date: Time:	INCIDENT BRIEFING ICS 201-CG

5. Initial Response Objectives, Current Actions, Planned Actions

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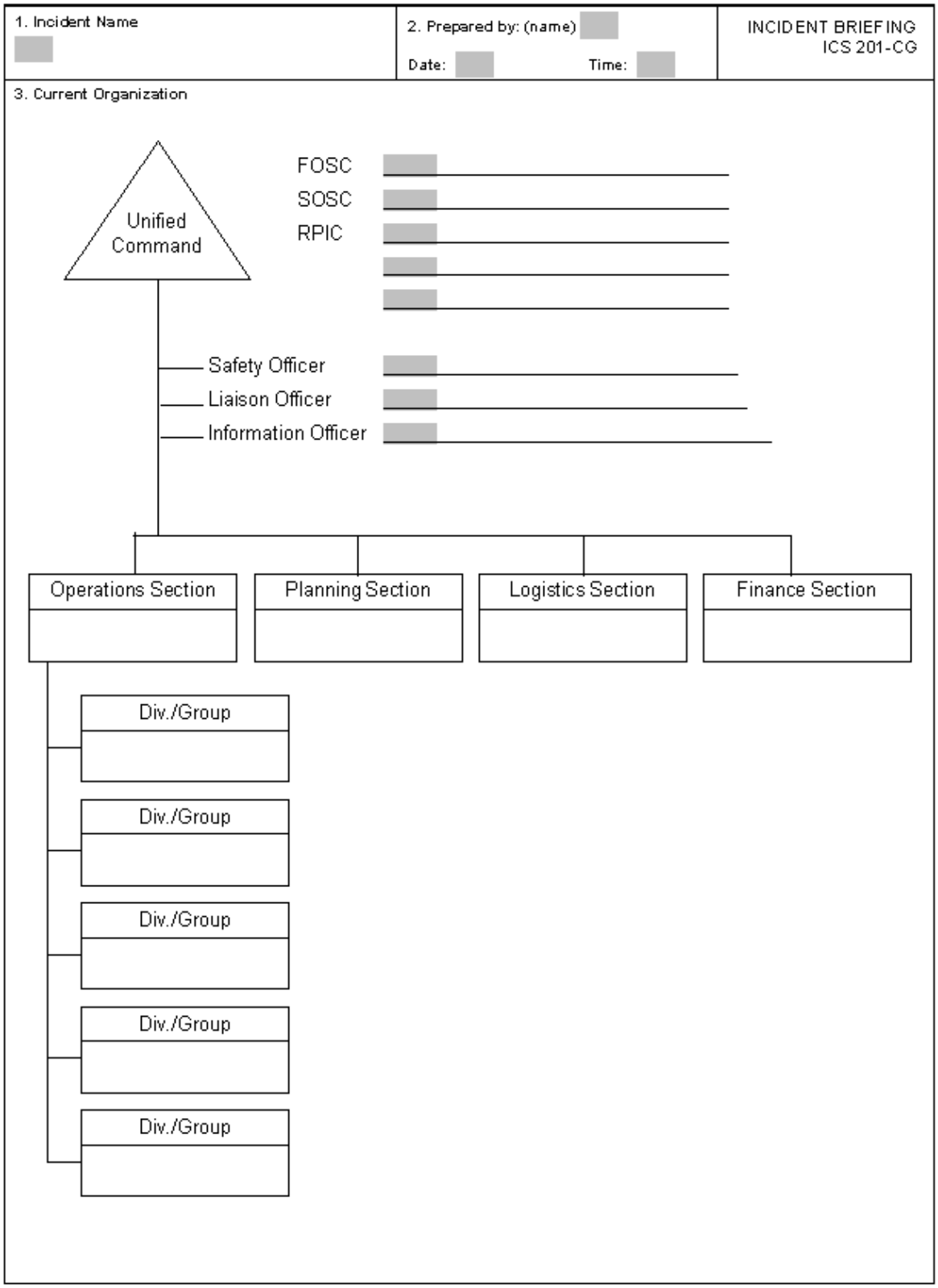

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1. Incident Name	2. Prepared by: (name) Date: Time:	INCIDENT BRIEFING ICS 201-CG

7. Resources Summary Resource	Resource Identifier	Date Time Ordered	ETA	On-Scene (X)	NOTES: (Location/Assignment/Status)

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1. Incident Name	2. Operational Period (Date/Time) From: To:	INCIDENT OBJECTIVES ICS 202-CG

3. Objective(s)

4. Operational Period Command Emphasis (Safety Message, Priorities, Key Decisions/Directions)

Approved Site Safety Plan Located at:

5. Prepared by: (Planning Section Chief)	Date/Time

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1. Incident Name	2. Operational Period (Date/Time) From: To:	ORGANIZATION ASSIGNMENT LIST ICS 203-CG

3. Incident Commander(s) and Staff		
Agency	IC	Deputy
Safety Officer:		
Information Officer:		
Liaison Officer:		

4. Agency Representatives	
Agency	Name

5. PLANNING/INTEL SECTION	
Chief	
Deputy	
Resources Unit	
Situation Unit	
Environmental Unit	
Documentation Unit	
Demobilization Unit	
Technical Specialists	

6. LOGISTICS SECTION	
Chief	
Deputy	
a. Support Branch	
Director	
Supply Unit	
Facilities Unit	
Vessel Support Unit	
Ground Support Unit	
b. Service Branch	
Director	
Communications Unit	
Medical Unit	
Food Unit	

7. OPERATION SECTION		
Chief		
Deputy		
Deputy		
Staging Area Manager		
Staging Area Manager		
Staging Area Manager		
a. Branch – Division Groups		
Branch Director		
Deputy		
Division Group		
Division Group		
Division Group		
Division/Group		
Division/Group		
b. Branch – Division/Groups		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
c. Branch – Division/Groups		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
d. Air Operations Branch		
Air Operations Br. Dir		
Helicopter Coordinator		

8. FINANCE/ADMINISTRATION SECTION	
Chief	
Deputy	
Time Unit	
Procurement Unit	
Compensation/Claims Unit	
Cost Unit	

9. Prepared By: (Resources Unit)	Date/Time

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NRC Incident No. #_____

1. Incident Name	2. Operational Period (Date / Time) From: To:	MEDICAL PLAN ICS 206-CG

3. Medical Aid Stations

Name	Location	Contact #	Paramedics On site (Y/N)

4. Transportation

Ambulance Service	Address	Contact #	Paramedics On board (Y/N)

5. Hospitals

Hospital Name	Address	Contact #	Travel Time		Burn Ctr?	Heli-Pad?
			Air	Ground		

6. Special Medical Emergency Procedures

7. Prepared by: (Medical Unit Leader) Date/Time	8. Reviewed by: (Safety Officer) Date/Time

MEDICAL PLAN ICS 206-CG (Rev.07/04)

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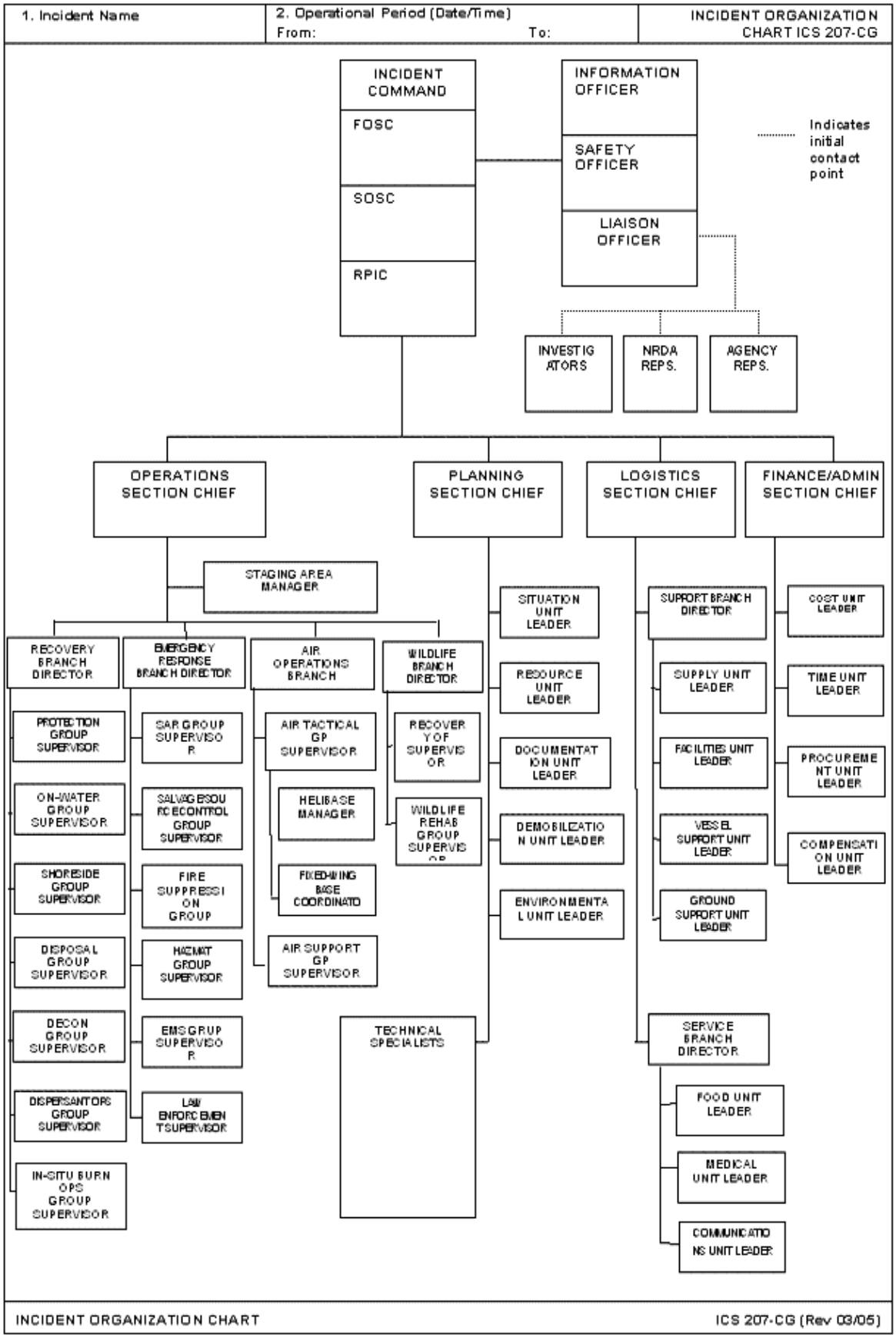

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SITE SAFETY PLAN

I. General

☐ Pump Station ☐ Pipeline Spill ☐ Spill to Water ☐ Excavation ☐ Other: _____

Location: _____

Work to be performed: _____

Issuing Date: _____ Time: _____
Temperature: ____° Wind Direction: ____
Humidity: _____

II. Hazards to be Evaluated

Y	N		Y	N		SPECIFIC HAZARDS Y	N	
☐	☐	Oxygen Deficient/Enriched	☐	☐	Ingestion / Skin Absorption	☐	☐	Crude Oil
☐	☐	Flammable Atmosphere	☐	☐	Frostbite	☐	☐	Other* ( )
		(Explosion Fire)	☐	☐	Chemical/MSDS # _____			
☐	☐	Toxic Atmosphere: _____			(Must be attached)			
☐	☐	Boat Operations	☐	☐	Physical Hazard _____			
☐	☐	Confined Space	☐	☐	Traffic _____			
			☐	☐	Vapor Cloud			

III. Testing & Monitoring (Check required items)

Tests are to be performed in the order listed.

Y	N		Continuous		Frequency
☐	☐	Oxygen Level	☐Y	☐N	_____ every ____
☐	☐	LEL	☐Y	☐N	_____ every ____
☐	☐	Hydrogen Sulfide	☐Y	☐N	_____ every ____
☐	☐	Benzene	☐Y	☐N	_____ every ____
☐	☐	Total Hydrocarbons	☐Y	☐N	_____ every ____
☐	☐	Other: _____	☐Y	☐N	_____ every ____

ACCEPTABLE ENTRY CONDITIONS

	SPECIAL WORK PRACTICES OR PPE REQUIRED	LEAVE AREA WORK EFFORTS SHOULD BE DIRECTED AT REDUCING CONCENTRATIONS
19.5 – 23.0% in air	< 19.5% or 23.0% in air	< 16.0 or ≥ 23.5% in air
< 10% in air	≥ 10.0 but < 20.0% in air	≥ 20.0% in air
< 10 ppm	≥ 10 but < 100 ppm	≥ 100 ppm
< .5 ppm	≥ .5 but < 10 ppm	≥ 10 ppm
< 300 ppm	≥ 300 but < 750 ppm	≥ 750 ppm

IV. Required Personal Protective Equipment (Check for required use)

General	Eye Prot.	Respiratory Prot.	Hearing Prot.	Gloves	Footwear	Clothing
☐ Hard Hat	☐ Safety Glasses	☐ SCBA/Air Line w/Escape	☐ Ear Plugs	☐ Leather	☐ Steel-toes	☐ FR Coveralls
☐ Safety Harness	☐ Goggles	☐ Air Line	☐ Ear Muffs	☐ Rubber	☐ Rubber	☐ Tyvek
☐ PFD	☐ Face-shield	☐ Air Purifying (Full Mask)	☐ Combination	☐ Nitrile	☐ Hip-boots	☐ Coated Tyvek
	☐ Tinted Lens	Cartridge Type: ☐ OV	☐ Hepa-OVV	☐ PVC	☐ _____	☐ Saranyx
				☐ _____		☐ _____

Any other special PPE: _____

V. Emergency Information and Rescue Services

Emergency Contact Person: _____ Contact by: _____
Fire Department: _____ Contact by: _____
Ambulance: _____ Contact by: _____
Hospital: _____ Contact by: _____
Rescue Services: _____ Contact by: _____
(if not provided by above)

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VI. Required Safety & Rescue Equipment (on site)

☐Lights	☐Fall Protection	☐First Aid Kit	☐Drinking Water	☐Fire Extinguisher	☐Tripod	☐**Other:**
☐Ladder	☐Retrieval Lines	☐Resuscitator	☐**Communication Method**			

VII. Comments or Special Work Procedures

VIII. Report All Injuries Immediately

IX. Control Measures

• Isolation & Lockout (identify items to be locked out)	• Ventilation ☐ Natural ☐ Mechanical
• Establish Work Zones when completed	Continuous ☐ No ☐ Yes
☐ Hot Zone = Red Ribbon	• Flagman / Watchman ☐
☐ Warm Zone = Yellow Ribbon	• Confined Space – Safety Watch ☐
☐ Cold Zone = Blue Ribbon	(See Exhibit "B" for Permit)
	• Evacuation Routes – (Identify on Map)
	☐ Air Horn – Emergency
	☐ Primary Route
	☐ Secondary Route

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X. Monitoring Results	Zone													
Oxygen	Time													
	Level													
	By													
LEL	Time													
	Level													
	By													
Hydrogen Sulfide	Time													
	Level													
	By													
Benzene	Time													
	Level													
	By													
VOC	Time													
	Level													
	By													
	Time													
	Level													
	By													
	Time													
	Level													
	By													
	Time													
	Level													
	By													
	Time													
	Level													
	By													

Equipment: Type:_____ Mfger:_____ Calibration / Expiration: _____
Type: _____ Mfger:_____ Calibration / Expiration: _____

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NRC Incident No. #_____

1. Incident Name	2. Operational Period (Date/Time) From: To:	UNIT LOG ICS 214-CG
3. Unit Name/Designators	4. Unit Leader (Name and ICS Position)	

5. Personnel Assigned

NAME	ICS POSITION	HOME BASE

6. Activity Log (Continue on Reverse)

TIME	MAJOR EVENTS

7. Prepared by: Date/Time

UNIT LOG ICS 214-CG (Rev 6/05)

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NRC Incident No. #________________________

1. Incident Name	2. Operational Period (Date/Time) From: To:	**UNIT LOG (CONT.)** ICS 214-CG

6. Activity Log (Continue on Reverse)

TIME	MAJOR EVENTS

7. Prepared by:	Date/Time:

UNIT LOG ICS 214-CG (Rev 6/05)

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6.0 SPILL IMPACT CONSIDERATIONS

6.1 Critical Areas to Protect

6.2 Environmental/Socio-Economic Sensitivities

6.3 Fisheries and Wildlife Protection

6.4 Staging Areas

6.5 Containment and Recovery of Spilled Product

Figure 6.1 On-Water Response Flowchart

6.6 Vulnerability Analysis

6.7 Alternative Response Strategies

Figure 6.2 Environmental Sensitivity Maps

Figure 6.3 Endangered/Threatened Species Listing

Figure 6.4 Aquifers

Figure 6.5 Affected HCA/Environmental

Figure 6.6 Drain Tiles

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6.1 CRITICAL AREAS TO PROTECT

The critical areas to protect are classified as high, moderate, and low sensitivity to oil for non-coastal/inland environments. The Federal, Province/State, and Local authorities will further clarify these categories at the time of the response. The categories are defined as follows:

HIGH SENSITIVITY

- Areas which are high in productivity, abundant in many species, extremely sensitive, difficult to rehabilitate, or inhabited by threatened/endangered species.
- Areas which consist of forested areas, brush/grassy areas, wooded lake areas, freshwater marshes, wildlife sanctuaries/refuges, and vegetated river/stream banks.

MODERATE SENSITIVITY

- Areas of moderate productivity, somewhat resistant to the effects of oiling.
- Areas which consist of degraded marsh habitat, clay/silt banks with vegetated margins, and gravel/cobble beaches.

LOW SENSITIVITY

- Areas of low productivity, man-made structures, and/or high energy.
- Areas which consist of gravel, sand, or clay material, barren/rocky riverbanks and lake edges, man-made structures, and concrete/compacted earthen drainage ditches.

6.2 ENVIRONMENTAL/SOCIO-ECONOMIC SENSITIVITIES

Environmental/Socio-economic sensitivities are of extreme importance when planning a response effort.The health and safety of the public and the environment, as well as the protection of the various socio-economic sensitivities, must be promptly addressed in order to mitigate the extent of damage and minimize the cost of the clean-up effort.

It is important to protect archeological sites and heritage resources (e.g. National Parks, National Marine Conservation Areas, and National Historic Sites). Impacted archeological sites or heritage resources of an area need to be identified and the likely impacts that result from the activities should be addressed. Specific consideration should be given to access to, and general use and disturbance of areas. The assessment should consider both direct and indirect impacts, cultural protocols and strategies for minimizing impacts. Consultation with local indigenous communities should occur as part of the planning process.

The Company will explore, where appropriate, equivalent environmental protection systems, methods, devices, or technologies that maintain or may be less damaging to the character of heritage resources or archeological sites. If a release from the pipeline impacts a heritage resource, the Company will respond as outlined in Section 3.0, report to the appropriate authority prescribed by law, cleanup and restore the area as required by regulation, and conduct such sampling, analyses, or associated monitoring during and after restoration.

All environmental/socio-economic sensitivities are worthy of protection, but must be prioritized during a response effort.When making decisions on which areas to designate as collection areas and which to protect, the following sources may be consulted:

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- Canadian Wildlife Services, U.S. Fish and Wildlife Service and related province/ state agencies
- Applicable Area Contingency Plans
- Other industry and private experts
- Indigenous groups

The environmental and socio-economic sensitivities in the vicinity of the Pipeline have been broken down into specific categories and identified in this Section. To further clarify the location of the sensitive areas of concern, references to published Area Contingency Plans and Environmental Sensitivity Maps are also provided in this section.

6.3 FISHERIES AND WILDLIFE PROTECTION

The Company will work with Federal, Province/State, and local agency personnel to provide labor and transportation to retrieve, clean, and rehabilitate birds and wildlife affected by an oil spill, as necessary. Oversight of the Company's wildlife preservation activities and coordination with Federal, Province/State, and Local agencies during an oil spill is the responsibility of the Incident Commander.

Protecting fish habitat (e.g. spawning and rearing grounds) is important to both consumers and commercial fisheries. Beyond typical response strategies, other options could include moving floating facilities, temporarily sinking facilities using cages designed for this purpose, temporary suspension of water intakes, or closing sluice gates to isolate the facilities from contamination.

Special consideration should be given to the protection and rehabilitation of endangered species and other wildlife and their habitat in the event of an oil spill and subsequent response. Jurisdictional authorities should be notified and worked with closely on all response/clean-up actions related to wildlife protection and rehabilitation. Laws with significant penalties are in place to ensure appropriate protection of these species.

Wildlife Rescue

The Company will work with Federal, Province/State, and Local agency personnel to provide labor and transportation to retrieve, clean, and rehabilitate wildlife affected by an oil spill, as the situation demands.

The following are items which should be considered for wildlife rescue and rehabilitation during a spill response:

- Bird relocation can be accomplished using a variety of deterrents, encouraging birds to avoid areas of spilled oil. Bird relocation can be accomplished by utilizing deterrent methods including:
  - Use of visual stimuli, such as inflatable bodies, owls, stationary figures, or helium balloons, etc.
  - Use of auditory stimuli, such as propane cannons, recorded sounds, or shell crackers.
  - Use of herding with aircraft, boats, vehicles, or people (as appropriate).Use of capture and relocation.

Search and Rescue - Points to consider

- **The Company's involvement should be limited to offering assistance as needed or requested by the agencies.**
- Prior to initiating any organized search and rescue plan, **authorization must be obtained from the appropriate Federal/State agency.**
- **Initial search and rescue efforts, if needed, should be left up to the appropriate agencies.**

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They have the personnel, equipment, and training to immediately begin capturing contaminated wildlife.

- With or without authorization, it must be anticipated that volunteer citizens will aid distressed/contaminated wildlife on their own. It is important to communicate that it may be illegal to handle wildlife without express authority from appropriate agencies. Provisions should be made to support an appropriate rehabilitator; however, **no support should be given to any unauthorized volunteer rescue efforts.**

- The regulatory agencies and response personnel should be provided the name and location of a qualified rehabilitator in the event contaminated wildlife is captured.

- Resources and contacts that can assist with wildlife rescue and rehabilitation are provided in Section 2.0. This list includes:

  - Outside rehabilitation organizations
  - Local regulatory agencies
  - Other resources

6.4 STAGING AREAS

When establishing personnel and equipment staging areas for a response to a Pipeline discharge, the following criteria should be evaluated:

- Access to waterborne equipment launching facilities and/or land equipment.

- Access to open space for staging/deployment of heavy equipment and personnel.

- Access to public services utilities (electricity, potable water, public phone, restroom and washroom facilities, etc.).

- Access to the environmental and socio-economically sensitive areas which are projected for impact.

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6.5 CONTAINMENT AND RECOVERY OF SPILLED PRODUCT

General descriptions of various specific response techniques that may be applied during a response effort are discussed below. Company responders are free to use all or any combination of these methods as incident conditions require, provided they meet the appropriate safety standards and other requirements relative to the situation encountered. Data was obtained from reports, manuals and pamphlets prepared by the American Petroleum Institute, Environmental Protection Agency, and the United States Coast Guard. The most effective cleanup of a product spill will result from an integrated combination of clean-up methods. Each operation should complement and assist related operations and not merely transfer spillage problems to areas where they could be more difficult to handle.

The spill should be assessed as soon as possible to determine the source, extent and location of travel. Terrain and other physical conditions downgradient of the spill site will determine the methods of control at a point in advance of the moving product. Often, the bulk of a spill can be contained at a single location or a few key locations in the immediate vicinity of the source point. When possible, the execution of this type of initial containment strategy helps confine a spill to a relatively limited area.

Spill on Land (Soil Surfaces)

- **Containment Methods**

  Product can be trapped in ditches and gullies by earth dams. Where excavating machinery is available, dams can be bulldozed to contain lakes of product. Dams, small and large, should be effectively employed to protect priority areas such as inlets to drains, sewers, ducts and watercourses. These can be constructed of earth, sandbags, absorbents, planks or any other effective method. If time does not permit a large dam, many small ones can be made, each one holding a portion of the spill as it advances. The terrain will dictate the placement of the dams. If the spill is minor, natural dams or earth absorption will usually stop the product before it advances a significant distance. Cleanup is the main concern in such situations.

  In situations where vapors from a spill present a clear and present danger to property or life (possible ignition because of passing automobiles, nearby houses, or work vehicles approaching the area), spraying the surface of the spill with dispersant will greatly reduce the release of additional vapors from the product. This method is especially adapted to gasoline spills on soil surfaces.

- **Removal Methods**

  The recovery and removal of free product from soil surfaces is a difficult job. The best approaches at present seem to be:

  - Removal with suction equipment to tank truck if concentrated in volumes large enough to be picked up. Channels can be formed to drain pools of product into storage pits. The suction equipment can then be used.
  - Small pockets may have to be dipped up by hand.
  - If practicable after removal of the bulk of the spill, controlled burning presents the possibility of a fast, simple, and inexpensive method of destruction of the remainder of the product. If all other options have been executed and the site is still unsafe for further activity because explosive vapors persist, the vapors may need to be intentionally ignited to prevent an accumulation sufficient to become an explosive mixture, provided the other requirements of these guidelines for controlled burning are met.

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Intentional ignition to remove released product should be utilized only if all of the following conditions are met:

- Other steps and procedures have been executed and a determination has been made that this is the safest remaining method of control.
- Intentional burning will not unduly damage pipelines, adjacent property, or the environment.
- Controlled burning is permitted by government authorities. Local government authorities to be contacted may include city council, county board of commissioners, city or county fire chiefs, the county forestry commission or fire tower, and the local environmental protection agency. In seeking permission from these authorities, be prepared to convince them that adequate safety precautions have been and will be taken during the operation.
- Controlled burning is conducted with the consent of local land owners.
- Safety must always be a prime consideration when considering controlled burning of product. Sparks and heat radiation from large fires can start secondary fires and strong winds make fire control difficult. There must be no danger of the fire spreading beyond control limits. All persons must be at a safe distance from the edge of the inflammable area. Remember that all burning must be controlled burning.

Spill on Lake or Pond (Calm or Slow-Moving Water)

- **Containment Methods**

A lake or pond offers the best conditions for removal of product from water. Although the removal is no easy task, the lake or pond presents the favorable conditions of low or no current and low or no waves.

The movement of product on a lake or pond is influenced mainly by wind. The product will tend to concentrate on one shore, bank or inlet. Booms should be set up immediately to hold the product in the confined area in the event of a change in wind direction.

If the spill does not concentrate itself on or near a shore (no wind effect), then a sweeping action using boats and floating booms will be necessary.

The essential requirement for this operation is that it be done very slowly. The booms should be moved at not more than 40 feet per minute. Once the slick is moved to a more convenient location (near shore), the normal operations of removal should begin.

If the slick is small and thin (rainbow effect) and not near the shoreline, an absorbent boom instead of a regular boom should be used to sweep the area very slowly and absorb the slick. The product may not have to be moved to the shoreline. See Figure 6.1 for on-water recovery decision tree.

- **Removal Methods**

If the Containment slick is thick enough, regular suction equipment may be used first; however, in most instances, a floating skimmer should be used.

If the floating skimmer starts picking up excess water (slick becomes thin), drawing the boom closer to the bank as product is removed will also keep film of product thicker.

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However, when the slick becomes too thin, the skimmer should be stopped and an absorbent applied (with a boat if necessary) to remove the final amounts. The floating skimmer (if speed is a must) or hand skimmers (if water is shallow enough) or both can be used to pick up the product-soaked absorbent. Before pumping the product-soaked absorbent with a floating skimmer, ensure that the absorbent in question can be pumped and will not harm the pump. Several types are nonabrasive to pump internals. If the floating skimmer is used first, the product-soaked absorbent/water mixture should be pumped into a tank truck.

A better method of retrieving the product-soaked absorbent is to draw it in as close to the shore as possible with the booms used to confine the product initially. The absorbent can then be hand skimmed from the water surface and placed in drums, on plastic sheets or in lined roll-off boxes. It should then be disposed of by acceptable means.

The final rainbow on the surface can be removed with additions of more absorbent.

Spill on Small to Medium Size Streams (Fast-Flowing Creeks)

- **Containment Methods**

The techniques used for product containment on fast-flowing shallow streams are quite different from the ones used on lakes, ponds, or other still bodies of water. The containment and removal processes require a calm stretch of water to allow the product to separate onto the surface of the water. If a calm stretch of water does not exist naturally, a deep slow-moving area should be created by damming. The dam can be constructed by using sandbags, planks or earth. If a dam is required, it should be situated at an accessible point where the stream has high enough banks. The dam should be constructed soundly and reinforced to support the product and water pressure.

- Underflow dam - The underflow dam is one method that can be used, especially on small creeks. The water is released at the bottom, of the dam using a pipe or pipes which are laid during construction of the dam. The flow rate through the pipe must be sufficient to keep the dam from overflowing. One method is to lay the pipe at an angle through the dam (while dam is being constructed) so that the height of the downstream end of the pipe will determine the height the water will rise behind the dam.

- Overflow dam - Another method of containment is the overflow type dam. The dam is constructed so that water flows over the dam, but a deep pool is created which slows the surface velocity of the water. Therefore, the condition of a calm stretch of water is met. The overflow dam may be used where larger flow rates (medium size creeks) of water are involved

  With this type dam, a separate barrier (floating or stationary boom) must be placed across the pool created by the dam. The separate barrier arrests the surface layer of product. At the same time, the water is flowing under the barrier and over the top of the dam. The barrier should be placed at an angle of 45 % across the pool to decrease the effective water velocity beneath it. Also, it helps to concentrate the product at the bank and not all along the barrier. A second barrier should be placed approximately 10 to 15 feet downstream of the first one as a secondary back-up.

  The stationary boom type barrier should be made of wood planks or other suitable material. The stationary boom should be soundly constructed and sealed against the bank. The ends of the planks
  can be buried in the banks of the stream and timber stakes driven into the stream bed for support as needed. The necessary length of the boom will be

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approximately 1-1/2 times the width of the waterway.

The plank boom should extend six to eight inches deep into the water and about two inches or higher above the water level. If the increase in velocity under the stationary boom is causing release of trapped product, it should be moved upward slightly. At no time should barrier be immersed more than 20% of the depth of the pool at the barrier location; that is, if the pool created by damming is three feet deep, do not exceed an immersion depth of seven inches with the barrier at the position the barrier is installed.

Another method used with the underflow dam is having the pipe or pipes sized to carry only a portion of the flow needed. The pipe would be placed at the bottom of the dam and level with the creek bed. The remaining flow of the creek could be siphoned or preferably pumped around the dam from a point away from the dam and from the deepest portion of the pool. The pumping or siphoning can be controlled to maintain the desired water level at the dam. The key is the removal of water through or around the dam at the lowest point in the basin. This prevents the oil from escaping with the released water.

A floating boom can be used in place of the stationary type if the created pool's size (bank to bank) and depth will permit. Since changing the depth and/or length of a standard floating boom in a small stream is difficult, the use of the stationary type permits adjustments to be made in depth to provide for a better separation of product and water. The advantages of using a floating boom are the speed of deployment and the fact that there is not need for additional support as with the stationary boom.

- Multiple Impoundments - Since emergency built dams (either underflow or overflow) are seldom perfect, a series of dams is usually required. The first one or two will trap the bulk and the ones that are downstream will trap the last traces of product. Precautions should be taken to ensure that the foundations of emergency dams are not washed away by the released water. If earth is used to construct an overflow dam, a layer of earth-filled bags should be placed on top of the dam so erosion will not take place. See Figure 6.1 for on-water recovery decision tree.

- **Removal Methods**

Once the containment dams are constructed, the problem or removal of the product from the water surface should be the prime consideration. The removal must be continuous or else build-up of product behind the dams or booms might lead to product escaping the traps.

The type of removal procedures used depends largely on the amount of product being trapped in a given span of time, if the amount of product moving down the stream is of sufficient quantity, the first dam or fixed boom would quite possibly trap enough for the floating skimmer to work efficiently. The skimmer will pump the product and possibly some water to a tank truck or other holding tank. Separated water may be released from the bottom of the tank truck if it becomes necessary. The absorbents could then be used at downstream dams or booms. It is inadvisable to place an absorbent in the stream prior to or at the first dam in anticipation of the arriving product. Let the product accumulate at the first dam and use the floating skimmer to recover the product.

Disposal of gross amount of product-soaked absorbent would not then be a problem. Follow directions on use of each absorbent. Some are designed to be placed on water before product arrives; others are intended only to be placed on the product after it accumulates on the water. Plastic sheets should be used to place the product- soaked absorbent on as it is hand skimmed from the water. Alternatively, the material may be

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placed in drums or lined roll-off boxes.

The containment and removal of spilled product on small to medium fast-flowing streams might require a combination of underflow or overflow dams, fixed booms, skimmers, and absorbents, to ensure a complete cleanup.

Spill on Large Streams and Rivers

- **Containment Methods**

The containment techniques differ considerably on large streams and rivers versus small streams. First, the smooth calm area of water necessary for product-water separation must be found along the stream or river rather than making one as with small streams. Floating booms (rather than fixed booms or dams) must be used to trap the surfaced product.

Local conditions of current and wind must be considered when selecting the site for the boom. A point with a low water velocity near the bank, sufficient depth to operate the product removal equipment, and good access are required. The fact that wind may tend to concentrate the product against one bank must be considered. A smooth, undisturbed area of water is required immediately upstream of the boom to ensure that the product has opportunity to separate out onto the surface. The boom should be positioned where the current is at a minimum. It is more effective to boom at a wide, slow position than on a narrow, fast stretch of water.

If the boom are positioned straight across a river or stream, at right angles to the flow, surface water tends to dive beneath the barrier (boom) when current velocities exceed about ½ knot (0.8 ft./sec.). However, if the current of the entire river is ½ knot or less, then a boom can be positioned straight across the river or large stream, but angled slightly in relation of the banks. By placing the boom at an angle to the banks, product on the surface is diverted along the boom to the side of the river.

The current velocity is usually much slower near the river bank than in the center and the product will move along the boom toward the bank for removal. A water-tight seal between the bank and the boom is essential. A secondary boom should be set up immediately downstream of the first one to capture the amounts that escape the upstream boom. A boom can be employed parallel to the river flow at the bank to form the seal with the booms used to trap the product.

Where the current velocity of the chosen site exceeds ½ knot, the boom should be positioned in two smooth curves from a point of maximum velocity (usually the center of the river) to both banks. However, this double-boom required product to be removed from both sides of the river. To determine the appropriate angle of boom placement and support (mooring) needed to hold the booms in position, the current velocity should be measured by timing a floating object which is 80% submerged over a distance of 100 feet. A time of 60 seconds over this distance indicates a water current of approximately 1 knot.

For currents from 1 to 2.5 knots (1.7 to 4.2 ft./sec.), the more the boom will have to be angled acute to the bank. The length of the boom will have to be such to reach the center of the river. For currents between ½ and 1 knot (0.8 and 1.7 ft./sec.), the angle of employment can be enlarged.

The major load on the boom is taken by the terminal moorings, particularly the one in the center of the river. However, intermediate moorings are also required both to maintain the smooth curve of the boom to prevent breaking of the boom and to assist with preventing skirt deflection. The intermediate moorings are preferably positioned every 25 feet and

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must be adjusted to avoid the formation of indentations in the boom profile. These trap product in pockets, prevent its deflection to the bank, and also encourage diving currents. The moorings' ropes should be five times the water depth.

In certain situations, it might be advantageous to position booms to deflect the approaching spilled product to a slower moving area. Naturally, additional booms would have to be positioned around this slower moving area prior to deflecting the product to the area. This approach has been used along river which has lagoons, etc., with a very low current action. The recovery would take place in the lagoons and not along the river bank. See Figure 6.1 for on-water recovery decision tree.

- **Removal Methods**

The product collected upstream of the floating booms in a large stream or river should be removed from the water surface as it accumulates. Regular suction equipment, a floating skimmer, and/or absorbents (including absorbent booms) should be used to remove the product as appropriate to the quantity being trapped in a given span of time. If the amount moving down the stream is of sufficient quantity, the primary floating boom would possibly trap enough for the floating skimmer to work efficiently. The skimmer will pump the product and some water to a tank truck or other holding tank.

The absorbents would then be used upstream of the secondary boom to absorb the underflow from the primary boom. An absorbent boom can also be placed between the primary and secondary booms to help the other absorbents control the underflow from the primary boom.

It is best to hand skim the saturated absorbents and place on plastic sheets. However, if the absorbent used can be pumped after product absorption and speed of removal is a necessity, the floating skimmer can be used to remove the product-soaked absorbent.

The disadvantage of pumping the product-soaked absorbent to a truck is the volume that will accumulate (skimmer will pump excess water) and the disposal problems associated with the large water/product-soaked absorbent mixture.

Spill on Stream which Flows into Lake or Pond

In certain locations where streams (small and large ones) flow into lakes or ponds at relatively short distances, it is conceivable that a spill could reach the lake before containment and recovery operations are set up. If time permits for containment operations to be set up on the stream in question, it then would be handled as described above depending upon the stream size involved.

However, if product in the stream is near the lake site or if product is flowing into the lake with a significant amount yet to arrive, a different containment should be employed.

- **Containment Methods**

Product on a stream flowing into a lake should be boomed as close to the entrance as possible. The boom should be positioned on the lake at an angle to the residential stream current so as to direct the surface water to a slower moving area. The area where the product is being deflected should be enclosed by booms to contain it. An additional boom for sweeping the product to the bank will be required. This area of containment should not have a current velocity of more than 1/2 knot (0.8 ft./sec.), preferably less. See Figure 6.1 for on-water recovery decision tree.

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- **Removal Methods**

  The removal of product from the lake or pond's surface would be handled as described earlier.

  For sizable releases, collected product will usually be pumped into tank trucks and transported to a storage facility. Tank trucks are available at several locations throughout.

Spill in Urban Areas

Oil spills in urban areas can greatly impact recreational use, human health, wildlife habitat(s), and potential beach or park closures. Manmade structures along waterways require unique protection strategies. Manmade structures could include vertical shore protection structures such as seawalls, piers, and bulkheads, as well as riprap revetments and groins, breakwaters, and jetties. Vertical structures can be constructed of concrete, wood, and corrugated metal. They usually extend below the water surface, although seawalls can have beaches or riprap in front of them. These structures are very common along developed shores, particularly in harbors, marinas, and residential areas. The range in degree of exposure to waves and currents varies widely, from very low in dead-end canals, to very high on offshore breakwaters. Boat wakes can generate wave energy in otherwise sheltered areas. Maintaining shipping or other kinds of vessel traffic through navigation channels or waterways during a spill response is a difficult consideration because there is usually economic and political pressure to re-establish normal operations as soon as possible. This consideration extends to vehicular traffic through urban areas. Deploying booms and skimmers or constructing recovery sites can conflict with such traffic for several days. Also, passage of deep-draft vessels through the waterway can suddenly change water level and flow or create wakes, causing booms to fail. For these reasons, recovery efforts must be coordinated through the Unified Command to ensure the cooperation of all parties involved.

- **Containment Methods**

  Containment techniques in an urban area depend greatly on the ability to deploy equipment due to obstacles presented by the urban area. Most booming and containment techniques will work with slight modifications such as direct anchoring instead of the use of booming buoys. Often, debris and other obstacles cause gaps in containment or clog up the flow of oil in diversion booming. Vessel traffic can also cause containment to fail, due to splash over from vessel wakes.

- **Removal Methods**

  Normal recovery techniques work when recovering oil in an urban area. However, recovery can be hampered by several situations. Floating debris clogging skimming equipment is the main cause for low recovery rates. Another problem for recovery in an urban area is lack of storage space. Often traffic problems or lack of access prevent storage equipment such as frac tanks and vacuum trucks from approaching the recovery zone.

Spill Under Ice

- **Containment Methods**

  The traditional strategy for dealing with oil under the ice in a river or lake is to cut a slot to aid in recovery. Ice slots can be cut using chain saws, handsaws, ice augers or some form of trencher. Another effective variation of this technique is the diversionary plywood barrier method which is also discussed below. See Figure 6.1 for on-water decision tree.

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- **Removal Methods**

Ice slotting is a very basic technique used to gain access to oil trapped beneath the ice. In ice slotting, a J shaped outline is sketched into the ice at a 30 degree angle to the current. The slight J hook or curve is necessary at the upstream side to provide flow towards the recovery area. In general, the slot width should be 1.5 times the thickness of the ice. Remember, a block of ice is heavy and the width of the slot must be taken into consideration so it can be safely removed or pushed under if the water beneath the ice is sufficiently deep. The length of the slot will be determined by the width of the river and strategy.

This technique is a successful strategy to implement. However, there are a few pit falls to be aware off. First, responders will fatigue rapidly if required to cut the slot or slots by hand using a chain saw or hand held saw. This can present a problem if there are not a sufficient number of Hazmat technicians available. Secondly, when cutting with chain saws, large volumes of water are kicked up by the moving chain onto the responder. This is a safety problem when the responders get wet in extreme cold weather conditions. Wearing rain gear however can reduce this problem.

A second technique is to slot the ice and use plywood to help divert oil beneath the ice to a recovery area. This technique is called the diversionary plywood barrier method. In this technique, a narrow slot is made through the ice and 4' x 8' sheets of plywood or equivalent are dropped into the slot to create a barrier and force the oil to follow along it to the collection area. This is the same principal employed when using floating boom.

The slot can be cut or drilled depending on the equipment available at the time of the response. If drilling is required, a gas powered ice auger can be used. In this scenario a series of 8" or 10" holes are drilled next to each other in the J pattern.

A chain saw can be used to connect the holes if an ice bridge exists between two auger holes. After the ice auguring is complete, plywood can be dropped into the augured slot.

Again, river ice is dirty and chipper blades on the augers may only last long enough to complete a single auger hole. This technique requires a large inventory of chipper blades. Extra auger flights can be used, which reduces down time to change blades. A real plus to slotting the ice with an ice auger is the limited exposure of responders to water. The water is generally restricted to the area around the responder's feet.

If an ice auger is not available, a chain saw can be used to cut a narrow slot. After the slot has been cut and ice removed, plywood can be inserted. When using a chainsaw that makes a 3/8" cut, a 1/8"-1/4" plywood or outdoor siding can be inserted into the slot and effectively be used to create the barrier. Again, the down side when using a large chain saws is fatigue and splash from water being kicked up by the chain. However, this problem is not as bad as cutting large slots as described above. Since only a single slot is made, the number of responders can be reduced and extra personal protective equipment in the form of rain gear can be used to minimize the water splash.

Spill on Ice

When managing an oil spill on ice special consideration must be given to several safety factors. Thickness of the ice and general accessibility of equipment must be considered when planning for on- ice recovery. Ice that is too thin to safely traverse or broken ice may prevent active recovery.

- **Containment Methods**

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For ice-covered on-land or on- water spills, snow or earthen berms may be constructed to contain oil around the leak, if terrain permits. Dikes filled with sorbent materials may be used on spills in smaller streams to create a manmade dam to prevent the further migration of the oil.

Oil may become encapsulated due to melting and refreezing of the ice. Oil may then be more difficult to access and remove. See Figure 6.1 for on-water recovery decision tree.

- **Removal Methods**

  Generally, on-ice recovery consists of the manual removal of the product from the spill site. If conditions permit, vacuum trucks or suction pumps may be used to remove pools of oil that may have collected. Often, product removal will be done by hand using brooms, shovels and rakes. Manually moving the oil/snow mixture into piles for collection where it is either vacuum or manually collected into storage containers.

Spill in Wetland Areas

Wetlands, which include upland and inland marshes, swamps and bogs, are highly sensitive to spills because they collect run-off from surrounding environments, and because they are home to many commercially and ecologically important species. Wetlands are very susceptible to damage and are a high priority to protect. Precautions should be taken so that the recovery effort does not cause more damage than that cause by the release.

- **Containment Methods**

  Containment booms can be strategically deployed to contain or divert the product into recovery areas where skimmers and vacuums can be used to remove the product. Berms can also be built to contain or divert the product. Consideration must be given to the damage that can be caused by holding the product in the wetland areas. Often, allowing the product to flow to natural collection areas and possibly assisting the flow by the use of high volume low pressure water pumps may be the best course of action.

- **Removal Methods**

  Skimmers and vacuums can be deployed to recover contained oil. Other acceptable response techniques might include bioremediation, sorbents and in-situ burning. The use of heavy equipment is often not practical because of the damage it can cause to plant and animal life. During recovery, specially designed flat bottom shallow draft vessels and the use of plywood or boards may be used to reduce the damage caused by recovery personnel. If the water table is high and the oil will not permeate the soil, shallow trenches may be dug to collect oil for removal.

  The Unified Command must balance the need to remove the product with the damage caused by active removal. Considerations for long term passive recovery should be considered.

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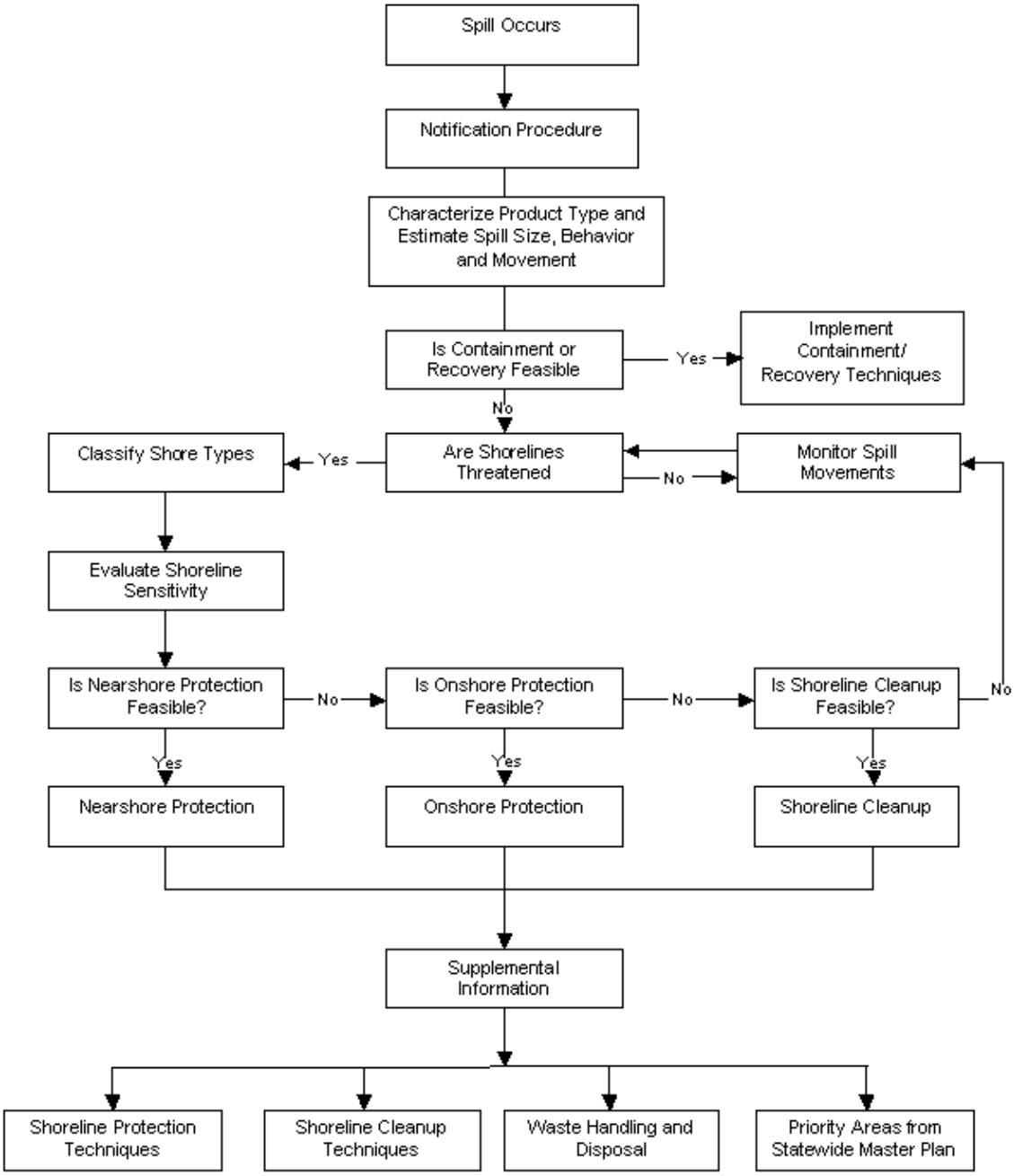
FIGURE 6.1

ON-WATER RESPONSE FLOWCHART



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6.6 VULNERABILITY ANALYSIS

The thorough examination of published Area Contingency Plans (ACPs) was conducted to identify sensitive areas in all the response zones.

The Environmental Sensitivity Maps located in Figure 6.2 identify sensitive areas along the Pipeline. The appropriate Area Contingency Plan maps are also included to provide more detailed information on sensitivities and possible potential response options.

6.7 ALTERNATIVE RESPONSE STRATEGIES

There are no pre-approved response options for inland spills within the United States. Any plans to use dispersants or in situ burn by the Company will be submitted to the Federal On-Scene Coordinator for Regional Response Team approval prior to such action being taken.

IN SITU BURNING

When considering the use of in situ burning the following considerations should be evaluated. In most cases, an agency application with further considerations will need to be completed before burning will be approved by the agency.

Size, Nature, and Product Spilled

- Flammability of the product. (Will the product burn?)
- Location of spill. (Distance and direction to nearest human use areas.)
- Volume of product released.
- Estimate of the surface area covered by the spill.
- How long has oil been exposed?
- Will burning cause more hazardous by-products?

Weather and Forecast

- Current weather conditions. (Rain / Heat)
- Wind speed and direction.
- 24 hour forecast.
- 48 hour forecast.

Evaluate the Response Operations

- Is there time enough to conduct burning?
- Is safety equipment available?
- Is adequate personnel available for monitoring / emergency response?
- Is mechanical recovery more intrusive than burning?

Habitats Impacted and Resources at Risk

- Have local agency / Officials been contacted.
  - Public Health
  - Land Owner / Manager
  - Local Fire Management (Fire Marshall)
  - Historic Property Specialist
  - Province / State Resource Agency
  - Aboriginal / Native American interests
- What is / will be the impact to surface water intakes and wells.
- Are endangered habitats / endangered species present?
- Is area used by Migratory Animals?
- What wildlife is present?

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Burn Plan

- How much of the oil is expected to burn?
- How long will it be expected to burn?
- How will burn be ignited?
- How will burn be extinguished?
- How will burned oil residue be collected?
- What are the monitoring protocols?

DISPERSANT USE

Dispersants are not commonly used on inland spills. Working closely with Federal, Province / State and local agencies will be necessary for gaining approval to use dispersants. Since dispersants do not eliminate the oil, only break up and spread the oil throughout the water column, it is important to look at the total effect the oil will have on the environment while considering the use of dispersants.

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FIGURE 6.2

ENVIRONMENTAL SENSITIVITY MAPS

Remember these maps are to be utilized as guidelines only. During a real response effort Federal, Province/State, and local agencies should be contacted to provide further assistance in the proper identification and protection of the various environmental and socio-economic sensitive areas

Canada ESM Map 1
Canada ESM Map 2
Canada ESM Map 3
Canada ESM Map 4
Canada ESM Map 5
Canada ESM Map 6
Canada ESM Map 7
Canada ESM Map 8
Canada ESM Map 9
Canada ESM Map 10
Canada ESM Map 11
Canada ESM Map 12
Canada ESM Map 13
Canada ESM Map 14
Canada ESM Map 15
Canada ESM Map 16
Canada ESM Map 17
Canada ESM Map 18
Canada ESM Map 19
Canada ESM Map 20
Canada ESM Map 21
Canada ESM Map 22
Canada ESM Map 23
Canada ESM Map 24
Canada ESM Map 25
Canada ESM Map 26
Canada ESM Map 27
Canada ESM Map 28
US ESM Map 1
US ESM Map 2
US ESM Map 3
US ESM Map 4
US ESM Map 5
US ESM Map 6
US ESM Map 7
US ESM Map 8
US ESM Map 9
US ESM Map 10
US ESM Map 11
US ESM Map 12
US ESM Map 13
US ESM Map 14
US ESM Map 15
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US ESM Map 20
US ESM Map 21
US ESM Map 22

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US ESM Map 23
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US ESM Map 36
US ESM Map 37
US ESM Map 38
USL Index Map
USL Map 2
USL Map 3
USL Map 3C1
USL Map 3D1
USL Map 3D2
USL Map 3D3
USL Map 3D4
USL Map 5P51
USL Map 5P53
USL Map 5P54
USL Map 5P62
USL Map 6
USL Map 6P61
USL Map 8
USL Map 9
USL Map 10
USL Map 11
USL Map 12
USL Map 12A2
USL Map 12A3
USL Map 12C2
USL Map 12D2
USL Map 13
USL Map 18
USL Map 19
USL Map 24
Cushing Extension ESM 1
Cushing Extension ESM 2
Cushing Extension ESM 3
Cushing Extension ESM 4
Cushing Extension ESM 5
Cushing Extension ESM 6
Cushing Extension ESM 7
Cushing Extension ESM 8
Cushing Extension ESM 9
Cushing Extension ESM 10
Cushing Extension ESM 11

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FIGURE 6.3

ENDANGERED/THREATENED SPECIES LISTING

Canada

Common Name	Scientific Name
Animals	
Burrowing Owl	*Athene cunicularia*
Olive-backed Pocket Mouse	*Perognathus fasciatus*
Long-billed Curlew	*Numenius americanus*
Short-eared Owl	*Asio flammeus*
Northern Leopard Frog	*Rana pipiens*
Sprague's Pipit	*Anthus spragueii*
Plants	
Bushy cinquefoil	*Potentilla paradoxa*
Chaffweed	*Anagallis minima*
Common tickseed	*Coreopsis tinctoria*
Dillen's wood sorrel	*Oxalis dillenii*
Endolepis	*Atriplex suckleyi*
Few-flowered aster	*Aster pauciflorus*
Few-flowered salt-meadow grass	*Torreyochloa pallida var pauciflora*
Lance-leaved loosestrife	*Lysimachia hybrida*
Little-seed rice grass	*Oryzopsis micrantha*
Low townsedia	*Townsendia exscapa*
Nevada rush	*Juncus nevadensis*
Pale blue-eyed grass	*Sisyrinchium septentrionale*
Rush-pink	*Stephanomeria runcinata*
Salt-marsh sand spurry	*Spergularia salina*
Short-stalk mouse-ear chickweed	*Cerastium brachypodum*
Shrubby evening-primrose	*Calylophus serrulatus*
American pellitory	*Parietaria pensylvanica*
American lopseed	*Phryma leptostachya*
Fox sedge	*Fox sedge*
Honewort	*Cryptotaenia canadensis*
Rice cutgrass	*Leersia oryzoides*
Yellow water crowfoot	*Ranunculus flabellaris*
Other	
None Listed	*N/A*

Illinois

Common Name	Scientific Name
Animals	
Bald Eagle	*Haliaeetus leucocephalus*
Loggerhead Shrike	*Lanius ludovicianus*
Indiana Bat	*Myotis sodalis*
Black-crowned Night Heron	*Nycticorax nycticorax*
Eastern Massasauga	*Sistrurus catenatus catenatus*

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Western Sand Darter	*Ammocrypta clarum*
Kirtland's Snake	*Clonophis kirtlandi*
Least Bittern	*Lxobrychus exilis*
Greater Prairie Chicken	*Tympanuchus cupido*
Barn Owl	*Tyto alba*
Lake Sturgeon	*Acipenser fulvescens*
Timber Rattlesnake	*Crotalus horridus*
Little Blue Heron	*Egretta caerulea*
Butterfly	*Ellipsaria lineolata*
Peregrine Falcon	*Falco peregrinus*
Common Moorhen	*Gallinula chloropus*
Bigeye Shiner	*Notropis boops*
Yellow-crowned Night Heron	*Nyctanassa violacea*
Illinois Chorus Frog	*Pseudacris streckeri*
Pallid Sturgeon	*Scaphirhynchus albus*
Royal Catchfly	*Silene regia*
Lined Snake	*Tropidoclonion lineatum*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Henslow's SparrowAmmodramus henslowii	*Ammodramus henslowii*
Short-eared Owl	*Asio flammeus*
Upland Sandpiper	*Bartramia longicauda*
Northern Harrier	*Circus cyaneus*
King Rail	*Rallus elegans*
Barn Owl	*Tyto alba*
Plants	
Prairie Rose Gentian	*Sabatia campestris*
Ear-leafed Foxglove	*Tomanthera auriculata*
Sedge	*Carex bromoides*
Fibrous-rooted Sedge	*Carex communis*
Drooping Sedge	*Carex prasina*
Blazing Star	*Liatris scariosa var. nieuwlandii*
Prairie Rose Gentian	*Sabatia campestris*
Grass-leaved Lily	*Stenanthium gramineum*
Ear-leafed Foxglove	*Tomanthera auriculata*
Spring Ladies' Tresses	*Spiranthes vernalis*
Prairie Spiderwort	*Tradescantia bracteata*
Decurrent False Aster	*Boltonia decurrens*
Other	
None Listed	*N/A*

Kansas

Common Name	Scientific Name
Animals	
American Burying Beetle	*Nicrophorus americanus*
Bald Eagle	*Haliaeetus leucocephalus*
Eastern Spotted Skunk	*Spilogale putorius*
Eskimo Curlew	*Numenius borealis*
Least Tern	*Sterna antillarum*
Peregrine Falcon	*Falco peregrinus*

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Piping Plover	*Charadrius melodus*
Snowy Plover	*Charadrius alexandrinus*
Western Silvery Minnow	*Hybognathus argyritis*
Chestnut Lamprey	*Ichthyomyzon castaneus*
Flathead Chub	*Platygobio gracilis*
Pallid Sturgeon	*Scaphirhynchus albus*
Sicklefin Chub	*Macrhybopsis meeki*
Silver Chub	*Macrhybopsis storeriana*
Silverband Shiner	*Notropis shumardi*
Smooth Earth Snake	*Virginia valeriae*
Sturgeon Chub	*Macrhybopsis gelida*
Topeka Shiner	*Notropis topeka*
Whooping Crane	*Grus americana*
Sharp Hornsnail	*Pleurocera acuta*
Arkansas Darter	*Etheostoma cragini*
Arkansas River Shiner	*Notropis girardi*
Arkansas River Speckled Chub	*Macrhybopsis tetranema*
Flutedshell Mussel	*Lasmigona costata*
Plants	
None Listed	*N/A*
Other	
None Listed	*N/A*

Missouri

Common Name	Scientific Name
Animals	
Indiana Bat	*Myotis sodalis*
Bald Eagle	*Haliaeetus leucocephalus*
Pallid Sturgeon	*Scaphirhynchus albus*
Interior Least Tern	*Sterna antillarum athalassos*
Eastern Massasauga	*Sistrurus catenatus catenatus*
Spectaclecase	*Cumberlandia monodonta*
Plants	
Running Buffalo Clover	*Trifolium stoloniferum*
Decurrent False Aster	*Boltonia decurrens*
Other	
None Listed	*N/A*

North Dakota

Common Name	Scientific Name
Animals	
Horned Grebe	*Podiceps auritus*
American White Pelican	*Pelecanus erythrorhynchos*
American Bittern	*Botaurus lentiginosus*
Swainson's Hawk	*Buteo swainsoni*
Ferruginous Hawk	*Buteo regalis*

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Yellow Rail	*Coturnicops noveboracensis*
Willet	*Catoptrophorus semipalmatus*
Upland Sandpiper	*Bartramia longicauda*
Long-billed Curlew	*Numenius americanus*
Marbled Godwit	*Limosa fedoa*
Wilson's Phalarope	*Phalaropus tricolor*
Franklin's Gull	*Larus pipixcan*
Black Tern	*Chlidonias niger*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Sprague's Pipit	*Anthus spragueii*
Grasshopper Sparrow	*Ammodramus savannarum*
Baird's Sparrow	*Ammodramus bairdii*
Nelson's Sharp-tailed Sparrow	*Ammodramus nelsonii*
Lark Bunting	*Calamospiza melanocorys*
Chestnut-collared Longspur	*Calcarius ornatus*
Canadian Toad	*Bufo hemiophrys*
Plains Spadefoot	*Spea bombifrons*
Smooth Green Snake	*Liochlorophis vernalis*
Western Hognose Snake	*Heterodon nasicus*
Black-tailed Prairie Dog	*Cynomys ludovicianus*
Sturgeon Chub	*Macrhybopsis gelida*
Sicklefin Chub	*Macrhybopsis meeki*
Pearl Dace	*Margariscus margarita*
Blue Sucker	*Cycleptus elongatus*
Northern Pintail	*Anas acuta*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Northern Harrier	*Circus cyaneus*
Golden Eagle	*Aquila chrysaetos*
Bald Eagle	*Haliaeetus leucocephalus*
Prairie Falcon	*Falco mexicanus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*
Greater Prairie Chicken	*Tympanuchus cupido*
Greater Sage-grouse	*Centrocercus urophasianus*
Piping Plover	*Charadrius melodus*
American Avocet	*Recurvirostra americana*
Least Tern	*Sterna antillarum*
Short-eared Owl	*Asio flammeus*
Burrowing Owl	*Athene cunicularia*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Loggerhead Shrike	*Lanius ludovicianus*
Sedge Wren	*Cistothorus platensis*
Dickcissel	*Spiza americana*
Le Conte's Sparrow	*Ammodramus leconteii*
Bobolink	*Dolichonyx oryzivorus*
Common Snapping Turtle	*Chelydra serpentina*
Short-horned Lizard	*Phrynosoma douglassi*
Northern Redbelly Snake	*Storeria occipitomaculata*
Pygmy Shrew	*Sorex hoyi*
Richardson's Ground Squirrel	*Spermophilus richardsonii*
Swift Fox	*Vulpes velox*
River Otter	*Lutra canadensis*

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Black-footed Ferret	*Mustela nigripes*
Paddlefish	*Polyodon spathula*
Pallid Sturgeon	*Scaphirhynchus albus*
Silver Chub	*Macrhybopsis storeriana*
Northern Redbelly Dace	*Phoxinus eos*
Flathead Chub	*Platygobio gracilis*
Trout-perch	*Percopsis omiscomaycus*
Threeridge	*Amblema plicata*
Wabash Pigtoe	*Fusconaia flava*
Mapleleaf	*Quadrula quadrula*
Black Sandshell	*Ligumia recta*
Creek Heelsplitter	*Lasmigona compressa*
Pink Heelsplitter	*Potamilus alatus*
Whooping Crane	*Grus americana*
Peregrine Falcon	*Falco peregrinus*
Brewer's Sparrow	*Spizella breweri*
McCown's Longspur	*Calcarius mccownii*
Smooth Softshell Turtle	*Apalone mutica*
False Map Turtle	*Graptemys pseudogeographica*
Northern Prairie Skink	*Eumeces septentrionalis*
Northern Sagebrush Lizard	*Sceloporus graciosus*
Arctic Shrew	*Sorex arcticus*
Western Small-footed Myotis	*Myotis ciliolabrum*
Long-eared Myotis	*Myotis evotis*
Long-legged Myotis	*Myotis volans*
Plains Pocket Mouse	*Perognathus flavescens*
Hispid Pocket Mouse	*Chaetodipus hispidus*
Sagebrush Vole	*Lemmiscus curtatus*
Eastern Spotted Skunk	*Spilogale putoris*
Gray Wolf	*Canis lupis*
Chestnut Lamprey	*Ichthyomyzon castaneus*
Silver Lamprey	*Ichthyomyzon unicuspis*
Central Stoneroller	*Campostoma anomalum*
Hornyhead Chub	*Nocomis biguttatus*
Pugnose Shiner	*Notropis anogenus*
Blacknose Shiner	*Notropis heterolepis*
Rosyface Shiner	*Notropis rubellus*
Finescale Dace	*Phoxinus neogaeus*
Yellow Bullhead	*Ameiurus natalis*
Flathead Catfish	*Pylodictis olivaris*
Logperch	*Percina caprodes*
River Darter	*Percina shumardi*
Pink Papershell	*Potamilus ohiensis*
Plants	
None Listed	*N/A*
Other	
None Listed	*N/A*

Nebraska

Common Name	Scientific Name

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Animals	
Eskimo Curlew	*Numenius borealis*
Whooping Crane	*Grus americana*
Interior Least Tern	*Sterna antillarum athalassos*
Bald Eagle	*Haliaeetus leucophalus*
Piping Plover	*Charadrius melodus*
Mountain Plover	*Charadrius montanus*
Black-footed Ferret	*Mustela nigripes*
Swift Fox	*Vulpes velox*
River Otter	*Lutra canadensis*
Southern Flying Squirrel	*Glaucomys volans*
Black-tailed Prairie Dog	*Cynomys ludovicianus*
Pallid Sturgeon	*Scaphirhyncus albus*
Topeka Shiner	*Notropis topeka*
Sturgeon chub	*Macrhybopsis gelida*
Blacknose shiner	*Notropis heteropis*
Lake sturgeon	*Acipenser fulvescens*
Northern Redbelly Dace	*Phoxinus eos*
Finescale Dace	*Phoxinus neogaeus*
American Burying Beetle	*Nicrophorus americanus*
Massasauga	*Sistrurs catenatus*
Scaleshell Mussel	*Leptodea leptodon*
Plants	
Hayden's (blowout) penstemon	*Penstemon haydenii*
Colorado Butterfly Plant	*Gaura neomexicana coloradensis*
Saltwort	*Salicornia rubra*
Western Prairie Fringed Orchid	*Platanthera praeclara*
Ute Lady's Tresses	*Spiranthes diluvialis*
Ginseng	*Panax quinquefolium*
Small White Lady's Slipper	*Cypripedium candidum*
Other	
None Listed	*N/A*

South Dakota

Common Name	Scientific Name
Animals	
American Burying Beetle	*Nicrophorus americanus*
Scaleshell	*Leptodea leptodon*
Higgins Eye	*Lampsilis higginsii*
Dakota Skipper	*Hesperia dacotae*
Banded Killifish	*Fundulus diaphanus*
Blacknose Shiner	*Notropis heterolepis*
Finescale Dace	*Phoxinus neogaeus*
Longnose Sucker	*Catostomus catostomus*
Northern Redbelly Dace	*Phoxinus eos*
Pallid Sturgeon	*Scaphirhynchus albus*
Pearl Dace	*Margariscus margarita*
Sicklefin Chub	*Macrhybopsis meeki*

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Sturgeon Chub	*Macrhybopsis gelida*
Topeka Shiner	*Notropis topeka*
Eastern Hognose Snake	*Heterodon platirhinos*
False Map Turtle	*Graptemys pseudogeographica*
Lined Snake	*Tropidoclonion lineatum*
American Dipper	*Cinclus mexicanus*
Bald Eagle	*Haliaeetus leucocephalus*
Eskimo Curlew	*Numenius borealis*
Interior Least Tern	*Sterna antillarum athalassos*
Osprey	*Pandion haliaetus*
Peregrine Falcon	*Falco peregrinus*
Piping Plover	*Charadrius melodus*
Whooping Crane	*Grus americana*
Black-footed Ferret	*Mustela nigripes*
Gray Wolf	*Canis lupus*
River Otter	*Lontra canadensis*
Swift Fox	*Vulpes velox*
Western Prairie Fringed Orchid	*Platanthera praeclara*
Plants	
None Listed	*N/A*
Other	
None Listed	*N/A*

Oklahoma

Common Name	Scientific Name
Animals	
Mississippi Alligator	*Alligator mississippiensis*
Gray Bat	*Myotis grisescens*
Indian Bat	*Myotis sodalis*
Ozark Bat	*Corynorhinus townsendii ingens*
Ozark Cavefish	*Amblyopsis rosae*
Whopping Crane	*Grus americana*
Eskimo Curlew	*Numenius borealis*
Leopards Darter	*Percina pantherina*
Bald Eagle	*Haliaeetus leucocephalus*
Neosho Madtom	*Noturus placidus*
Pipping Plover	*Charadrius melodus*
Ouachita Rock Pocketbook	*Arkansia wheeleri*
Arkansas River Shiner	*Notropis girardi*
Least Tern	*Sterna antillarum*
Black-Capped Vireo	*Vireo atricapillus*
Red-Cockaded Woodpecker	*Picoides borealis*
Plants	
Western Prairie Fringed Orchid	*Platanthera praeclara*
Other	

Note: Country and Province information is maintained separately from the plan for emergency responder use.

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FIGURE 6.4

AQUIFERS		
NAME	COUNTY/STATE	PROVINCE
[redacted]	[redacted]	[redacted]

HYDRAULICALLY SENSITIVE AREAS AND OPERATOR DESIGNATED HCAs	
NAME	LOCATION
[redacted]	

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FIGURE 6.5

US ENVIRINMENTAL SENSITIVE AREAS			
ID	SOURCE	ORGANIZATION	Map Sheet
[redacted]			

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[redacted]

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[redacted]

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[redacted]

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[redacted]

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[redacted]

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US HIGH POPULATED AREAS				
HPA ID	NAME	COUNTY NAME	STATE NAME	MapSheet
[redacted]				

US POPULATED AREAS				
ID	NAME	COUNTY NAME	STATE NAME	MapSheet
[redacted]				

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US DAMS				
DAM NAME	COUNTY	RIVER	STATE	MapSheet
[redacted]				

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US LAKES		
NAME	STATE	MapSheet
[redacted]		

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US RIVERS & STREAMS			
FEATURE	NAME	STATE	MapSheet
[redacted]			

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[redacted]

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ALBERTA, CANADA SENSITIVITY AREAS		
OBJECT ID	SITE NAME	MapSheet
	[redacted]	

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CANADIAN WILDLIFE		
WOP ID	OBSERVATION	MapSheet
[redacted]		

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CANADIAN POPULATED AREAS				
PLACE ID	PROVIDENCE	GEONAME	CONCISE	MapSheet
[redacted]				

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CANADIAN MANUFACTURING WATERWELLS				
WELL_ID	WELL_OWNER	AQUIFER	WELL_USE	MapSheet
[redacted]				

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CANADIAN MUNICIPAL WELLS			
WATER USE	WELL USE	Sask_ID	MapSheet
[redacted]			

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CANADIAN LAKES		
NAME	Lake_ID	MapSheet
[redacted]		

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CANADIAN RIVERS & STREAMS	
NAME	MapSheet
[redacted]	

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[redacted]

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FIGURE 6.6

DRAIN TILES

"Consideration needs to be given to the presence of drain tiles and how they could provide a hydraulic conduit for the migration of the product off the right of way."

SPREAD 3B DRAIN TILE LOCATIONS - NORTH OF 197TH STREET								
POINT	STATION	ANGLE	DESCRIPTION	DC FILE	TRACT NO.	MILE POST	LAT	LONG
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
RANDOM LOCATION								
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

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APPENDIX A

RESPONSE EQUIPMENT/RESOURCES

A.1 Company Owned Response Equipment

A.2 Other Company Resources

A.3 Contract Resources

A.4 Cooperative/Mutual Aid Resources

A.5 Volunteers

A.6 Communications

Figure A.1 Company Owned Spill Response Equipment

Figure A.2 Response Resources

Figure A.3 USCG OSRO Classifications

Figure A.4 Coop Agreements/OSRO Contracts

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RESPONSE EQUIPMENT/RESOURCES

A.1 COMPANY OWNED RESPONSE EQUIPMENT

The Company owns and operates oil spill response equipment contained within response trailers staged throughout the pipeline system. This equipment is maintained according to manufacture's recommendations by Company and/or contracted personnel. An equipment summary detailing locations, type and amount stored in the response trailers is listed in Figure A.1. The Company also has contracts in place with Oil Spill Removal Organizations and other clean-up contractors that are capable of responding to all discharges along the Pipeline. Figure A.2 lists the contracted Oil Spill Removal Organizations.

Equipment trailers are located at the Hardisty Pump Station (Alberta), Regina Pump Station (Saskatchewan), in Valley City (North Dakota) at an external contractor site, in Brookings (South Dakota), Yankton (South Dakota), Cushing (Oklahoma) and St. Joseph (Missouri) at a TransCanada office location.

The Qualified Individual has the authority to activate other private contractors, experts, and consultants as the situation demands.

All Pipeline personnel who might be involved in an oil spill have been informed that detergents or other surfactants are prohibited from being used on an oil spill in the water and that dispersants can only be used with the approval of the Canadian Regional Environmental Emergency Team (REET) or US Regional Response Team, the interagency group composed of Federal and State agency representatives that coordinates oil spill response.

A.2 OTHER COMPANY RESOURCES

Additional Company spill response equipment and manpower resources are not available to supplement the response operation; however, third party contractors will be activated on an as needed basis.

A.3 CONTRACT RESOURCES

The resources will be secured from a Company approved contractor. Management will typically handle notification/implementation of these resources. Figure A.2 provides a quick reference to the Oil Spill Removal Organizations and details their response capability and estimated response times. **Telephone reference is provided in Figure 2.5.** *(Note: The Company will ensure that each OSRO has a comprehensive maintenance program and applicable training / drills programs in place at contract renewal.)*

A.4 COOPERATIVE/MUTUAL AID RESOURCES

The Company is a member of the following Oil Spill Cooperatives or mutual aid groups:

- Western Canadian Spill Services Ltd.
- Alberta - Area U and S Oil Spill Cooperatives
- Saskatchewan - Area 3, 6, and 4 & 5 Oil Spill Cooperatives

A.5 VOLUNTEERS

Volunteers will not be utilized by the Company for the response operations. In the U.S., all volunteers will be referred to the Federal Regional Response Team.

A.6 COMMUNICATIONS

Effective and efficient communications systems are essential for emergency response at every level. The communications system will be utilized to gather information and current

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status reports as well as to provide coordination and direction to widely separated work groups involved in search, containment/diversion, repair, traffic control, public control or evacuation, and restoration.

The Company's overall Emergency Notification Chart (Figure 2.2) indicates individuals within the Company and governmental agencies who must be contacted in the event of an emergency.

Notification information for the Qualified Individuals, Alternate Qualified Individuals, emergency response contractors, and governmental agencies is located in Section 2.0 and the Response Zone Annexes.

Lines of communication between the Incident Commander, local personnel, and contractors are demonstrated in the organization charts provided in Figures 4.1 and 4.2. Communication of the overall spill response operation between the Company and the responsible government agencies will occur between the Incident Commander and the Federal On-Scene Coordinator.

Central Communications System

Prearranged communication channels are of the utmost importance in dealing with Company emergencies. The notification procedures and telephone contacts documented in Section 2.0 will be reviewed in accordance with the earlier documented updating procedures. The predetermined communications channels include the following:

- A list of emergency telephone numbers for internal management and emergency response personnel (Figures 2.2 and 2.5).
- A list of emergency telephone numbers for various external resources such as the Fire Departments, Public Officials and local agencies is provided in the Annexes.
- A list of emergency telephone numbers for contract response resources (Figure 2.5).

Communications Equipment

Field communications during a spill response will be handled via radios, telephones, cellular phones, fax machines, and computers and will be maintained by Company personnel. In the event of a Worst Case Discharge, field communications will be enhanced with contract resources as the situation demands.

Communications Type

Voice communications may be conducted over the public telephone system or Company provided two-way radio equipment.

Radios - Hand-held and vehicle-mounted radio sets are the most effective means of communication for the field response operation. The units are battery operated, multi-channeled, and have a typical range that will cover the area of the response operation. Additional radio sets and battery packs/charges will be necessary in the event of a prolonged response operation.

Telephone (Conventional) - Conventional land line telephones are the most effective means of communication for regulatory and advisory notifications during a spill response operation. Additional telephone lines can be installed in the event of a prolonged response operation. All major facilities have access to standard telephone service.

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Cellular - Cellular telephones are useful during spill events giving the user the ability to travel while using the communication system.

FAX Machines - FAX machines allow for a rapid transfer of information/documentation such as status reports/updates, written notifications, and purchase orders. All administrative office have facsimile machines.

Computers - Computers are commonly used in networks which allow access to various other locations and company personnel. Computers also speed the consolidation of information and preparation of a written report.

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FIGURE A.1

COMPANY OWNED SPILL RESPONSE EQUIPMENT

COMPANY OWNED RESPONSE EQUIPMENT	
5 SPILL RESPONSE TRAILERS (ONE PER RESPONSE ZONE)	
Description	**Quantity**
Response boat 18.5 foot work boat with a 60 HP outboard	1
Jon boat 14 foot Safety boat with a 9.9 hp	1
34 ft Equipment trailer with 6 ft office includes equipment shelving, heat lights, power awning, rear ramp door and 1 side door. Roof rack for storage of the 14' boat and 500ft boom.	1
River Boom 6" x 6'	500 ft
Portable dam 50 ft	1
Diesel /hydraulic Skimming System with diesel power transfer pump and hoses	1
Sorbent pads	5 bales
Sorbent boom	5 bales
500 gallon portable tank	1
2,000 gallon portable tank	1
10,000 gallon portable bladder	1
Winter equipment(e.g. Chain saws, chains, pry bars, ropes,ice,augers)	varies
Bird Hazing Kit	1
20' boom Trailer	1

Supplemental Trailer Equipment List

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FIGURE A.2

RESPONSE RESOURCES

Zone : Hardisty Pump Station/ Regina Pump Station

COOPERATIVES
Western Canadian Spill Services Ltd.
Albert - Area U and S Oil Spill Cooperatives
Saskatchewan - Area 3 and 6 Oil Spill Cooperatives
National Response Corporation (OSRO, not a Cooperative)

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Zone : Regina Pump Station / Haskett Pump Station

COOPERATIVES
National Response Corporation (OSRO, not a Cooperative)
Western Canadian Spill Services Ltd.
Saskatchewan - Area 6 and 4 & 5 Oil Spill Cooperatives

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Zone : North Dakota, South Dakota, Nebraska

Area : North Dakota, South Dakota, Nebraska						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lakes				

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Zone : Kansas, Missouri, Illinois

Area : Kansas, Missouri, Illinois						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore	X	X	X	X
		Near Shore	X	X	X	X
		Great Lakes				

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Zone : Cushing Extension

Area : Cushing Extension Area						
OSRO Name	Contract Number	Environment Type	Facility Classification Level			
			MM	W1	W2	W3
National Response Corporation	TBD	River/Canal	X	X	X	X
		Inland	X	X	X	X
		Open Ocean	X	X	X	X
		OffShore				
		Near Shore	X	X	X	X
		Great Lakes	X	X	X	X

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FIGURE A.3

USCG OSRO CLASSIFICATIONS

The USCG has classified OSROs according to their response capabilities, within each Captain of the Port (COTP) zone, for vessels and for facilities in four types of environments. Response capabilities are rated MM, W1, W2, or W3 as described below

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MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATION			
Classification	**Resource Quantity Guidelines**	**Maximum Facility Response Times**	**Maximum Vessel Response Times**
	Rivers/Canals		
MM	Protective Boom: 4,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 25,000*ft EDRC:; 1,875 bbls TSC: 3,750 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom: 25,000*ft EDRC:; 3,750 bbls TSC: 7,500 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
W3	Protective Boom:25,000*ft EDRC:; 7,500 bbls TSC: 15,000 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours
	Great Lakes		
MM	Protective Boom: 6,000*ft EDRC:; 1,250 bbls TSC: 2,500 bbls	All Ports: 6 hours	All Ports: 12 hours
W1	Protective Boom:30,000*ft EDRC:; 6,250 bbls TSC: 12,500 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom:30,000*ft EDRC:; 12,500 bbls TSC: 25,000 bbls	All Ports: 36 hours	All Ports: 42 hours
W3	Protective Boom:30,000*ft EDRC:; 25,000 bbls TSC: 50,000 bbls	All Ports: 60 hours	All Ports: 66 hours

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MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATION			
Classification	**Resource Quantity Guidelines**	**Maximum Facility Response Times**	**Maximum Vessel Response Times**
Inland			
MM	Protective Boom:6,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 30,000*ft EDRC:; 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom: 25,000*ft EDRC:; 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
W3	Protective Boom: 25,000*ft EDRC:; 50,500 bbls TSC: 100,500 bbls	High Volume Ports: 54 hours Other Ports: 60 hours	High Volume Ports: 60 hours Other Ports: 72 hours
Great Lakes			
MM	Protective Boom: 8,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports: 6 hours Other Location: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 30,000*ft EDRC:; 12,500 bbls TSC: 25,500 bbls	High Volume Ports: 12 hours Other Ports: 24 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W2	Protective Boom: 30,000*ft EDRC:; 25,500 bbls TSC: 50,500 bbls	High Volume Ports: 30 hours Other Ports: 36 hours	High Volume Ports: 36 hours Other Ports: 48 hours
W3	Protective Boom: 30,000*ft EDRC:; 50,000 bbls TSC: 100,000 bbls	High Volume Ports: 54 hours Other Location: 60 hours (for open ocean, plus travel time from shore)	High Volume Ports: 60 hours Other Location: 72 hours (for open ocean, plus travel time from shore)

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MINIMUM EQUIPMENT REQUIREMENTS FOR OSRO CLASSIFICATION

Classification	Resource Quantity Guidelines	Maximum Facility Response Times	Maximum Vessel Response Times
	Offshore		
MM	Protective Boom:6,000*ft EDRC:; 1,200 bbls TSC: 2,400 bbls	High Volume Ports:6 hours Other Ports: 12 hours	High Volume Ports: 12 hours Other Ports: 24 hours
W1	Protective Boom: 15,000*ft EDRC: 12,500 bbls TSC: 25,500 bbls	High Volume Ports:24hours Other Ports: 48hours	High Volume Ports: 24 hours Other Ports: 48 hours
W2	Protective Boom: 15,000*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports:30hours Other Ports: 36hours	High Volume Ports: 36hours Other Ports: 48hours
W3	Protective Boom: 15,000*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports:54hours Other Ports: 60hours	High Volume Ports: 60hours Other Ports: 72hours
	Open Ocean		
MM	Protective Boom: 0*ft EDRC: 1,200 bbls TSC: 2,400 bbls	High Volume Ports:6hours Other Ports: 12hours	High Volume Ports: 12hours Other Ports: 24hours
W1	Protective Boom: 0*ft EDRC: 12,500 bbls TSC: 25,000 bbls	High Volume Ports:6hours Other Ports: 12hours	High Volume Ports: 12hours Other Ports: 24hours
W2	Protective Boom: 0*ft EDRC: 25,000 bbls TSC: 50,000 bbls	High Volume Ports:30hours Other Ports: 36hours	High Volume Ports: 36hours Other Ports: 48hours
W3	Protective Boom: 0*ft EDRC: 50,000 bbls TSC: 100,000 bbls	High Volume Ports:54hours Other Ports: 60hours	High Volume Ports: 60hours Other Ports: 72hours

1. Rivers/canals include bodies of water, including the Intracoastal Waterway and other bodies artificially created for navigation, confined within an inland area and having a project depth of 12 feet (3.66 meters).
2. EDRC stands for "effective daily recovery capacity," or the calculated recovery capacity of oil recovery devices determined by using a formula that takes into account limiting factors such as daylight, weather, sea state, and emulsified oil in the recovered material.
3. TSC stands for "temporary storage capacity," meaning sufficient storage capacity equal to twice the EDRC of an OSRO. Temporary storage may include inflatable bladders, rubber barges, certified barge capacity, or other temporary storage that can be utilized on scene at a spill response and which is designed and intended for the storage of flammable or combustible liquids. It does not include vessels or barges of opportunity for which no pre-arrangements have been made. Fixed shore-based storage capacity, ensured available by contract or other means, will be acceptable.

* In addition, 1,000 feet of containment boom plus 300 feet per skimming system.

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FIGURE A.4

AGREEMENTS/CONTRACTS

Click to view the file - NRC Packet_23_1_2009_14_31_34.pdf

Click to view the file - WCSS Packet_29_11_2008_10_23_9.pdf

Click to view the file - Alberta Area 2U Packet_29_11_2008_10_27_35.pdf

Click to view the file - Alberta Area 1S Packet_29_11_2008_10_28_3.pdf

Click to view the file - Sask Area 3 Packet_29_11_2008_10_28_27.pdf

Click to view the file - Sask Area 6 Packet_29_11_2008_10_29_12.pdf

Click to view the file - Sask Area 4and5 Packet_29_11_2008_10_29_50.pdf

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Decision Summary (DS-244)

TransCanada
In business to deliver

To:	[redacted]	**Date:**	October 14, 2008
From:	[redacted]	**Location:**	Calgary, Alberta
Subject:	NRC OSRO Resource Retainer		

Decision Proposed ([redacted] per Annum(U.S. Currency) for 3 years)

Your approval is requested for funds related to emergency response planning and preparedness. As a matter of risk mitigation and regulatory compliance, it is proposed to enter into a contractual retainer to address a number of emergency response functions during operations. This amount falls within the existing capital expenditures for emergency response for 2009.

Background

National Response Corporation (NRC) will provide Keystone with Oil Spill Response Organization (OSRO) resources. Specifically, NRC will be the overall coordinating company that has the ability to safely respond to spill related incidents along the pipeline. NRC ensures spill readiness which included supplier subcontracts, training, workshops and overall spill site coordination. NRC has the proven ability to handle spills of all sizes and is approved by the United States Coastguard.

NRC has its own equipment, spill managers and a network of related industries to ensure Keystone is prepared to respond efficiently and effectively. The retention of a contractor is mandatory for Keystone to meet regulatory requirements. Having a retainer guarantees Keystone the resources when most needed.

The contract should start on January 1, 2009 and will form part of the existing Emergency Response Plan for 2009. This type of contract was not contemplated in the original Emergency Response budget of [redacted], but is part of the overall plan. The first year will be absorbed by the existing budget and for future years, these costs should be part of a field operations budget.

Requested by:

[redacted]	14 October 2008 Date

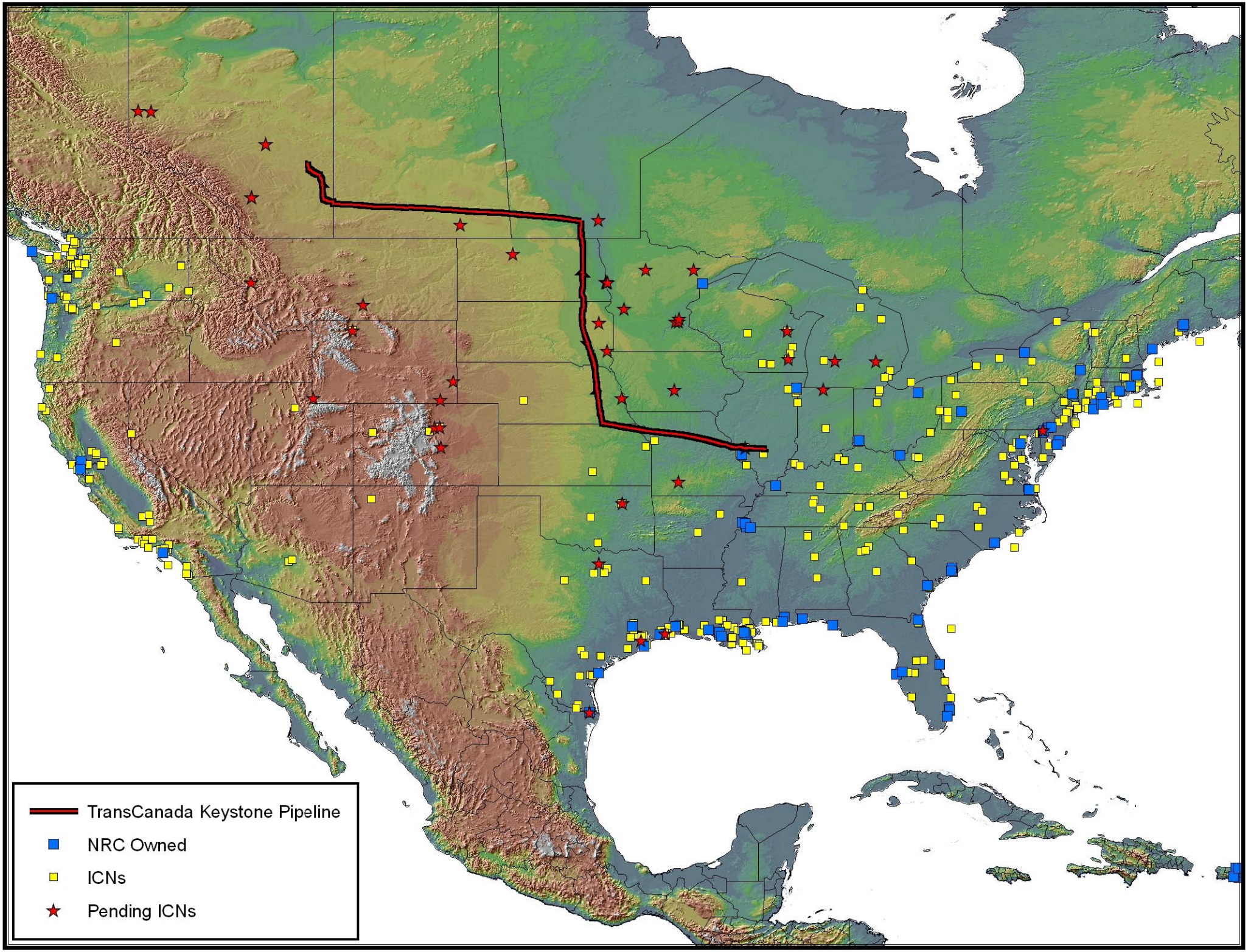
Approved by:

[redacted]	14 October 2008 Date

National Response Corporation, Inc.

National Response Corporation, Inc. is an Oil Spill Response Organization contracted to conduct oil recovery for TransCanada Keystone Limited Partnership and TC Oil Pipeline Operations, Inc. National Response Corporation uses a network of associated cleanup contractors throughout North America and the world. National Response Corporation has been certified by the United States Coast Guard, as described in the Emergency Response Manual, to respond to releases along the length of the Pipeline.

For further information about National Response Corporation and a list of response equipment you can visit their website at http://www.nrcc.com.


TransCanada Keystone Pipeline
NRC Owned
ICNs
Pending ICNs

Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

Western Canadian Spill Services Ltd

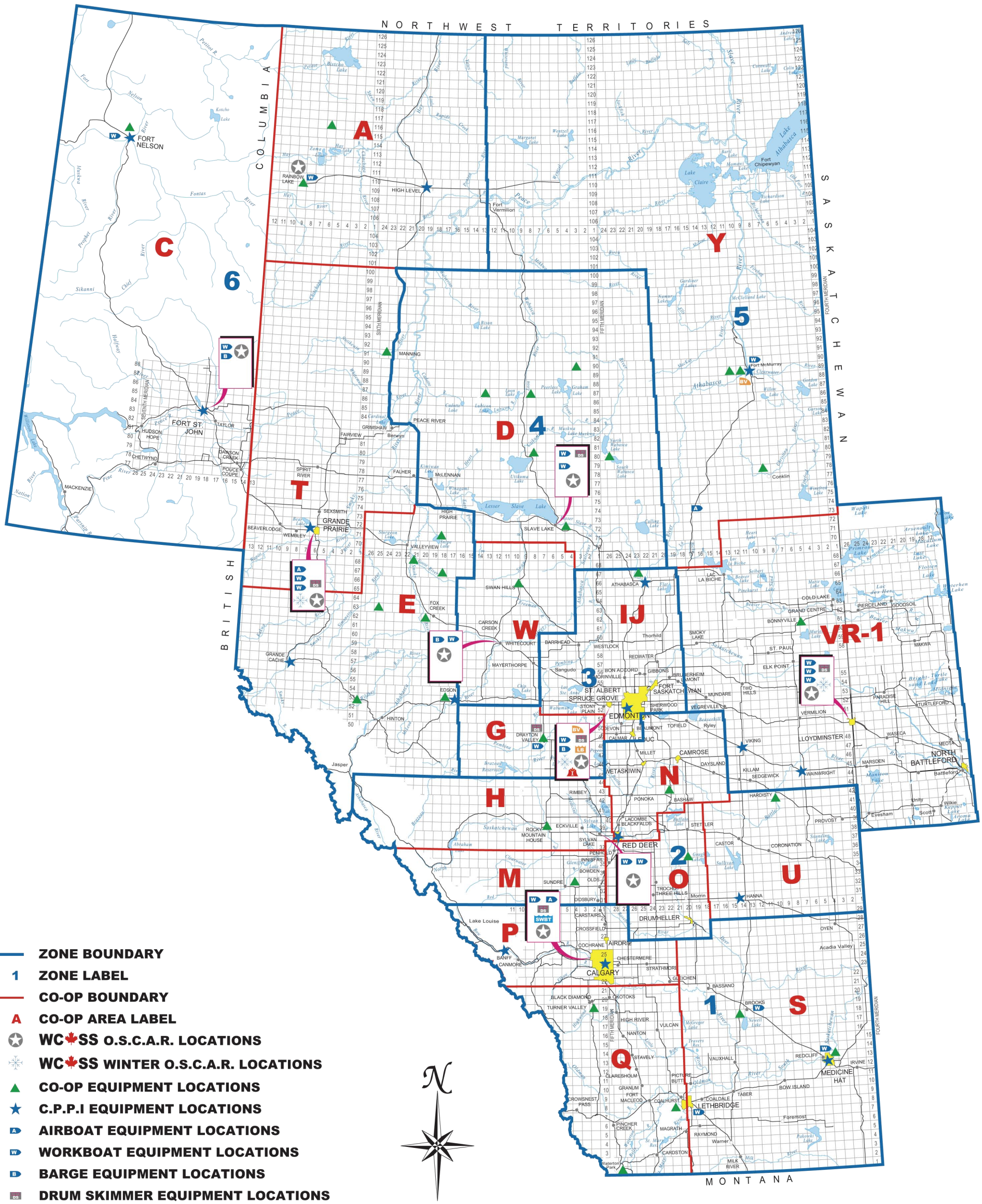
Western Canadian Spill Services Ltd. is the spill preparedness organization of the upstream petroleum industry in North East British Columbia, Alberta and Cooperative VR1 that extends into Saskatchewan. The purpose of Western Canadian Spill Services is to maintain an effective spill response capability for the upstream petroleum industry in Western Canada and to provide information and education on spill issues including spill prevention.

Through an agreement between Western Canadian Spill Services and the Canadian Petroleum Products Institute the members of the Western Canadian Spill Services in good standing can have access to the equipment owned by Canadian Petroleum Products Institute.

In Manitoba, the Western Canadian Spill Services contracts with Euroway Industrial Service Company Ltd, to store and maintain response equipment available for use by members of the Western Canadian Spill Services. Euroway is located in Winnipeg, Manitoba.

For further information about Western Canadian Spill Services and a list of response equipment you can visit their website at http://www.wcss.ab.ca. Information on the Canadian Petroleum Products Institute can be found at their website www.cppi.ca.

WC SS OIL SPILL
COOPERATIVE BOUNDARIES
2008



- ZONE BOUNDARY
- 1 ZONE LABEL
- CO-OP BOUNDARY
- A CO-OP AREA LABEL
- WC SS O.S.C.A.R. LOCATIONS
- WC SS WINTER O.S.C.A.R. LOCATIONS
- CO-OP EQUIPMENT LOCATIONS
- C.P.P.I EQUIPMENT LOCATIONS
- AIRBOAT EQUIPMENT LOCATIONS
- WORKBOAT EQUIPMENT LOCATIONS
- BARGE EQUIPMENT LOCATIONS
- DRUM SKIMMER EQUIPMENT LOCATIONS
- BOOM VANE EQUIPMENT LOCATIONS
- SHALLOW WATER BOOM TRAILER LOCATIONS
- LAKE BOOM EQUIPMENT LOCATIONS
- INCINERATOR EQUIPMENT LOCATIONS

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CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

Alberta	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
Athabasca	Basic	Volunteer Fire Dept. (Town)	Fire Chief Denis Mathieu	4707-50 Street T9S 3A3	[redacted]			
Banff	Basic	Fire Department	Deputy Jim Watt	201 Beaver Street PO Box 1260 T0L 0C0				
Calgary	Basic	ECL Transportation	Bruce Thomson Gail Sharko	7100 44 St SE T2C 2V7 (Gail) 5366-55 Street SE T2C 3G9 (trailer)				
Edmonton	Basic	ECL Transportation	Randy Johnston Gail Sharko (Calgary)	1810 66 Ave T6P 1M4				
Edson	Basic	Fire Department	Chief Allan Schram	6 Avenue 49 Street Box 6300 T7E 1T7				
Ft. McMurray	CPPI Basic . WCSS Equip. OSCAR, Skid Unit, Work Boat, Boom Vane	Eveready Industrial (TriVax Enterprises)	Brent Bakke	230A MacKay Crescent T9H 5C6				
Grande Prairie	Basic	Fire Department (cheque NOT to City)	Deputy Chief Harvey Pearson Dennis Driver, Stn. Captain	8111 Resources Road T8V 7Y2				
Hanna	Basic	Volunteer Fire Dept.	Chief David Mohl	201 1 Ave East Box 430 T0J 1P0				
High Level	Basic	Fire Department	Chief Rod Schmidt	10201-100 Ave T0H 1Z0 (FD) 9813 102 St T0H 1Z0 (town)				
Lethbridge	WCSS Equip. Muskrat, mini OSCAR, work boat	Mid-West Pump (90) Ltd.	Gerry Colburn Ed Carpenter	311 33 St N T1H 3Z6				
Medicine Hat	Basic	Fire Department	Chief Garry Mauch Deputy Allan Guest Randy Stotz	440 Maple Ave SE T1A 7S3				
Viking	Basic	Fire Department	Chief Ken Ruzicka	4920-53 Avenue T0B 4N0				

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

BC	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
Burns Lake	Basic	Lyle Sande Agencies (Chevron)	Lyle Sande Kristi McCrindle	65 Railway Ave. PO Box 619 V0J 1E0				
Campbell River	Basic	K&S Petroleum Ltd. (Chevron)	Kerry Coulson	4700 Orange Point Road PO Box 968 V9W 6Y4				
Castlegar	Basic	Fire Department	Chief Gerry Rempel Ast Chief Tony Cooper	2161 6 Ave V1N 3B2				
Cranbrook	Basic	Jepson Petroleum Ltd (Petro-Canada)	Mgr. Chris Jepson Dave Schmideder	1814 Theatre Road V1C 7G1				
Creston	Basic	R A Glennon Petroleum (Shell)	Robert Smith Randy Glennon Stacey Ostendorf	1411 Northwest Blvd RR 6 V0B 1G6				
Ft. Nelson	Basic	Fire Department	Chief Dennis Muise Asst. Chief James Childs	5404 48 Ave Bag 399 V0C 1R0				
Ft. St. John	Basic	Fire Department	Dep Chief Fred Burrows Chief Jeff Lambert Doreen Holmes	9407-100 Avenue V1J 6W1 10631-100 Street V1J 3Z5 (Town Office)				
Golden	Basic	Fire Department	Chief Shawn Tomash	1107-11 Avenue S. P.O. Box 350 V0A 1H0				
Kamloops	Basic	Petro-Canada Terminal	Stephen Demianiuk Rick Geier	2955 Tranquille Rd V2B 7W2				
Kelowna	Basic	Fire Department	Eileen Davies	2255 Enterprise Way V1Y 8B8				
Nanaimo	Basic	Nanaimo Fire Rescue	Deputy Chief Bob Simpson	**Trailer: Fire Stn #2** **2499 Dorman Road** **V9S 5T3** / 200, 575 Fitzwilliam St V9R 3B2 (BS)				
Prince George	Basic	Husky Energy Refinery	Greg Primus Bill Fraser	2542 Pulp Mill Rd PO Box 1390 V2L 4V4				
Revelstoke	Basic	Big Eddy Fuel (Shell)	Peter Humphries	733 South Highway 23 Box 1740 V0E 2S0				
Surrey (Cloverdale)	Basic	D.W.P. Distributors Limited (Chevron)	Bill Poppy	5504 176 Street Surrey, BC V3S 4C3				
Terrace	Basic	Fire Department	Chief Peter Weeber	3, 3215 Eby Street V8G 2X8				

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

BC	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
Valemount	Basic	Fire Department	Chief Rick LaLonde, Hugh Miller, Dep. Donovan Gee, Dep.	1380 5 Avenue Box 727 V0E 2Z0	[redacted]			
Williams Lake	Basic	TaGerra Holdings Ltd. (Chevron)	Tammi Caferra Linda Dudoski	101 25 Hodgson Road V2G 3P5				

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

Manitoba	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
Brandon	Basic	Fire Department	A/Lt. Donald Matthews	**Trailer @ Fire Stn #2** 637 Princess Avenue R7A 0P2 (DM)	[redacted]			
Dauphin	Basic	Brendonn Holdings Ltd. (Petro-Canada)	Mike Gawaziuk	Hwy. 5A West PO Box 607 R7N 2V4				
Swan River	Basic	Doak's Fuel Service (Imperial Oil)	Dale Macooh Troy Carter	PO Box 695 523-3 Avenue S R0L 1Z0				
The Pas (Town)	Basic	Fire Department	Deputy Chief Richard Paetzold Chief Ron Bourquin	81 Edwards Ave PO Box 870 R9A 1K8				
Thompson	Basic	Doak's Fuel Service (Imperial Oil)	Rob Bilawka	CN Grounds-Station Rd PO Box 309 R8N 1N1				
Winnipeg	CPPI Basic . WCSS Equip. OSCAR, 2 Jet Boats	Euroway Industrial Service Co. Ltd.	Gary Mittermayr	245 Transport Road Box 4, Group 582, RR 5 R2C 2Z2				

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

Saskatch.	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
La Ronge	Basic	Fire Department	Chief Ron Pratt	1222 Hildebrand Drive PO Box 5680 S0J 1L0	[redacted]			
North Battleford	Basic	Fire Department	Chief Mike Saunders Deputy Bryan Beach	902 104 Street PO Box 460 S9A 2Y6				
Prince Albert	Basic	Marsollier Petroleum Ltd. (Esso)	Kelly Bartel Curtis Parent	1100 6 Ave E S6V 2J9				
Regina	Basic	Envirotec Services Inc.	Lyle Clouatre (Daniel Guskjolen looks after trailer - 99 Andre Ave, Regina S4T 7N1)	804-46 Street East Saskatoon S7K 3V7 **Trailer: 1910 Winnipeg Street N., Regina**				
Saskatoon	Basic	Fire Department	Chief Gary Kobussen (admin office) Jim Wood (AO) (Captain Jerry Unser looks after trailer)	125 Idylwyld Dr S S7M 1L4 (admin offices) **Trailer: Fire Hall 7** **3550 Wanuskewin Road** **Saskatoon**				
Swift Current	Basic	Fire Department	Chief Bob Rindahl Cathie Werbowetsky	236 Chaplin Street E S9H 5B2				
Weyburn	Basic	Fire Department	Chief Denis Pilon & Asst Murray Sabados	55-16 Street NE PO Box 370 S4H 2K6				
Yorkton	Basic	Brendonn Holdings Ltd. (Petro-Canada)	Tony Ripa & R Kuschak	24 Broadway Street W S3N 0L4				

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

CPPI/WCSS* Environmental Protection Unit (EPU) Custodian Information

NWT	CPPI Equip.	Custodian	Contact	Address	Phone	Night Phone	Fax	E-mail
Hay River	Basic	Matonabee Petroleum Ltd. (Petro-Canada)	Bill Wright	43064 MacKenzie Highway X0E 0R9	[redacted]			
Yellowknife	Basic	Matonabee Petroleum Ltd. (Petro-Canada)	Shawn Delaney Dalyn Chan	117 Kamlake Road Box 2697 X1A 2R1				
Yukon	**CPPI Equip.**	**Custodian**	**Contact**	**Address**	**Phone**	**Night Phone**	**Fax**	**E-mail**
Whitehorse	Basic	Dall Contracting Ltd. (Petro-Canada)	Mike Baldwin	110 Galena Rd Y1A 2W6	[redacted]	[redacted]	[redacted]	[redacted]

* WCSS - Western Canadian Spill Services
(see www.wcss.ab.ca for additional locations of WCSS equipment)

Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

Albert Area 2U Oil Spill Cooperative

The Province of Alberta is divided into 6 oil spill cooperative zones. Each zone is then divided into areas. The designation 2U means area U of zone 2. The TransCanada Keystone Pipeline system begins and travels south through this area. The cooperative is run by a managing committee with custodians who are responsible for storage and maintenance of the response equipment.

Through the preceding agreement TransCanada Keystone Pipeline system will have the ability to use the cooperatives equipment, if available, during an incident.

The equipment list, contact information and maps are included in this document.

Zone 2 - Coop Area U

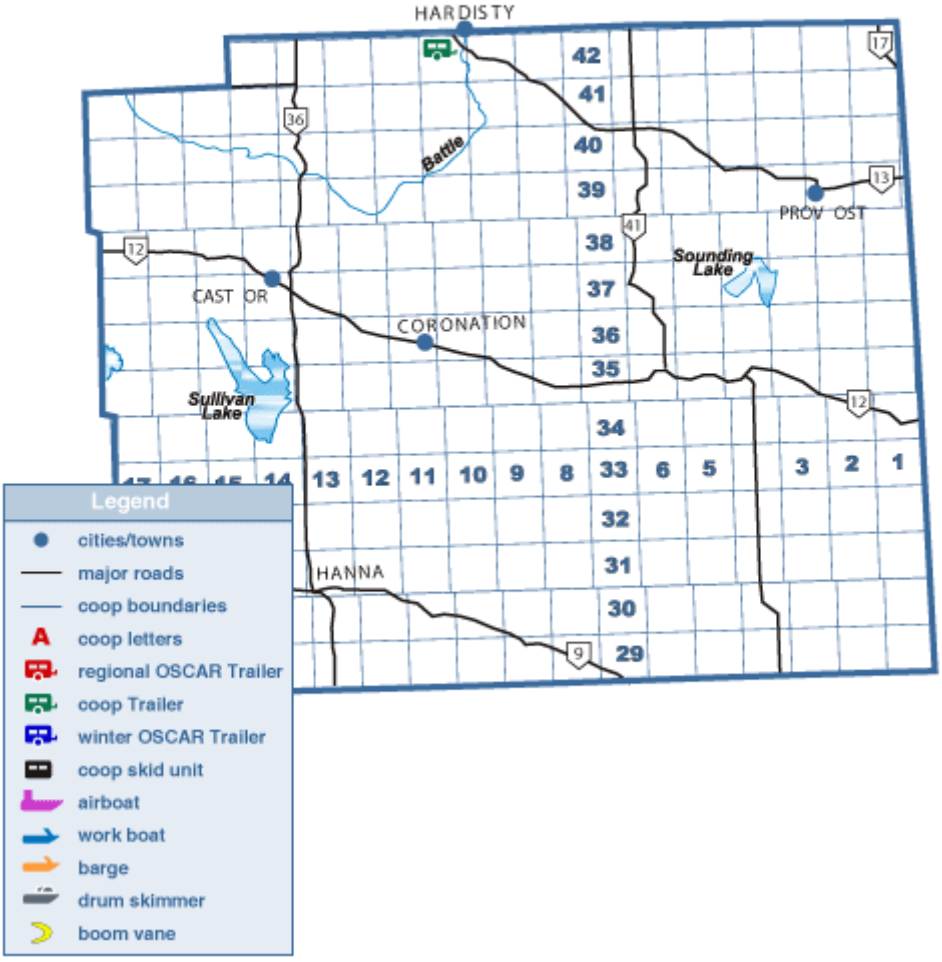
COOP Custodian

Greg Schmidt/Trevor Bitzer
Greg's Contracting Services Ltd.
Ph : [redacted]
After Hours: Max Devey
[redacted]

Equipment Location
Greg's Contracting Services Ltd. Box 29 4616A 47 Street
Hardisty, AB T0B 1V0

Equipment Summary

- OSCAR Trailer



Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

Albert Area 1S Oil Spill Cooperative

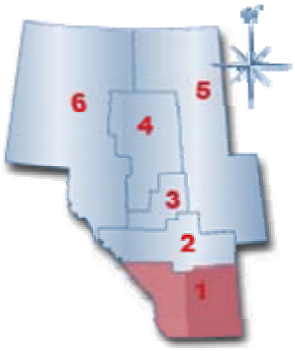
The Province of Alberta is divided into 6 oil spill cooperative zones. Each zone is then divided into areas. The designation 1S means area S of zone 1. The TransCanada Keystone Pipeline system traverses the north east corner of this area. The cooperative is run by a managing committee with custodians who are responsible for storage and maintenance of the response equipment.

Through the preceding agreement TransCanada Keystone Pipeline system will have the ability to use the cooperatives equipment, if available, during an incident.

The equipment list, contact information and maps are included in this document.

Zone 1 - Coop Area S

Regional Custodian



Adrian Schuurman
Mid-West Pumps (90) Ltd.
[redacted]
24-HR: [redacted]
Fax: (403) 327-4660

Ed Carpenter

Equipment Location
Lethbridge

Equipment Summary

- Mini-OSCAR (3/4-ton truck with 2 5/16" ball hitch)
- Muskrat (1/2-ton truck with 2" ball hitch)
- Marathon Workboat (1/2-tin with 2" ball hitch)

Coop Custodian

Mike Wenner
P&H Oilfield Maintenance
24-HR Ph: [redacted]
Fax: (403) 362-0107
Cell: [redacted]

Equipment Location
NE 34-18-15 W4M Brooks, AB

Equipment Summary

- 45' Trailer (Tractor Truck)
- Muskrat Workboat (1/2-ton with 2" ball hitch)

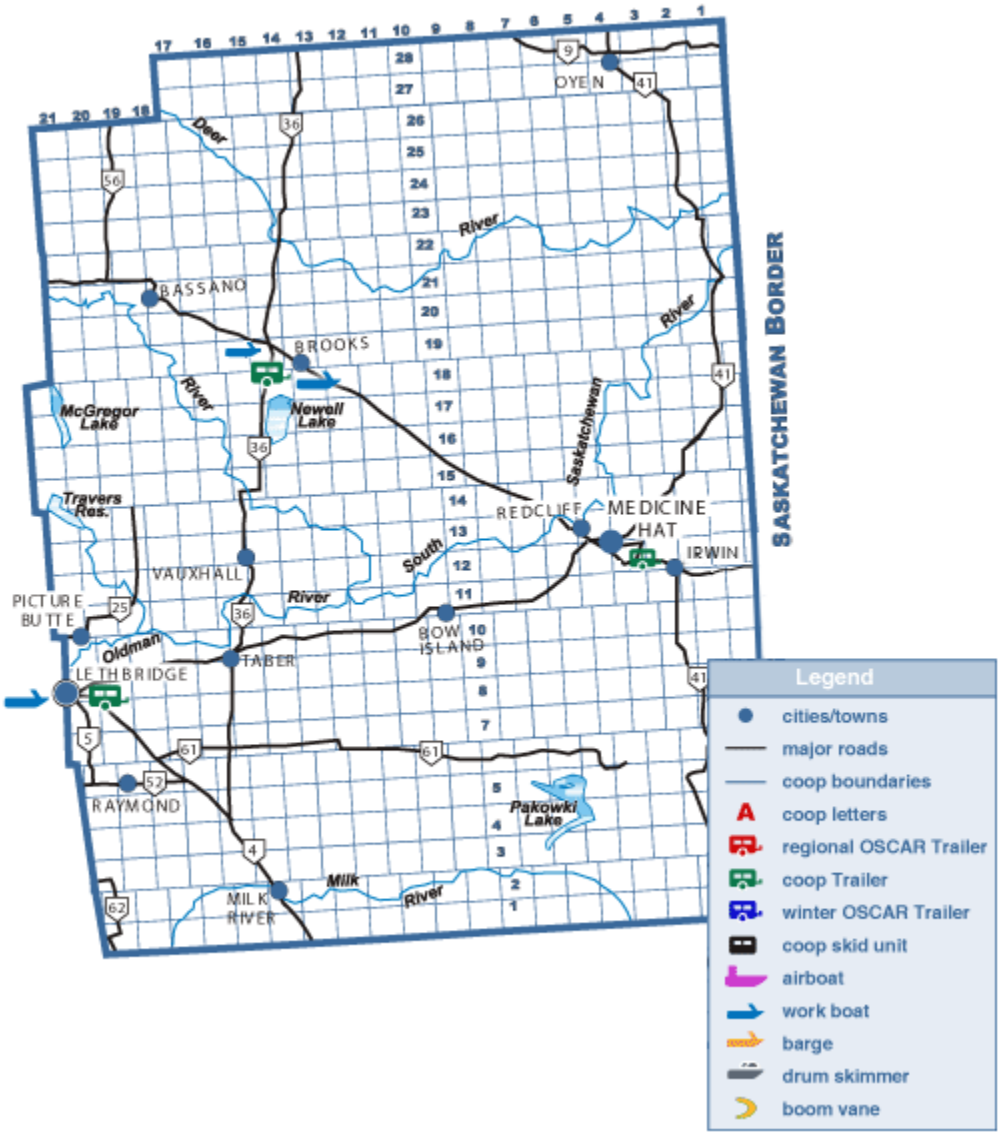
Directions
From Brooks, take Castle Road heading west towards Hwy 36 for 5 kms. Yard is located on south side of road, or Junction of Hwy 1 and Hwy 36. Head south of Hwy 36 until you reach Castle Road , yard is located on south side.

Mike Wenner
P&H Oilfield Maintenance
24-HR Ph: [redacted]
Fax: (403) 362-0107
Cell: [redacted]

Equipment Location
15-7-13-5-W4 Enerplus site North of Medicine Hat, AB

Equipment Summary

- C-Can Skid Unit (Bed Truck)


SASKATCHEWAN BORDER
OYEN
BASSANO
BROOKS
Newell Lake
McGregor Lake
Travers Res.
REDCLIFF
MEDICINE HAT
IRWIN
VAUXHALL
PICTURE BUTTE
LETHBRIDGE
TABER
BOW ISLAND
RAYMOND
MILK RIVER
Pakowki Lake
Deer River
South Saskatchewan River
Oldman River
Milk River
Legend
cities/towns
major roads
coop boundaries
coop letters
regional OSCAR Trailer
coop Trailer
winter OSCAR Trailer
coop skid unit
airboat
work boat
barge
drum skimmer
boom vane

Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

Saskatchewan Area 3 Oil Spill Cooperative

The Province of Saskatchewan is divided into 5 oil spill cooperative areas. The TransCanada Keystone Pipeline travels from west to east through area 3. The cooperative is run by a steering committee with custodians who are responsible for storage and maintenance of the response equipment.

Through the preceding agreement TransCanada Keystone Pipeline system will have the ability to use the cooperatives equipment, if available, during an incident.

The equipment list, contact information and maps are included in this document.

AREA 3 Emercency Response Unit

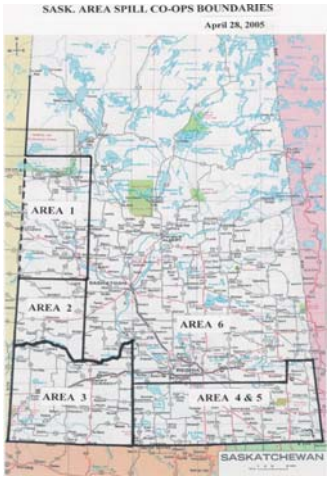
Trailer Location:

06-08-011-18w3 Bench Oil Battery – Husky Energy Inc.

Steering Committee:

Title	Name	Office	Phone
CHAIRMAN:	Gilbert Cadrain	Husky Energy Inc.	[redacted]
SECRETARY:	Gary Hammer	Plains Marketing	[redacted]
TREASURER:	Garry Zinger	Focus Energy	[redacted]
COMMITTEE:	Ron Dolter	S.I.R	[redacted]
	Darcy Thoreson	Equipment Custodian	[redacted]
	Dave Knipfel	Huskey Energy	[redacted]
	Jeff Seffern	Talisman Energy Inc.	[redacted]
	Rob Forester	Crescent Point	[redacted]
	Tim Stevenson	Penn West	[redacted]
	Blake Barsness	Acclaim Energy	

Boundry Map:



AREA III ENVIRONMENTAL RESPONSE TRAILER UNIT

The following equipment is stored in a 8' x 28' tandem axle trailer c/w pintle hitch.

EMERGENCY RESPONSE TELEPHONE NUMBERS

EMERGENCY 911

COMPANY	CONTACT	PHONE
Ambulance (non-emergency)	Swift Current Cabri Gull Lake Shaunavon	[redacted]
Air Ambulance	Saskatoon (Information)	[redacted]
Fire Department (non-emergency)	Swift Current Cabri Shaunavon (Kevin) Gull Lake	[redacted]
Hospitals		
Cabri Health Centre Gull Lake Health Centre S. C. Union Hospita Shaunavon Union Hospital	Cabri Gull Lake Swift Current Shaunavon	[redacted]
Royal Canadian Mounted Police	Swift Current Gull Lake Shaunavon Cabri	[redacted]
Saskatchewan Pow Corporation Elec. Swift Current	Emergencies 24 Hour	[redacted]
Gas		
Swift Current Shaunavon Cabri	24 Hour 24 Hour 24 Hour	[redacted]

Website Address for Spill Cooperatives:

www.area3eru.com
http://areatwo.sasktelhosting.net/
http://www.saskoilspill.com/
http://www.saskoilspill.com/main.htm
http://www.area6sask.com/

INITIAL SPILL REPONSE FLOW CHART

SPILL OBSERVED ? RESPONSE

1. ASSESS THE SPILL OCCURRENCE:

- ASSESS IMMEDIATE HAZARDS TO:
  - PERSONAL SAFETY
  - PUBLIC SAFETY
  - PROPERTY
  - ENVIRONMENTAL

2. ASSESS THE SPILL OCCURRENCE:

- ASSESS AND REPORT SOURCE
- ASSESS AND REPORT SPILL TYPE
  - OIL
  - SALT WATER
  - CHEMICAL
- ASSESS AND REPORT SPILL SIZE
- ASSESS SPILL AND REPORT FLOW DIRECTION AND FURTHER CONTAMINATION

3. NOTIFY IMMEDIATE SUPERVISOR:

- IDENTIFY LOCATION OF SPILL
- NOTE TIME SPILL DISCOVERED
- NOTE ADVERSE WEATHER CONDITIONS
  - WEATHER
  - TERRAIN
  - DOWNSTREAM WATER USERS
- POTENTIAL TO STOP FLOW FROM SOURCE
- POTENTIAL TO CONTAIN SPILL FLOW
- COMMUNICATE ON SITE RESPONSE ACTION PLAN

SPILL REPORTED ? IMMEDIATE SUPERVISOR IS NOW THE INTERIM ON-SCENE COMMANDER.

1. ACTIVATE OIL SPILL CONTINGENCY PLAN

- SET THE RESPONSE UNIT INTO MOTION
- ESTABLISH THE ON-SCENE COMMANDER

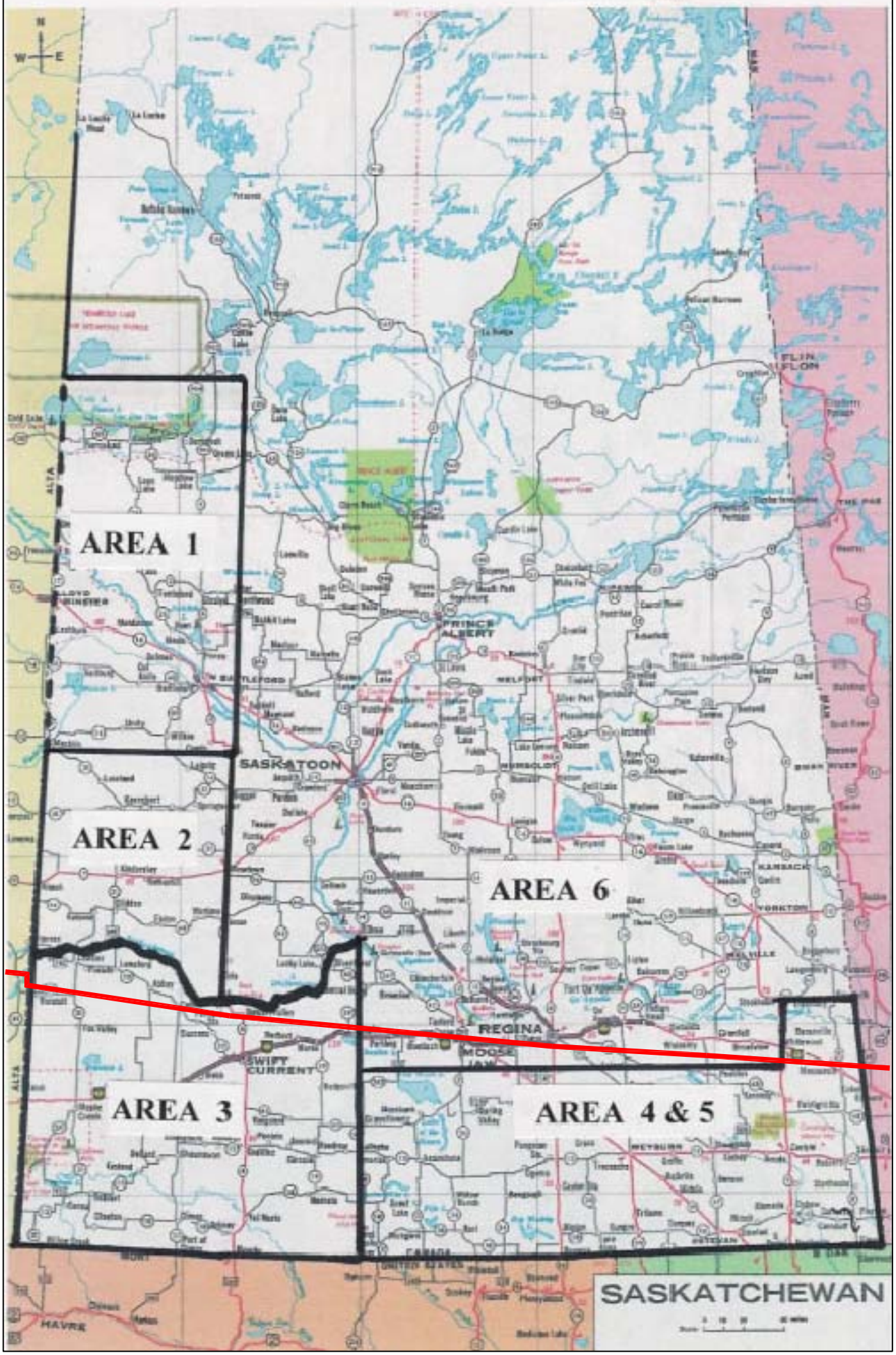
AREA III MOBILIZATION TO SPILL SITE ? ON-SCENE COMMANDER

1. ESTABLISH AND MAINTAIN COMPLETE CONTROL OF THE OPERATION:

- SET UP A COMMAND POST FOR OPERATIONS
- DISPATCH FIELD STAFF TO SPILL SITE TO VERIFY THE SPILL LOCATION, THE EXTENT OF THE SPILL AND PROCEED WITH SHUT-IN PROCEDURES
- MOBILIZE THE AREA III EQUIPMENT ?(COMBINATION #1, 2, 3, 4.)
- CALL KEY PERSONNEL AND REGULATORY AGENCIES
- ORGANIZE AND ACTIVATE CONTINGENCY PLAN AS PER AREA III SPILL CONTINGENCY MANUAL FOR CONTAINMENT AND CLEANUP OF SPILL.

SASK. AREA SPILL CO-OPS BOUNDARIES

April 28, 2005



Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

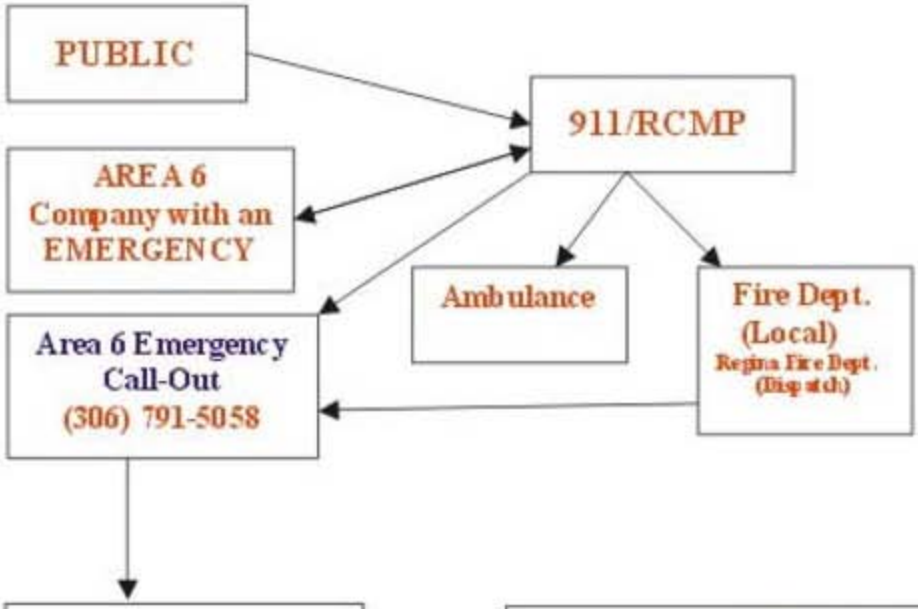
Saskatchewan Area 6 Oil Spill Cooperative

The Province of Saskatchewan is divided into 5 oil spill cooperative areas. The TransCanada Keystone Pipeline travels from west to east through the southernmost part of area 6. The cooperative is comprised of several oil companies in the area who designate their company owned response equipment to be available to other members of the area cooperative for use during an incident.

Through the preceding agreement TransCanada Keystone Pipeline system will have the ability to use the cooperatives equipment, if available, during an incident.

Contact information and Saskatchewan area map are included in this document.

AREA 6 EMERGENCY RESPONSE CO-OP
CALL-OUT CHART & INSTRUCTIONS (May 2008)



Alliance Pipeline
1-800-884 8811
Kinder Morgan (Cochin)
1-800-265 6000
Co-op Refineries
(306) 721 5372
Spectra Energy
1-403-838-3764
Imperial Oil
(24/7) (306) 757 4342

Enbridge Pipelines
1-877-420 8800
Moose Jaw Asphalt
1-306-691 7800 (ext. 0)
Petro Canada
(Saskatoon)
1-306-382 1455 (ext. 0)
Plains Midstream
1-866-875 2554
SaskEnergy/TransGas
(306) 777 9800

MEMBER INSTRUCTIONS

*** THE "FIRST" COMPANY TO RECEIVE A CALL or have a PIPELINE EMERGENCY shall contact the AREA 6 EMERGENCY CALL-OUT and announce the following summary message:

"(your company) is calling on behalf of the Area 6 Emergency Response Co-op.

There is a "pipeline emergency" at the following (location).

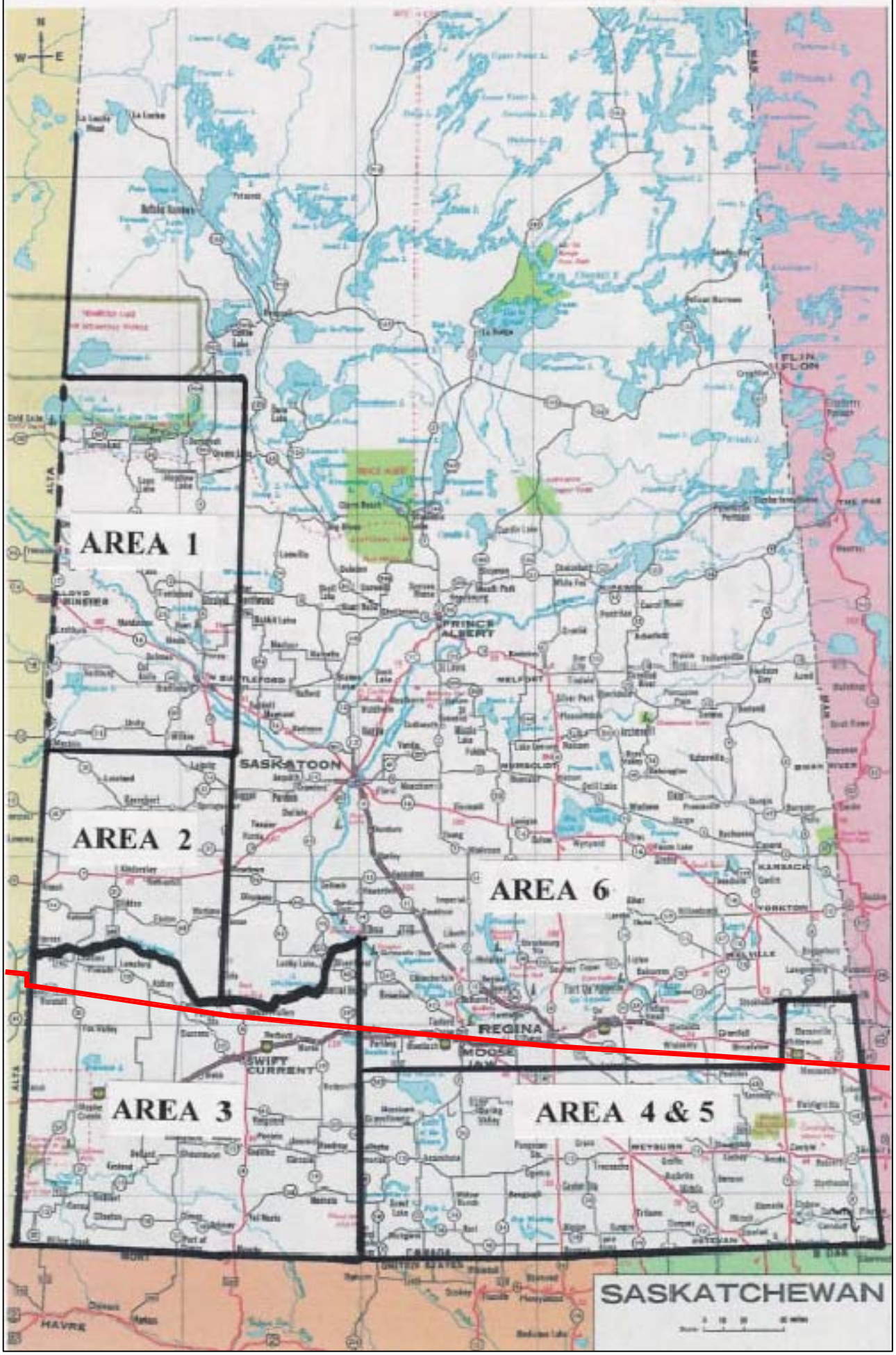
The company involved is (state name if known) or (state unknown).

Please "ACTIVATE" the Area 6 Emergency Response Co-op's "Call-Down Procedure".

SPECIAL INSTRUCTIONS: Please state if you are requesting assistance or this is for notification purposes only. Also if you require equipment, manpower or any special requests or instructions.

SASK. AREA SPILL CO-OPS BOUNDARIES

April 28, 2005



Oil Spill Cooperative Agreement

TransCanada Keystone Limited Partnership has agreed and intends to join the Oil Spill Cooperative organizations in all areas which its pipeline crosses. Currently, the pipeline is not in operation, therefore the contracts / agreements are not in place. When contracts / agreements are completed they will replace this page of this document and will be made available for inspection.

Saskatchewan Area 4&5 Oil Spill Cooperative

The Province of Saskatchewan is divided into 5 oil spill cooperative areas. The TransCanada Keystone Pipeline travels from west to east through a small area in the north-east corner of area 4&5. The cooperative is run by a steering committee with custodians who are responsible for storage and maintenance of the response equipment.

Through the preceding agreement TransCanada Keystone Pipeline system will have the ability to use the cooperatives equipment, if available, during an incident.

The equipment location, contact information and Saskatchewan area map are included in this document.

EQUIPMENT LOCATION	*DATE LAST REVISED: 08-Feb-26*
OIL SPILL CONTINGENCY AREA 4&5 FIRST RESPONSE FOR EQUIPMENT/TRAILER AND LOCATION	

OIL SPILL FIRST RESPONSE

Phone: **(306) 634-6277** to notify the Oil Spill Contingency that you will need the trailer and to make arrangements to pick up the trailer.

EQUIPMENT LOCATION

Oil spill equipment is stored in a 32 foot trailer.

TRAILER LOCATION

Redigo Construction Company Limited
44 Hwy 39 East
Estevan, Saskatchewan

DRIVER QUALIFICATION AND VEHICLE RATING REQUIREMENTS

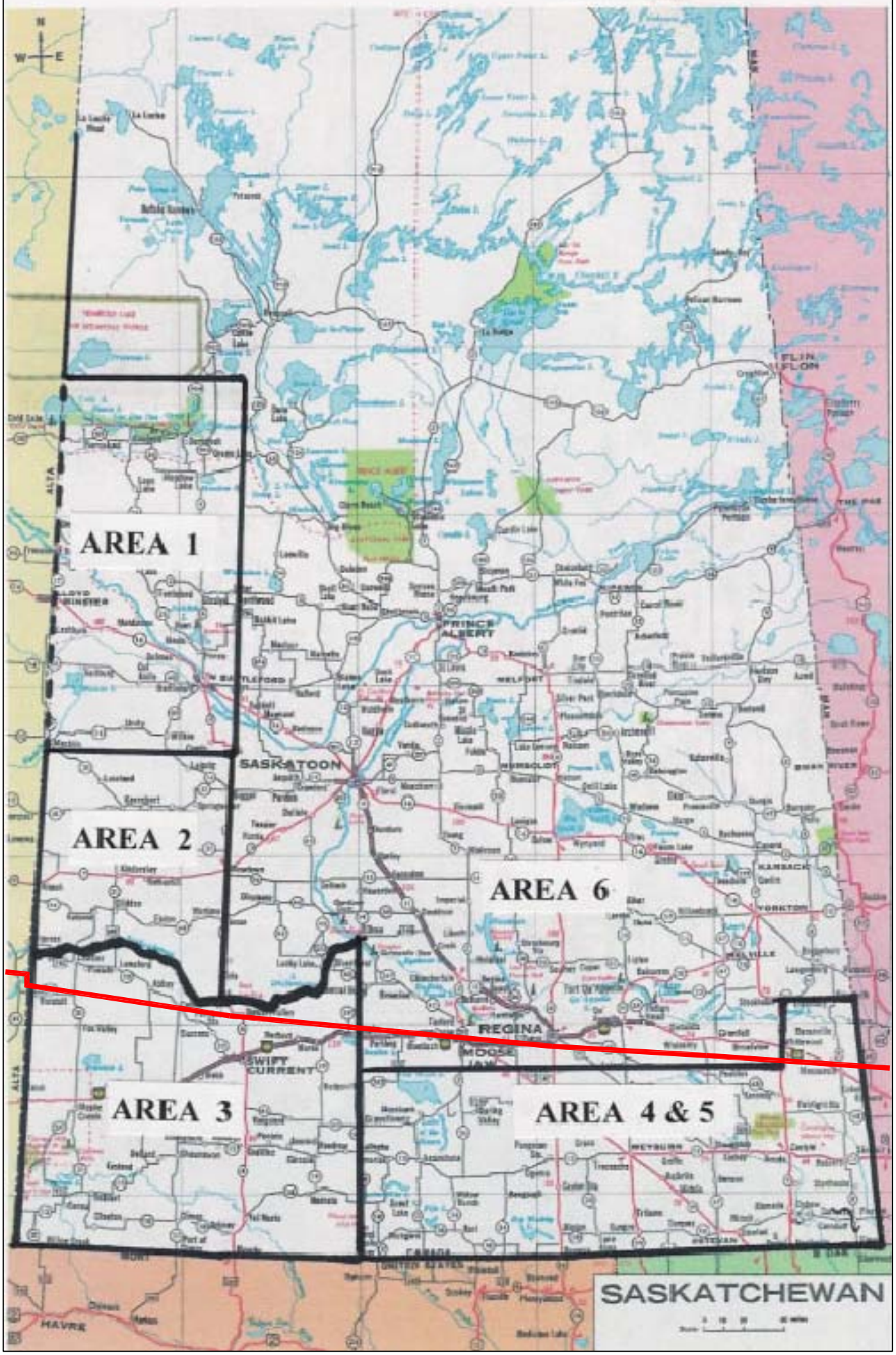
As the trailer is greater than 10,000 lb (actual weight approx. 13,000 lb), drivers must possess a minimum of a Class 1G license, as per SGI requirements. Also, vehicles must be rated accordingly. Below is a list of contractors with qualified drivers and vehicles. Any other contractors with qualified drivers and vehicles may also be used to mobilize and de-mobilize the trailer.

Murray Towing and Boosting Service, Estevan [redacted]
Carson Welding & Maintenance , Lampman - [redacted]
Jerry Mainil Limited, Weyburn- [redacted]

The ball for the hitch is located just inside the side door.

SASK. AREA SPILL CO-OPS BOUNDARIES

April 28, 2005



APPENDIX B

WORST CASE DISCHARGE ANALYSIS AND SCENARIOS

Introduction

Hardisty Pump Station/ Regina Pump Station

Worst Case Discharge
Planning Volume Calculations

Regina Pump Station / Haskett Pump Station

Worst Case Discharge
Planning Volume Calculations

North Dakota, South Dakota, Nebraska

Worst Case Discharge
Planning Volume Calculations

Kansas, Missouri, Illinois

Worst Case Discharge
Planning Volume Calculations

Cushing Extension

Worst Case Discharge
Planning Volume Calculations

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INTRODUCTION

This Appendix identifies potential causes for oil discharges and discusses the response efforts that are necessary for successful mitigation. Included in this Appendix are hypothetical scenarios for various types of spills that have the potential to occur along the system. It is anticipated that the Company will respond to spills in a consistent manner regardless of the location. Therefore, the guidelines discussed in this appendix will apply to all spills whenever possible.

United States Department of Transportation/Pipeline and Hazardous Materials Safety Administration Discharge Volume Calculation

- **Worst Case Discharge**

  The largest volume (Bbls) of the following:

  - *Pipeline's maximum release time (hrs), plus the maximum shutdown response time (hrs), multiplied by the maximum flow rate (bph), plus the largest line drainage volume after shutdown of the line section.*

  --***OR***--

  - *Largest foreseeable discharge for the line section is based on the maximum historic discharge, if one exists, adjusted for any subsequent corrective action or preventive action taken.*

  --***OR***--

  - *Capacity of the single largest breakout tank or battery of tanks within a single secondary containment system, adjusted for the capacity or size of the secondary containment system.*

Scenario Types

The occurrence of a Worst Case Discharge (WCD) could be the result of any number of scenarios along the pipeline system including:

- Piping rupture.
- Piping leak, under pressure and not under pressure.
- Explosion or fire.
- Equipment failure (e.g. pumping system failure, relief valve failure, or other general equipment relevant to operational activities associated with internal or external facility transfers).

The response actions to each of these scenarios are outlined in Section 3.1 and Figure 3.1. The response resources are identified in a quick reference format in Figure 2.5. Pipeline response personnel list/telephone numbers and other internal/external resources telephone numbers are detailed in Figures 2.2 and 2.5.

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RESPONSE CAPABILITY SCENARIOS

(Canada) **Hardisty Pump Station/ Regina Pump Station**

[redacted]

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[redacted]

©2012 O' Brien's Response Management Inc.

[redacted]

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(Canada) **Hardisty Pump Station/ Regina Pump Station**

RESPONSE PLANNING VOLUME CALCULATIONS

Location Data			
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
Discharge Volumes/Calculations			
[redacted]			[redacted]
Selected Calculation Factors (Based on USCG Tables)			
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
Response Planning Volume Calculation			
[redacted]			[redacted]
[redacted]			[redacted]
[redacted]			[redacted]
	Tier 1	Tier 2	Tier 3
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

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RESPONSE CAPABILITY SCENARIOS

(Canada) Regina Pump Station / Haskett Pump Station

[redacted]

©2012 O' Brien's Response Management Inc.

[redacted]

- [redacted]
- [redacted]

  [redacted]
- [redacted]
- [redacted]

©2012 O' Brien's Response Management Inc.

[redacted]

©2012 O' Brien's Response Management Inc.

(Canada) Regina Pump Station / Haskett Pump Station

RESPONSE PLANNING VOLUME CALCULATIONS

Location Data

[redacted]

Discharge Volumes/Calculations

[redacted]

Selected Calculation Factors (Based on USCG Tables)

[redacted]

Response Planning Volume Calculation

[redacted]

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RESPONSE CAPABILITY SCENARIOS

North Dakota, South Dakota, Nebraska

Pipeline Worst Case Discharge = [redacted]

Description

The pipeline-based Worst Case Discharge is projected as a scenario [redacted] feet downstream of [redacted]

Volume

Worst Case = (Initial Line Fill Volume - Pumping Rate Volume) x [redacted] = Barrels
= [redacted]

The Worst Case Discharge for this response zone was calculated electronically using elevation data, pipeline statistics, and designed operational levels. The first calculation completed was the volume released prior to the shutdown of the pipeline system. This volume is noted as "Pumping Rate Volume" and is equal to [redacted] barrels. Using the designed operational levels, the pumping rate volume is calculated by taking the pumping rate of [redacted] barrels per day and multiplying by the shutdown time of [redacted] minutes. The [redacted] minutes of shutdown time consists of [redacted] minutes of evaluation time, where the controllers decide that there is a problem and the line needs to be shut down, [redacted] minutes of pump station shutdown, which must be completed in a certain order to prevent damage to the system. To ensure that the volume is not underestimated, the [redacted] minutes of shutdown time is multiplied by the full pumping rate, [redacted] barrels per minute, even though, as pump stations are shut down the rate will decrease throughout the [redacted] minutes of shutdown.

The second calculated number is the amount of drain down. These calculations were done at [redacted] foot increments throughout the length of the pipeline. This drain down volume is calculated using electronic elevation data and assumes a complete break in the pipeline. The computer program used develops elevation profiles of the pipeline and provides the volume of a release at each [redacted] foot point taking into account the large elevation changes in the pipeline. The combination of the pumping rate volume and the drain down volume provides the "Initial Line Fill Volume".

In the Initial Line Fill Volume calculation the program only accounts for large elevation changes. In such, long flat portions that have smaller hills and valleys are calculated as draining fully, when common sense and subject matter studies, such as the California State Fire Marshall report of March 1993, have proven that these smaller elevation changes will prevent much of these areas from draining. Therefore, the worst case discharge has been calculated above reducing the line drainage component to 60% of the computer generated amount.

Response Requirement

The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These

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response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for non-high volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

Notes

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

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Breakout Tanks

There are no breakout tanks in the Response Zone.

Volume

If the Response Zone had breakout tank(s), a worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system.

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North Dakota, South Dakota, Nebraska

RESPONSE PLANNING VOLUME CALCULATIONS

Location Data			
Location Type			Inland/Near Shore
Port Type			Non-High Volume
WCD Product Type			Crude Oil
Product Group			3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)			[redacted]
Discharge Volumes/Calculations			
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)			[redacted]
Selected Calculation Factors (Based on USCG Tables)			
Removal Capacity Planning Volume - Percent Natural Dissipation			30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil			50%
Removal Capacity Planning Volume - Percent Oil Onshore			50%
Emulsification Factor			2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor			15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor			25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor			40%
Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			[redacted]
Shoreline Recovery Volume (bbls)			[redacted]
Shoreline Cleanup Volume (bbls)			[redacted]
	Tier 1	Tier 2	Tier 3
On-Water Recovery Cpcty (bbls/day)	[redacted]	[redacted]	[redacted]
Shallow Water Resp Cpblty (bbls/day)	[redacted]	[redacted]	[redacted]
Storage Capacity (bbls/day)	[redacted]	[redacted]	[redacted]
On-Water Response Caps (bbls/day)	12,500	25,000	50,000
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	12	36	60

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RESPONSE CAPABILITY SCENARIOS

Kansas, Missouri, Illinois

Pipeline Worst Case Discharge =

Description

The pipeline-based Worst Case Discharge is projected as a scenario [redacted] upstream of [redacted]

Volume

Worst Case = (Initial Line Fill Volume - Pumping Rate Volume) x [redacted] = Barrels
= [redacted]

The Worst Case Discharge for this response zone was calculated electronically using elevation data, pipeline statistics, and designed operational levels. The first calculation completed was the volume released prior to the shutdown of the pipeline system. This volume is noted as "Pumping Rate Volume" and is equal to [redacted] barrels. Using the designed operational levels, the pumping rate volume is calculated by taking the pumping rate of [redacted] barrels per day and multiplying by the shutdown time of [redacted] minutes. The [redacted] minutes of shutdown time consists of [redacted] minutes of evaluation time, where the controllers decide that there is a problem and the line needs to be shut down, [redacted] minutes of pump station shutdown, which must be completed in a certain order to prevent damage to the system. To ensure that the volume is not underestimated, the [redacted] minutes of shutdown time is multiplied by the full pumping rate, [redacted] barrels per minute, even though, as pump stations are shut down the rate will decrease throughout the [redacted] minutes of shutdown.

The second calculated number is the amount of drain down. These calculations were done at [redacted] foot increments throughout the length of the pipeline. This drain down volume is calculated using electronic elevation data and assumes a complete break in the pipeline. The computer program used develops elevation profiles of the pipeline and provides the volume of a release at each [redacted] foot point taking into account the large elevation changes in the pipeline. The combination of the pumping rate volume and the drain down volume provides the "Initial Line Fill Volume".

In the Initial Line Fill Volume calculation the program only accounts for large elevation changes. In such, long flat portions that have smaller hills and valleys are calculated as draining fully, when common sense and subject matter studies, such as the California State Fire Marshall report of March 1993, have proven that these smaller elevation changes will prevent much of these areas from draining. Therefore, the worst case discharge has been calculated above reducing the line drainage component to 60% of the computer generated amount.

Response Requirement

The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These

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response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for non-high volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

Notes

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

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Breakout Tanks

There are no breakout tanks in the Response Zone.

Volume

If the Response Zone had breakout tank(s), a worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system.

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Kansas, Missouri, Illinois

RESPONSE PLANNING VOLUME CALCULATIONS

Location Data			
Location Type			Inland/Near Shore
Port Type			High Volume
WCD Product Type			Crude Oil
Product Group			3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)			[redacted]
Discharge Volumes/Calculations			
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)			[redacted]
Selected Calculation Factors (Based on USCG Tables)			
Removal Capacity Planning Volume - Percent Natural Dissipation			30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil			50%
Removal Capacity Planning Volume - Percent Oil Onshore			50%
Emulsification Factor			2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor			15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor			25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor			40%
Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			[redacted]
Shoreline Recovery Volume (bbls)			[redacted]
Shoreline Cleanup Volume (bbls)			[redacted]
	Tier 1	Tier 2	Tier 3
On-Water Recovery Cpcty (bbls/day)	[redacted]	[redacted]	[redacted]
Shallow Water Resp Cpblty (bbls/day)	[redacted]	[redacted]	[redacted]
Storage Capacity (bbls/day)	[redacted]	[redacted]	[redacted]
On-Water Response Caps (bbls/day)	12,500	25,000	50,000
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	6	30	54

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RESPONSE CAPABILITY SCENARIOS

Cushing Extension

Pipeline Worst Case Discharge =

Description

The pipeline-based Worst Case Discharge is projected as a scenario [redacted] downstream of Station Steele City.

Volume

Worst Case = (Initial Line Fill Volume - Pumping Rate Volume) x [redacted] = Barrels
= [redacted]

The Worst Case Discharge for this response zone was calculated electronically using elevation data, pipeline statistics, and designed operational levels. The first calculation completed was the volume released prior to the shutdown of the pipeline system. This volume is noted as "Pumping Rate Volume" and is equal to [redacted] barrels. Using the designed operational levels, the pumping rate volume is calculated by taking the pumping rate of [redacted] barrels per day and multiplying by the shutdown time of [redacted] minutes. The [redacted] minutes of shutdown time consists of [redacted] minutes of evaluation time, where the controllers decide that there is a problem and the line needs to be shut down, [redacted] minutes of pump station shutdown, which must be completed in a certain order to prevent damage to the system. To ensure that the volume is not underestimated, the [redacted] minutes of shutdown time is multiplied by the full pumping rate, [redacted] barrels per minute, even though, as pump stations are shut down the rate will decrease throughout the [redacted] minutes of shutdown.

Response Requirement

The Company has identified sufficient response resources, by contract or other approved means, to respond to a Worst Case Discharge to the maximum extent practicable. These response resources include:

- Resources capable of arriving at the staging area within the applicable response tier requirements for non-high volume areas (Tier 1 = 12 hours; Tier 2 = 36 hours; Tier 3 = 60 hours).
- Resources capable of oil recovery in inclement weather conditions (i.e. heavy rain, snow, ice).

Notes

- Contracted and Company owned equipment and manpower resources are detailed in Figure 2.5 and Appendix A.
- Telephone references are provided in Figures 2.2 and 2.5.

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Breakout Tanks

There are no breakout tanks in the Response Zone.

Volume

If the Response Zone had breakout tank(s), a worst case discharge scenario involving breakout tankage uses the single largest volume tank in the response zone, adjusted for the size of the secondary containment system.

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Cushing Extension

RESPONSE PLANNING VOLUME CALCULATIONS

Location Data			
Location Type			Inland/Near Shore
Port Type			High Volume
WCD Product Type			Crude Oil
Product Group			3
Pipeline and Hazardous Materials Safety Administration WCD Volume (bbls)			[redacted]
Discharge Volumes/Calculations			
Worst Case Discharge - Based on Pipeline and Hazardous Materials Safety Administration criteria (bbls)			[redacted]
Selected Calculation Factors (Based on USCG Tables)			
Removal Capacity Planning Volume - Percent Natural Dissipation			30%
Removal Capacity Planning Volume - Percent Recovered Floating Oil			50%
Removal Capacity Planning Volume - Percent Oil Onshore			50%
Emulsification Factor			2
Tier 1 - On Water Oil Recovery Resource Mobilization Factor			15%
Tier 2 - On Water Oil Recovery Resource Mobilization Factor			25%
Tier 3 - On Water Oil Recovery Resource Mobilization Factor			40%
Response Planning Volume Calculation			
On-Water Recovery Volume (bbls)			[redacted]
Shoreline Recovery Volume (bbls)			[redacted]
Shoreline Cleanup Volume (bbls)			[redacted]
	Tier 1	Tier 2	Tier 3
On-Water Recovery Cpcty (bbls/day)	[redacted]	[redacted]	[redacted]
Shallow Water Resp Cpblty (bbls/day)	[redacted]	[redacted]	[redacted]
Storage Capacity (bbls/day)	[redacted]	[redacted]	[redacted]
On-Water Response Caps (bbls/day)	12,500	25,000	50,000
Additional Response Req'd (bbls/day)	0	0	0
Response Time (hrs)	6	30	54

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APPENDIX C

EMERGENCY PRE-PLANNING

C.1 Release Detection

C. 2 Leak Detection Systems

C. 3 Discharge Prevention Systems

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EMERGENCY PRE-PLANNING

Leak detection and discharge prevention is accomplished through safe operating procedures and maintenance procedures outlined in the Company Operations and Maintenance (O&M) Manual. The Company Operations and Maintenance Manual is designed to meet the requirements found in Statutory Orders and Regulations /99-294 S27, National Energy Board, Operation and Maintenance Manuals, and Title 49, US Code of Federal Regulations, Part 195, Transportation of Hazardous Liquids by Pipeline.

C.1 RELEASE DETECTION

- The Keystone Console and Company Field Employees are responsible for ensuring the integrity of facilities and detecting releases.

- There are four primary types of indications that a release may be occurring:

  - An unexplained hydraulic upset condition observed in the Pipeline system operating data.
  - A consistent unexplainable Pipeline system shortage occurring over several check time periods.
  - An alarm from a Supervisory Control and Data Acquisition-based leak detection system.
  - A report of a direct observation of a release or released product received from an employee or the public.

- All indications, including supposedly direct observation, are subject to confirmation; however, the Company policy is to shut down if any doubt exists as to the integrity of the Pipeline system. The simultaneous occurrence of two or more of the indicators above greatly increases the probability that the Pipeline system has lost integrity.

- Specific guidance for response to abnormal operating conditions and determining the location of a suspected pipeline release may be found in the Company's Operations and Maintenance Manual, maintained separately.

- A form for recording conversations with an observer who reports an emergency is located in Appendix F of this Plan. Copies of this form should be kept readily accessible at telephones.

- Routine actions to be taken by Company Field Employees to ensure facility integrity and detect releases are listed as follows:

  - Keystone Console Monitors Pressures using Supervisory Control and Data Acquisition
  - Routine Station/ROW Checks Performed
  - Routine Aerial Surveillance
  - 24 Hour Emergency Reporting Phone Number Monitored

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C.2 LEAK DETECTION SYSTEMS

Leak detection systems utilized along the Pipeline include:

- System-level indication is accomplished through usage of a Supervisory Control and Data Acquisition (SCADA) system. This system is capable of monitoring flow rates, pressure, metering information (delivery / receipt volumes), temperature, and valve positions. The Supervisory Control and Data Acquisition system is monitored on a 24-hour per day basis by both the centralized Pipeline Control Center and Secondary Control points.

The location of a spill caused by a catastrophic break, which may be indicative of a Worst Case Discharge, can be inferred by Supervisory Control and Data Acquisition personnel down to a Pipeline section between operating pump stations. This inference is based upon rapid and abrupt changes in operating conditions.

C.3 DISCHARGE PREVENTION SYSTEMS

Pipeline pump stations are designed in a manner that maximizes the containment of leaks on-site and deters the migration of leaks off-site. Discharge prevention is accomplished through the following measures:

- Pipelines and related structures have grounding systems to reduce the possibility of accidental ignition due to lightning.

- Discharge prevention is also accomplished through the use of general housekeeping procedures and leak inspection system.

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APPENDIX D

TRAINING AND DRILLS

D.1 Response Team Training

Emergency Response Plan Review
Hazardous Waste Operations and Emergency Response (29 CFR 1910.120)
Incident Command System
Training Records Maintenance
Contractor Training
Training Qualifications

D. 2 Response Team Exercises

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Annual Response Team Tabletop Exercise
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Area Exercises
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Notification
Assessment/Evaluation
Mobilization
Response - Strategy
Response - Resources Used
Response - Effectiveness
Command Structure
Measurement
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Public Relations

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D.1 RESPONSE TEAM TRAINING

The Company provides training related to discharge prevention, testing and response, including measures to repair Pipeline ruptures and mitigate discharges. The training methods address oil discharges from the Pipeline from several perspectives: human health and safety, rupture control and repair operations, pollution control, and overall (crisis) management of the emergency.

The competency of each training program is closely monitored by the Training Section through observation of and/or participation in actual training sessions.

Through the various training methods described below the Company's training program is intended to ensure the following results:

That all personnel know:

- Their responsibilities under the Plan.
- The name, address and procedures for contacting the operator on a 24-hour basis.
- The name of and procedures for contacting the Qualified Individual on a 24-hour basis.

That all reporting personnel know:

- The Pipelines and Response Zone details for the affected area (Response Zones Annexes).
- The telephone number of the Federal Provincial/State and local agencies and other required notifications (Section 2.0).
- The notification process. (Section 2.0).

That all response personnel know:

- The characteristics and hazards of the oil discharged (Section 3.0 and Appendix G - MSDS).
- The conditions that is likely to worsen emergencies, including the consequences of pipeline malfunctions, and the appropriate corrective actions.
- The steps necessary to control any accidental discharge of oil and to minimize the potential for fire, explosion, toxicity or environmental damage (Section 3.0).
- The proper firefighting procedures and use of equipment, fire suits, and breathing apparatus (Section 3.0). Only trained persons will be utilized. Company personnel are only trained on the use of handheld Ansul 30# fire extinguisher units for small incipient fires.

Emergency Response Plan Review

All Response Team Members should review their Emergency Response Plan whenever their job position or responsibilities change under the Plan. A copy of this Plan will be available at all times to Team Members.

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HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (29 CFR 1910.120)

Federal and State regulations require that Response Team Members maintain up-to-date Hazardous Waste Operations and Emergency Response training necessary to function in their assigned positions. At a minimum, team members will receive "First Responder Awareness Level" training. All personnel responding to an incident must satisfy the applicable Hazardous Waste Operations and Emergency Response training requirements of 29 CFR 1910.120.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE TRAINING REQUIREMENTS		
Responder Classification	**Required Training Hours**	**Refresher**
29CFR 1910.120(q) Emergency Response		
First Responder - Awareness Level	2-4 hrs demonstration of competency	same
First Responder - Operations Level	8 hrs	8 hrs
Hazardous Materials Technician	24 hrs plus competency	8 hrs
Hazardous Materials Specialist	24 hrs plus competency in specialized areas	8 hrs
Incident Commander	24 hrs plus competency	8 hrs
29CFR 1910.120(e) Clean Up Sites		
General Site Workers	40 hrs / 3 days on the job training	8 hrs
Occasional Workers (Limited Tasks)	24 hrs / 1 day on the job training	8 hrs
General Site Workers (Low Hazard)	24 hrs / 1 day on the job training	8 hrs
Supervisors	8 hrs supervisor training	8 hrs
* Previous work experience and/or training certified as equivalent by employer.		

Incident Command System

Response Team Members will receive Incident Command System training and may also receive supplemental training in other related general topics.

Training Records Maintenance

Emergency response training records are maintained at the Company's office. Training records for response personnel will be maintained for as long as personnel have duties in this Emergency Response Plan.

Contractor Training

The Company also recognizes that contract personnel must also have sufficient training to respond emergency response situations. The Company communicates this training need to its key contractors during contract negotiations and often specifically spells out this requirement in its contracts. The Company also tends to use well-known spill response contractors whose reputation and experience levels help ensure personnel who respond will be trained to appropriate levels.

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Training Qualifications

As no formalized method of certifying training instructors has been provided by Occupational Safety and Health Administration, the Company ensures the competency of its instructors and training organizations by selecting trainers and/or organizations with professional reputations and extensive hands-on and classroom experience in their subject matter. The Company personnel with responsibility to coordinate the training program also conduct periodic informal audits of training courses selected for the Company training program to ensure their suitability for the program.

D.2 RESPONSE TEAM EXERCISES

Spill Management Team members, government agencies, contractors, and other resources must participate in response exercises required by Federal, State, or local regulations and as detailed in the "National Preparedness for Response Exercise Program (PREP) Guidelines." The Company (through the Community, Safety and Environment Department) will conduct announced drills to maintain compliance, and each plan-holder must participate in at least one exercise annually. The following table lists the triennial exercise cycle for facilities (see National Preparedness for Response Exercise Program Guidelines for full details).

TRIENNIAL CYCLE		
Total Number	**Frequency**	**Exercise Type/Description**
12	Quarterly	Qualified Individual Notification Exercise
3	Annually	Equipment Deployment Exercise *(Facility-owned equipment)*
3	Annual	Response Team Tabletop Exercise
3	Annual	Equipment Deployment Exercise *(facilities with Oil Spill Removal Organization-owned equipment)*
3	3 per Triennial Cycle	Unannounced Exercise *(not a separate exercise)* Actual response can be considered as an unannounced exercise. Credit can also be given for unannounced equipment deployment and Response Team tabletop exercises.
NOTES: 1) All Emergency Response Plan components must be exercised at least once in the Cycle.		

Quarterly QI Notification Exercise

- **Scope:** Exercise communication between Pipeline personnel and the Qualified Individual(s) and/or designated alternate(s). At least once each year, one of the notification exercises should be conducted during non-business hours.

- **Objective:** Contact must be made with a Qualified Individual or designated alternate, as identified in the Plan.

- **General:** All personnel receiving notification shall respond to the notification and verify their receipt of the notification. Personnel who do not respond should be contacted to determine whether or not they received the notification.

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Annual Equipment Deployment Exercise (for operator and/or Oil Spill Removal Organization equipment)

- **Scope:** Demonstrate ability to deploy spill response equipment identified in the Emergency Response Plan.

  May consist entirely of operator owned equipment, or a combination of OSRO and operator equipment.
  The number of equipment deployment exercises conducted should be such that equipment and personnel assigned to each Response Zone are exercised at least one a year. If the same personnel and equipment respond to multiple zones, they need only exercise once per year. If different personnel and equipment response to various Response Zones, each must participate in an annual equipment deployment exercise.

- **Objective:** Demonstrate personnel's ability to deploy and operate response equipment. Ensure that the response equipment is in proper working order.

- **General:** The Facility may take credit for actual equipment deployment to a spill, or for training sessions, as long as the activities are properly documented.

Annual Response Team Tabletop Exercise

- **Scope:** Exercise the response team's organization, communication, and decision- making in managing a spill response. Each team identified within the Plan must conduct an annual Response Team Tabletop Exercise.

- **Objective:** Exercise the response team in a review of the following:

  Knowledge of the Plan.
  Proper notifications.
  Communications system.
  Ability to access an OSRO.
  Coordination of internal spill response personnel.
  Review of the transition from a initial team to a regional team.
  Ability to effectively coordinate response activity with the National Response System (NRS) Infrastructure.
  Ability to access information in the Area Contingency Plan.

- **General:** A minimum of one Response Team Tabletop Exercise in a triennial cycle will involve a Worst Case Discharge scenario.

Government-Initiated Unannounced Exercise

- **Scope:** Demonstrate ability to respond to a Worst Case Discharge spill event.

- **Objectives:** Designated Emergency Response Team Members should demonstrate adequate knowledge of their Emergency Response Plan and the ability to organize, communicate, coordinate, and respond in accordance with that Plan.

- **General:** Annually, the Pipeline and Hazardous Materials Safety Administration may conduct up to 20 unannounced exercises throughout the U.S. for the pipeline industry as a whole. A single owner or operator will not be required to participate in a PHMSA-initiated unannounced exercise if they have already participated in one within the previous 36 months.

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Area Exercises

- **Objective:** The purpose of the area exercise is to exercise the entire response community in a particular area. An area is defined as ?that geographic area for which a separate and distinct Area Contingency Plan has been prepared, as described in Oil Pollution Act 90.? The response community includes the Federal, State, and local government and industry. The area exercises are designed to exercise the government and industry interface for spill response.

- **General:** The goal is to ensure that all areas of the country are exercised triennially. All of the area exercises will be developed by an exercise design team. The exercise design team is comprised of representatives from the Federal, State, and local government and industry. A lead plan holder would lead each area exercise. The lead plan holder is the organization (government or industry) that holds the primary plan that is exercised in the area exercise. The lead plan holder would have the final word on designing the scope and scenario of the exercise.

Exercise Documentation

- All exercises should be documented and maintained at the Company office; documentation should specify:

  The type of exercise;
  Date and time of the exercise;
  A description of the exercise;
  The objectives met in the exercise;
  The components of the response plan exercised; and
  Lessons learned.

- Exercise documentation should be kept on file for the required length of time depending on the regulating agency (three (3) years for the U.S. Coast Guard and five (5) years for the Pipeline and Hazardous Materials Safety Administration and the U.S. Environmental Protection Agency).

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D.3 PURPOSE OF REVIEW AND EVALUATION

This Section provides procedures and information useful to responders for post incident/exercise review and evaluation. Post incident/exercise reviews should be conducted in a timely manner following an incident/exercise. The Plan should be evaluated to determine its usefulness during the incident/exercise and appropriate revisions should be made. All incident/exercise documentation should be included in the Plan evaluation process.

Outline of Review

Given below are items a team composed of outside people knowledgeable in spill response and key members of the response teams should examine. These questions are intended as guidelines only; many other questions are likely to be appropriate at each stage of a critique.

- ***Detection***

  Was the spill detected promptly?
  How was it detected? By whom?
  Could it have been detected earlier? How?
  Are any instruments or procedures available to consider which might aid in spill detection?

- ***Notification***

  Were proper procedures followed in notifying government agencies? Were notifications prompt?
  Was management notified promptly/response appropriate?
  Was the Pipeline owner/operator notified promptly? If so, why, how, and who? If not, why not?

- ***Assessment/Evaluation***

  Was the magnitude of the problem assessed correctly at the start?
  What means were used for this assessment?
  Are any guides or aids needed to assist spill evaluation?
  What sources of information were available on winds and on water currents?
  Is our information adequate?
  Was this information useful (and used) for spill trajectory forecasts? Were such forecasts realistic?
  Do we have adequate information on product properties?
  Do we need additional information on changes of product properties with time, i.e., as a result of weathering and other processes?

- ***Mobilization***

  What steps were taken to mobilize spill countermeasures?
  What resources were used?
  Was mobilization prompt?
  Could it have been speeded up or should it have been?
  What about mobilization of manpower resources?
  Was the local spill cooperative used appropriately?
  How could this be improved?
  Was it appropriate to mobilize the Pipeline owner/operator resources and was this promptly initiated?
  What other resources are available and have they been identified and used adequately?

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- ***Response - Strategy***

  Is there an adequate Spill Response Plan for the location?
  Is it flexible enough to cope with unexpected spill events?
  Does the Plan include clear understanding of local environmental sensitivities?
  What was the initial strategy for response to this spill?
  Is this strategy defined in the Spill Plan?
  How did the strategy evolve and change during this spill and how were these changes implemented?
  What caused such changes?
  Are there improvements needed? More training?

- ***Response - Resources Used***

  What resources were mobilized?
  How were they mobilized?
  How did resource utilization change with time? Why?
  Were resources used effectively?

  - Contractors
  - Government agencies
  - Company resources
  - Cooperatives
  - Volunteers
  - Consultants
  - Other (e.g., bird rescue centers)

  What changes would have been useful?
  Do we have adequate knowledge of resource availability?
  Do we have adequate knowledge of waste disposal capabilities?

- ***Response - Effectiveness***

  Was containment effective and prompt?
  How could it have been improved?
  Should the location or the local cooperative have additional resources for containment?
  Was recovery effective and prompt?
  How could it have been improved?
  Should the location or the local cooperative have additional resources for recovery of spilled product?
  Was contaminated equipment disposed promptly and safely?
  Was there adequate in-house product separation, recovery, and disposal?
  How could it have been improved?
  Was there adequate outside disposal resources available?

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- ***Command Structure***

  Who was initially in charge of spill response?
  What sort of organization was initially set up?
  How did this change with time? Why?
  What changes would have been useful?
  Was there adequate surveillance?
  Should there be any changes?
  Were communications adequate?
  What improvements are needed? Hardware, procedures, etc.
  Was support from financial services adequate? Prompt?
  Should there be any changes?
  Is more planning needed?
  Should financial procedures be developed to handle such incidents?

- ***Measurement***

  Was there adequate measurement or estimation of the volume of product spilled?
  Was there adequate measurement or estimation of the volume of product recovered?
  Was there adequate measurement or estimation of the volume of product disposed?
  Should better measurement procedures be developed for either phase of operations?
  If so, what would be appropriate and acceptable?

- ***Government Relations***

  What are the roles and effects of the various government agencies which were involved?
  Was there a single focal point among the government agencies for contact?
  Should there have been better focus of communications to the agencies?
  Were government agencies adequately informed at all stages?
  Were too many agencies involved?
  Are any changes needed in procedures to manage government relations?
  Examples of affected U.S. agencies (there may be others):

  - U.S. Coast Guard
  - Environmental Protection Agency
  - National Oceanic and Atmospheric Administration
  - Dept of Fish and Wildlife
  - State Parks
  - Harbors and Marinas
  - States
  - Cities
  - Counties

  Was there adequate agreement with the government agencies on disposal methods?
  Was there adequate agreement with the government agencies on criteria for cleanup?
  How was this agreement developed?
  Were we too agreeable with the agencies in accepting their requests for specific action items (e.g., degree of cleanup)?
  Should there be advance planning of criteria for cleanup, aimed at specific local environmentally sensitive areas? (Such criteria should probably also be designed for different types of product.)

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- ***Public Relations***

  How were relations with the media handled?
  What problems were encountered?
  Are improvements needed?
  How could public outcry have been reduced? Was it serious?
  Would it be useful to undertake a public information effort to "educate" reporters about product and effects to it if spilled?
  These areas should be investigated shortly after the incident to assure that actions taken are fresh in peoples' minds.

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Appendix C –
Construction, Mitigation, and Reclamation Plan

APPENDIX G

Construction, Mitigation, and Reclamation Plan

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KEYSTONE XL PROJECT

CONSTRUCTION, MITIGATION, AND RECLAMATION PLAN

April 2012
Rev. 4

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1.0 INTRODUCTION

The construction, mitigation, and reclamation requirements described in this Plan apply to work on all of TransCanada Keystone Pipeline, L.P.'s (Keystone's) Keystone XL Project (Project) lands, including the following;

- uplands, including agricultural (cultivated or capable of being cultivated) lands, pasture lands; range lands; grass lands; forested lands; lands in residential, commercial, or industrial areas; lands in public rights of way; and lands in private rights-of-way;
- wetlands; and
- waterbodies and riparian areas.

Keystone, during the construction, operation, and maintenance of the Project, shall implement the construction, mitigation, and reclamation actions contained in this Plan to the extent that they do not conflict with the requirements of any applicable federal, state, or local rules and regulations, or other permits or approvals that are applicable to the Project. Additionally, Keystone may deviate from specific requirements of this Plan on specific private lands as agreed to by landowners or as required to suit actual site conditions as determined and directed by Keystone. All work must be in compliance with federal, state, and local permits.

The Project will be designed, constructed, operated and maintained in a manner that meets or exceeds applicable industry standards and regulatory requirements. Keystone's Integrity Management Plan and Emergency Response Plan outlines the preventative maintenance, inspection, line patrol, leak detection systems, SCADA, and other pipeline integrity management procedures to be implemented during operation of the Project.

2.0 GENERAL CONDITIONS

2.1 Training

Experienced, well-trained personnel are essential for the successful implementation of this Plan. Keystone and its Contractors shall undergo prevention and response, as well as safety training. The program shall be designed to improve awareness of safety requirements, pollution control laws and procedures, and proper operation and maintenance of equipment.

The construction contractor (Contractor), and all of his subcontractors shall ensure that persons engaged in Project construction are informed of the construction issues and concerns and that they attend and receive training regarding these requirements as well as all laws, rules and regulations applicable to the work. Prior to construction, all Project personnel will be trained on environmental permit requirements and environmental specifications, including fuel handling and storage, cultural resource protection methods, stream and wetland crossing requirements, and sensitive species protection measures.

Different levels of training shall be required for different groups of Contractor personnel. Contractor supervisors, managers, field foremen, and other Contractor personnel designated by Keystone shall attend a comprehensive environmental training session. All other Contractor personnel shall attend a training session before the beginning of construction and during construction as environmental issues and incidents warrant. Additional training sessions shall be held for newly assigned personnel prior to commencing work on the Project.

All Contractor personnel shall attend the training session prior to entering the construction right-of-way. All Contractor personnel shall sign an acknowledgement of having attended the appropriate level of training and shall display a hard hat sticker that signifies attendance at environmental training. In order to ensure successful compliance, Contractor personnel shall attend repeat or supplemental training if compliance is not satisfactory or as new, significant new issues arise.

All visitors and any other personnel without specific work assignments shall be required to attend a safety and environmental awareness orientation.

2.2 Environmental Inspection

Keystone will use Environmental Inspectors on each construction spread. The Environmental Inspectors will review the Project activities daily for compliance with state, federal and local regulatory requirements. The Environmental Inspectors will have the authority to stop specific tasks as approved by the Chief Inspector. They can also order corrective action in the event that construction activities violate the provisions of this Plan, landowner requirements, or any applicable permit requirements.

2.3 Advance Notice of Access to Property Prior to Construction

Prior to initially accessing landowners' property, Keystone shall provide the landowner or tenant with a minimum of 24 hours prior notice unless otherwise negotiated with the landowner and as described in the Project line list). Additionally, the landowner or tenant shall be provided with Keystone contact information. Landowners may utilize contact information to inform Keystone of any concerns related to construction.

Prior notice shall consist of a personal contact, a telephone contact, or delivery of written notice to the landowner to inform the landowner of whereby the landowner or tenant is informed of Keystone's intent to initially access the land. The landowner or tenant need not acknowledge receipt of written notice before Keystone can enter the landowner's property.

Keystone will coordinate with managers of public lands to reduce conflicts between construction activities and recreational uses. Keystone will consult with land managers on state and federal lands regarding any necessary construction and maintenance restrictions consistent with management and use of such lands. Damages from disruption of recreational uses of private lands will be the subject of compensation negotiations with individual landowners.

If pipeline activities occur during the winter season Keystone will consult with the appropriate regulatory agencies to establish the appropriate protective measures to avoid or mitigate wildlife seasonal, timing or migration concerns.

2.4 Other Notifications

The Contractor shall notify, in writing, both Keystone and the authority having jurisdiction over any road, railroad, canal, drainage ditch, river, foreign pipeline, or other utility to be crossed by the pipeline at least 48 hours (excluding Saturdays, Sundays, and statutory holidays), or as specified on the applicable permit(s), prior to commencement of pipeline construction, in order that the said authority may appoint an inspector to ensure that the crossing is constructed in a satisfactory manner.

The Contractor shall notify Keystone immediately of any spill of a potentially hazardous substance that creates a sheen on a wetland or waterbody, as well as any existing soil contamination discovered during construction.

The Contractor shall immediately notify Keystone of the discovery of previously unreported historic property, other significant cultural materials, or suspected human remains uncovered during pipeline construction.

The Contractor shall immediately notify Keystone of a Project-related injury to or mortality of a threatened or endangered animal.

2.5 Damages to Private Property

Pipeline construction activities shall be confined to the construction right-of-way, temporary work space, additional temporary work space, and approved access routes.

Keystone shall reasonably compensate landowners for any construction-related damages caused by Keystone which occur on or off of the established pipeline construction right-of-way.

Keystone shall reasonably compensate landowners for damages to private property caused by Keystone beyond the initial construction and reclamation of the pipeline, to include those damages caused by Keystone during future construction, operation, maintenance, and repairs relating to the pipeline.

2.6 Appearance of Worksite

The construction right-of-way shall be maintained in a clean, neat condition at all times. At no time shall litter be allowed to accumulate at any location on the construction right-of-way. The Contractor shall provide a daily garbage detail with each major construction crew to keep the construction right-of-way clear of trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, defective materials and all construction and other debris immediately behind construction operations unless otherwise approved by Keystone. Paper from wrapping or coating products or lightweight items shall not be permitted to be scattered by the wind.

The traveled surfaces of roads, streets, highways, etc. (and railroads when applicable) shall be cleaned free of mud, dirt, or any debris deposited by equipment traversing these roads or exiting from the construction right-of-way.

2.7 Access

Prior to the pipeline's installation, Keystone and the landowner shall reach a mutually acceptable agreement on the route that shall be utilized by the Contractor for entering and exiting the pipeline construction right-of-way should access to the construction right-of-way not be practicable or feasible from adjacent segments of the pipeline construction right-of-way, public road, or railroad right-of-way.

All construction vehicles and equipment traffic shall be confined to the public roads, private roads acquired for use by Keystone, and the construction right-of-way. If temporary private access roads are constructed, they shall be designed to maintain proper drainage and shall be built to minimize soil erosion.

Sufficiently sized gaps shall be left in all spoil and topsoil wind rows and a hard or soft plug shall be left in the trench at all temporary private access roads and obvious livestock or wildlife trails unless the landowner agrees prior to construction that these access points can be blocked during construction.

All construction-related private roads and access points to the right-of-way shall be marked with signs. Any private roads not to be utilized during construction shall also be marked.

2.8 Aboveground Facilities

Locations for aboveground facilities shall be selected in a manner so as to be as unobtrusive as reasonably possible to ongoing agricultural or other landowner activities occurring on the lands adjacent to the facilities. If it is not feasible, to avoid interference, such activities shall be located so as to incur the least hindrance to the adjacent agricultural operations (i.e., located in field corners or areas where at least one side is not used for cropping purposes) provided the location is consistent with the design constraints of the pipeline. Aboveground facilities shall avoid floodplains and wetlands to the maximum extent possible. Additionally, they shall be located to avoid existing drain tile systems to the extent possible. To further reduce visual impacts from aboveground pipeline facilities and structures, Keystone will comply with standard industry painting practices with respect to aboveground facilities. Keystone will address any visual aesthetics issues with landowners in individual consultations.

2.9 Minimum Depth of Cover

The pipeline shall be installed so that the top of the pipe and coating is a minimum depth of 5 feet below the bottom of waterbodies including rivers, creeks, streams, ditches, and drains. This depth shall normally be maintained

over a distance of 15 feet on each side of the waterbody measured from the top of the defined stream channel. If concrete weights or concrete coated pipe is utilized for negative buoyancy of the pipeline, the minimum depth of cover shall be measured from the top of the concrete to the original ground contour. The following table indicates standard depths that would apply to pipeline construction.

Location	Normal Excavation (inches)	For Rock Excavation (inches
Most areas	48	36
All waterbodies	60	36
Dry creeks, ditches, drains, washes, gullies, etc.	60	36
Drainage ditches at public roads and railroads	60	48

Depth of cover requirements may be modified by Keystone based on site-specific conditions. However, all depths shall be in compliance with all established codes.

2.10 Non-Hazardous Waste Disposal

Non-hazardous pipeline construction wastes include human waste, trash, pipe banding and spacers, waste from coating products, welding rods, timber skids, cleared vegetation, stumps, and rock.

All waste which contains (or at any time contained) oil, grease, solvents, or other petroleum products falls within the scope of the oil and hazardous substances control, cleanup, and disposal procedures. This material shall be segregated for handling and disposal as hazardous wastes.

The Contractor shall be responsible for ensuring that human wastes are handled and disposed of exclusively by means of portable, self-contained toilets during all construction operations. Wastes from these units shall be collected by a licensed contractor for disposal only at licensed and approved facilities.

The Contractor shall remove all trash from the construction right-of-way on a daily basis unless otherwise approved or directed by Keystone.

The Contractor shall dispose of HDD drill cuttings and drilling mud at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone, or hauling to an approved licensed landfill or other site approved by Keystone.

The Contractor shall remove all extraneous vegetative, rock, and other natural debris from the construction right-of-way by the completion of cleanup

The Contractor shall remove all trash and wastes from Contractor yards, and Pipe Stockpipe Sites, and staging areas when work is completed at each location.

The Contractor shall dispose of all waste materials at licensed waste disposal facilities. Wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

2.11 Hazardous Wastes

The Contractor shall ensure that all hazardous and potentially hazardous materials are transported, stored, and handled in accordance with all applicable legislation. Workers exposed to or required to handle dangerous materials shall be trained in accordance with the applicable regulator and the manufacturer's recommendations.

The Contractor shall dispose of all hazardous materials at licensed waste disposal facilities. Hazardous wastes shall not be disposed of in any other fashion such as un-permitted burying or burning.

All transporters of oil, hazardous substances, and hazardous wastes shall be licensed and certified according to the applicable state vehicle code. Incidents on public highways shall be reported to the appropriate agencies.

All hazardous wastes being transported off-site shall be manifested. The manifest shall conform to requirements of the appropriate state agency. The transporter shall be licensed and certified to handle hazardous wastes on the public highways. The vehicles as well as the drivers must conform to all applicable vehicle codes for transporting hazardous wastes. The manifest shall conform to 49 CFR Parts 172.101, 172.202, and 172.203.

If toxic or hazardous waste materials or containers are encountered during construction, the Contractor shall stop work immediately to prevent disturbing or further disturbing the waste material and shall immediately notify Keystone. The Contractor shall not restart work until clearance is granted by Keystone.

2.12 Noise Control

The Contractor shall minimize noise during non-daylight hours and within 1 mile of residences or other noise-sensitive areas such as hospitals, motels or campgrounds. Keystone shall abide by all applicable noise regulations regarding noise near residential and commercial/industrial areas. The Contractor shall provide notice to Keystone if noise levels are expected to exceed bylaws for a short duration. Keystone will give advanced notice to landowners within 500 feet of right-of-way prior to construction, limit the hours during which construction activities with high-decibel noise levels are conducted, coordinate work schedules, and ensure that construction proceeds quickly through such areas. The Contractor shall minimize noise in the immediate vicinity of herds of livestock or poultry operations, which are particularly sensitive to noise.

Keystone will set up a toll-free telephone line for landowners to report any construction noise-related issues.

2.13 Weed Control

Keystone will prepare a weed management plan for each state crossed by the project, as required. In general, these plans will consider the following measures listed below.

Prior to mobilization for the Project, the Contractor shall thoroughly clean all construction equipment, including timber mats, prior to moving the equipment to the job site to limit the potential for the spread of noxious weeds, insects and soil-borne pests. The Contractor shall clean the equipment with high-pressure washing equipment.

Prior to construction, Keystone will mark all areas of the right-of-way which contain infestations of noxious, invasive species or soil-borne pests. Such marking will clearly indicate the limits of the infestation along the right-of-way. During construction, the Contractor shall clean the tracks, tires, and blades of equipment by hand (track shovel) or compressed air to remove excess soil prior to movement of equipment out of weed or soil-borne pest infested areas, or utilize cleaning stations to remove vegetative materials using water under high pressure (see detail Drawings 30 and 31).

In areas of isolated weed populations, the Contractor shall strip topsoil from the full width of the construction right-of-way and store the topsoil separately from other topsoil and subsoil. The Environmental Inspectors will identify these locations in the field prior to grading activities.

The Contractor shall use mulch and straw or hay bales that are free of noxious weeds for temporary erosion and sediment control.

The Contractor shall implement pre-construction treatments such as mowing prior to seed development or herbicide application to areas of noxious weed infestation prior to other clearing, grading, trenching, or other soil disturbing work at locations identified in the construction drawings.

Keystone will implement Best Management Practices (BMPs) for conducting vegetation control where necessary before and after construction. Typical agricultural herbicides, developed in consultation with county or state regulatory agencies, will be used. Herbicide types will be determined based on the weed species requiring control. The Contractor shall apply herbicides, where required, within one week, or as deemed necessary for optimum mortality success, prior to disturbing the area by clearing, grading, trenching, or other soil disturbing work. Herbicides shall be applied by applicators appropriately licensed or certified by the state in which the work is conducted. All herbicides applied prior to construction shall be non-residual or shall have a significant residual effect no longer than 30 days. Herbicides applied during construction shall be non-residual. Keystone will implement BMPs in the use of pesticides and herbicides along the pipeline corridor to reduce potential impacts to avian and wildlife species.

The Contractor shall not use herbicides in or within 100 feet of a wetland or waterbody.

After pipeline construction, on any construction right-of-way over which Keystone will retain control over the surface use of the land after construction (i.e., valve sites, metering stations, pump stations, etc.), Keystone shall provide for weed control to limit the potential for the spread of weeds onto adjacent lands used for agricultural purposes. Any weed control spraying performed by Keystone shall be done by a state-licensed pesticide applicator.

Keystone shall be responsible for reimbursing all reasonable costs incurred by owners of land adjacent to aboveground facilities when the landowners must control weeds on their land which can be reasonably determined to have spread from land occupied by Keystone's aboveground facilities.

2.14 Dust Control

The Contractor shall at all-time control airborne dust levels during construction activities to levels acceptable to Keystone. The Contractor shall employ water trucks, sprinklers or calcium chloride as necessary to reduce dust to acceptable levels. Utilization of calcium chloride is limited to roads.

Dust shall be strictly controlled where the work approaches dwellings, farm buildings, and other areas occupied by people and when the pipeline parallels an existing road or highway. This shall also apply to access roads where dust raised by construction vehicles may irritate or inconvenience local residents. The speed of all Contractor vehicles shall be controlled in these areas. Emissions from construction equipment combustion, open burning, and temporary fuel transfer systems and associated tanks will be controlled to the extent required by state and local agencies through the permit process.

The Contractor shall take appropriate precautions to prevent fugitive emissions caused by sand blasting from reaching any residence or public building. The Contractor shall place curtains of suitable material, as necessary, to prevent wind-blown particles from sand blasting operations from reaching any residence or public building.

Additional measures may be required by state regulations or local ordinances. The Contractor will comply with all applicable state regulations and local ordinances with respect to truck transportation and fugitive dust emissions.

2.15 Off Road Vehicle Control

Keystone shall offer to landowners or managers of forested lands to install and maintain measures to control unauthorized vehicle access to the construction right-of-way where appropriate. These measures may include the following unless otherwise approved or directed by Keystone based on site specific conditions or circumstances:

- signs;
- fences with locking gates;
- slash and timber barriers, pipe barriers, or boulders lined across the

construction right-of-way; and

- conifers or other appropriate trees or shrubs across the construction right-of-way.

2.16 Fire Prevention and Control

The Contractor shall comply with all federal, state, county and local fire regulations pertaining to burning permits and the prevention of uncontrolled fires. The following mitigative measures shall be implemented to prevent fire hazards and control of fires:

- A list of relevant fire authorities and their designated representative to contact shall be maintained on site by construction personnel.
- Adequate firefighting equipment shall be available on site in accordance with the applicable regulatory requirements shall be available on site.
- The level of forest fire hazard shall be posted at the construction office (where visible for workers) and workers shall be made aware of the hazard level and related implications.
- The Contractor shall provide equipment to handle any possible fire emergency. This shall include, although not be limited to, water trucks; portable water pumps; chemical fire extinguishers; hand tools such as shovels, axes, and chain saws; and heavy equipment adequate for the construction of fire breaks when needed.
- Specifically, the Contractor shall supply and maintain in working order an adequate supply of fire extinguishers for each crew engaged in potentially combustible work such as welding, cutting, grinding, and burning of brush or vegetative debris.
- In the event of a fire, the Contractor shall immediately use resources necessary to contain the fire. The Contractor shall then notify local emergency response personnel.
- All tree clearing activities are to be carried out in accordance with local rules and regulations for the prevention of forest fires.
- Burning shall be done in compliance with state, county, or local applicable regulations.
- Any burning will be done within the right-of-way. Only small piles shall be burned to avoid overheating or damage to trees or other structures along the right-of-way.
- Flammable wastes shall be removed from the construction site on a regular basis.
- Flammable materials kept on the construction site must be stored in approved containers away from ignition sources.
- Smoking shall be prohibited around flammable materials.
- Smoking shall be prohibited on the entire construction site when the fire hazard is high.

2.17 Road and Railroad Crossings

Construction across paved roads, highways, and railroads will be in accordance with the requirements of the road and railroad crossing permits and approvals obtained by Keystone. In general, all major paved roads, all primary gravel roads, highways, and railroads will be crossed by boring beneath the road or railroad. Detail drawing 21 illustrates a typical bored road or railroad crossing. Boring requires the excavation of a pit on each side of the feature, the placement of boring equipment in the pit, and boring a hole under the road at least equal to the diameter of the pipe. For long crossings, sections can be welded onto the pipe string just before being pulled through the borehole. Boring will result in minimal or no disruption to traffic at road or railroad crossings. Each boring will be expected to take 1 to 2 days for most roads and railroads and up to 10 days for long crossings such as interstate or four-lane highways.

Most smaller, unpaved roads and driveways will be crossed using the open-cut method where permitted by local authorities or private owners. The open-cut method will require temporary closure of the road to traffic and establishment of detours. If no reasonable detour is feasible, at least one lane of traffic will be kept open, except during brief periods when it is essential to close the road to install the pipeline. Most open-cut road crossings can be finished and the road resurfaced in 1 or 2 days. Keystone will take measures, such as posting signs at open-cut road crossings, to ensure safety and minimize traffic disruptions.

2.18 Adverse Weather

The Contractor shall restrict certain construction activities and work in cultivated agricultural areas in excessively wet soil conditions to minimize rutting and soil compaction. In determining when or where construction activities should be restricted or suspended during wet conditions, the Contractor shall consider the following factors:

- the extent that rutting may cause mixing of topsoil with subsoil layers or damage to tile drains;
- excessive buildup of mud on tires and cleats;
- excessive ponding of water at the soil surface; and
- the potential for excessive soil compaction.

The Contractor shall implement mitigative measures as directed by Keystone in order to minimize rutting and soil compaction in excessively wet soil conditions which may include:

- restricting work to areas on the spread where conditions allow;
- using low ground weight, wide-track equipment, or other low impact construction techniques;
- limiting work to areas that have adequately drained soils or have a cover of vegetation ,such as sod, crops or crop residues, sufficient to prevent mixing of topsoil with subsoil layers or damage to drain tiles; and

- installing geotextile material or construction mats in problem areas.

"Stop work" authority will be designated to the chief inspector but will be implemented when recommended by the Environmental Inspector.

2.19 Cultural Resources

Keystone intends to avoid cultural resources to the extent practicable by rerouting the pipeline corridor and related appurtenances, avoiding construction activities on properties listed in or eligible for listing in the National Register of Historic Places (NRHP), as well as boring or using HDD through culturally sterile soils.

The Contractor shall implement the measures outlined in any unanticipated discovery plan or any Programmatic Agreement that is adopted to minimize disturbance to cultural sites and shall take immediate action as outlined in the Programmatic Agreement if any unanticipated cultural discovery is encountered during construction.

The preferred treatment of any historical property or culturally significant site is avoidance. Where required, Keystone will monitor the construction spread using a cultural resource monitor working under the direction of a professional who meets the standards of the *Secretary of the Interior's Historic Preservation Professional Qualification Standards* (48 FR 44716, September 29, 1983).

Prior to commencing construction, Keystone also will provide an appropriate level of training to all construction personnel so that the requirements of any unanticipated discovery plan or Programmatic Agreement are understood and unanticipated discoveries quickly identified.

In the event an unanticipated cultural discovery is made, the Contractor will immediately halt all construction activities within a 100-foot radius, including traffic; notify the Keystone Environmental Inspector; and implement interim measures to protect the discovery from looting or vandalism. The appropriate federal, state, local, or tribal authorities will be notified of discovery within 48 hours of the initial find. Construction will not proceed within the 100-foot radius of discovery site until all mitigation measures defined in the Programmatic Agreement are concluded and Keystone receives approval from the appropriate agencies that construction may resume. No work or activity within the 100-foot buffer area may take place until approvals are communicated at the spread level by the lead Environmental Inspector.

3.0 SPILL PREVENTION AND CONTAINMENT

Spill prevention and containment applies to the use and management of hazardous materials on the construction right-of-way and all ancillary areas during construction. This includes the refueling or servicing of all equipment with diesel fuel, gasoline, lubricating oils, grease, and hydraulic and other fluids during normal upland applications and special applications within 100 feet of perennial streams or wetlands.

Keystone will prepare a project-specific Spill Prevention Containment and Countermeasure (SPCC) Plan. The Contractor shall provide additional information to complete the SPCC Plan for each construction spread, and shall provide site-specific data that meets the requirements of 40 CFR Part 112 for every location used for staging fuel or oil storage tanks and for every location used for bulk fuel or oil transfer. Each SPCC Plan will be prepared prior to introducing the subject fuel, oil, or hazardous material to the subject location.

3.1 Spill Prevention

3.1.1 Staging Areas

Staging areas (including Contractor yards and pipe stockpile sites) shall be set up for each construction spread. Bulk fuel and storage tanks will be placed only at Contractor yards. No bulk fuel and storage tanks will be placed in the construction ROW. Hazardous materials at staging areas shall be stored in compliance with federal and state laws. The following spill prevention measures shall be implemented by the Contractor:

- Contractor fuel trucks shall be loaded at existing bulk fuel dealerships or from bulk tanks set up for that purpose at the staging area. In the former case, the bulk dealer is responsible for preventing and controlling spills.
- The Environmental Inspector shall inspect the tank site for compliance with the 100-foot setback requirement and approve the tank site prior to installing bulk fuel or storage tanks on the construction yard.
- Fuels and lubricants shall be stored only at designated staging areas. Storage of fuel and lubricants in the staging area shall be at least 100 feet away from the water's edge. Refueling and lubrication of equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands.
- Contractors shall be required to perform all routine equipment maintenance at the staging area and recover and dispose of wastes in an appropriate manner.
- Fixed fuel dispensing locations will be provided with secondary containment to capture fuel from leaks, drips, and overfills.
- Temporary liners, berms, or dikes (secondary containment) shall be constructed around the aboveground bulk tanks, providing 110 percent containment volume of the largest storage tank or trailer within the containment structure, so that potential spill materials shall be contained and collected in specified areas. Tanks shall not be placed in areas subject to periodic flooding or washout.
- Drivers of tank trucks are responsible for safety and spill prevention during tank truck unloading. Procedures for loading and unloading tank trucks shall meet the minimum requirements established by the Department of Transportation.

- Drivers of tank trucks are responsible for setting brakes and chocking wheels prior to off loading. Warning signs requiring drivers to set brakes and chock wheels shall be displayed at all tanks. Proper grounding of equipment shall be undertaken during fuel transfer operations. Drivers shall observe and control the fueling operations at all times to prevent overfilling the temporary tank.
- Prior to departure of any tank truck, all vehicle outlets shall be examined closely by the driver for leakage, tightened, adjusted or replaced to prevent leakage while in transit.
- A supply of sorbent and barrier materials sufficient to allow the rapid containment and recovery of spills shall be maintained at each construction staging area. Sorbent and barrier materials shall also be utilized to contain runoff from contaminated areas.
- Shovels and drums shall be kept at each of the individual staging areas. In the event that small quantities of soil become contaminated, shovels shall be utilized to collect the soil and the material shall be stored in 55-gallon drums. Large quantities of contaminated soil may be bio-remediated on site or disposed in an approved landfill, subject to government approval, or collected utilizing heavy equipment, and stored in drums or other suitable containers prior to disposal. Should contamination occur adjacent to staging areas as a result of runoff, shovels or heavy equipment shall be utilized to collect the contaminated material. Contaminated soil shall be disposed of in accordance with state and federal regulations.
- Temporary aboveground tanks shall be subject to visual inspection on a monthly basis and when the tank is refilled. Inspection records shall be maintained. Operators shall routinely keep tanks under close surveillance and potential leaks or spills shall be quickly detected.
- Visible fuel leaks shall be reported to the Contractors' designated representative and corrected as soon as conditions warrant. Keystone's designated representative shall be informed.
- Drain valves on temporary tanks shall be locked to prevent accidental or unauthorized discharges from the tank.
- Oil and other hazardous materials stored in 350-gallon totes, 55-gallon drums, 5-gallon pails, smaller retail-size containers or other portable containers will be staged or stored in areas with a secondary temporary containment structure. Secondary containment structures may consist of temporary earthen berms with a chemical resistant liner, or a portable containment system constructed of steel, PVC, or other suitable material. The secondary containment structure will be capable of containing 110 percent of the volume of material stored in these areas.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.1.2 Construction Right-of-Way

The Contractor will ensure that all equipment is free of leaks prior to use on the Project and prior to entering or working in or near waterbodies or wetlands. Throughout construction, the Contractor will conduct regular maintenance and inspections of the equipment to reduce the potential for spills or leaks.

Rubber-tired vehicles (pickup trucks, buses) normally shall refuel at the construction staging areas or commercial gas stations. Tracked machinery (backhoes, bulldozers) shall be refueled and lubricated on the construction right-of-way. Equipment maintenance shall be conducted in staging areas when practical. When impractical, repairs to equipment can be made on the construction right-of-way when approved by Keystone's representative.

Each fuel truck that transports and dispenses fuel to construction equipment or Project vehicles along the construction ROW or within equipment staging and material areas shall carry an oil spill response kit and spill response equipment onboard at all times. In the event that response materials are depleted through use or their condition is deteriorated through age, the materials will be replenished prior to placing the fueling vehicle back into service.

The following preventive measures apply to refueling and lubricating activities on the construction right-of-way:

- Construction activities shall be conducted to allow for prompt and effective cleanup of spills of fuel and other hazardous materials. Each construction crew, including cleanup crews shall have on hand sufficient tools and material to stop leaks and supplies of absorbent and barrier materials to allow rapid containment and recovery of spilled materials. Crew members must know and follow the procedure for reporting spills.
- Refueling and lubricating of construction equipment shall be restricted to upland areas at least 100 feet away from streams and wetlands. Where this is not possible (e.g., trench dewatering pumps), the equipment shall be fueled by designated personnel with special training in refueling, spill containment, and cleanup. The Environmental Inspector shall ensure that signs are installed identifying restricted areas.
- No fuel, oil or hazardous material storage, staging, or transfer other than refueling will occur within 100 feet of any storm drain, drop inlet, or high consequence area (HCA).
- Spent oils, lubricants, filters, etc. shall be collected and disposed of at an approved location in accordance with state and federal regulations.
- Equipment shall not be washed in streams.
- Stationary equipment will be placed within a secondary containment if it will be operated or require refueling within 100 feet of a wetland or waterbody boundary.

Keystone may allow modification of the above specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits.

3.2 Contingency Plans

The Contractor shall develop emergency response procedures for all incidents (e.g., spills, leaks, fires) involving hazardous materials which could pose a threat to human health or the environment. The procedures shall address activities in all work areas, as well as during transport to and from the construction right-of-way and to any disposal or recycling facility.

3.3 Equipment

The Contractor shall retain emergency response equipment in all areas where hazardous materials are handled or stored. This equipment shall be readily available to respond to a hazardous material emergency. Such equipment shall include, but not be limited to, the following:

- first aid supplies;
- phone or communications radio;
- protective clothing (Tyvek suit, gloves, goggles, boots);
- hand-held fire equipment;
- absorbent material and storage containers;
- non-sparking bung wrench and shovel; and
- brooms and dust pan.

Hazardous material emergency equipment shall be carried in all mechanic and supervisor vehicles. This equipment shall include, at a minimum:

- first aid supplies;
- phone or communications radio;
- 2 sets of protective clothing (Tyvek suit, gloves, goggles, boots);
- 1 non-sparking shovel;
- 6 plastic garbage bags (20 gallon);
- 10 absorbent socks and spill pads;
- Hand-held fire extinguisher;
- barrier tape; and
- 2 orange reflector cones.

Fuel and service trucks shall carry a minimum of 20 pounds of suitable commercial sorbent material.

The Contractor shall inspect emergency equipment weekly, and service and maintain equipment regularly. Records shall be kept of all inspections and services.

3.4 Emergency Notification

Emergency notification procedures between the Contractor and Keystone shall be established in the planning stages of construction. A Keystone representative shall be identified to serve as contact in the event of a spill during construction activities. In the event of a spill meeting government reporting criteria, the Contractor immediately shall notify the Keystone representative who, in turn, shall notify the appropriate regulatory agencies.

Any material released into water that creates a sheen must be reported immediately to Keystone. The Contractor is required to notify Keystone immediately if there is any spill of oil, oil products, or hazardous materials that reaches a wetland or waterbody. Incidents on public highways shall be reported to Keystone and the appropriate agencies by Keystone.

If a spill occurs on navigable waters of the United States, Keystone shall notify the National Response Center (NRC) at 1-800-424-8802. For spills that occur on public lands, into surface waters, or into sensitive areas, the appropriate governmental agency's district office also shall be notified.

3.5 Spill Containment and Countermeasures

In the event of a spill of hazardous material, Contractor personnel shall:

- notify the appointed Keystone representative;
- identify the product hazards related to the spilled material and implement appropriate safety procedures, based on the nature of the hazard;
- control danger to the public and personnel at the site;
- implement spill contingency plans and mobilize appropriate resources and manpower;
- isolate or shutdown the source of the spill;
- block manholes or culverts to limit spill travel;
- initiate containment procedures to limit the spill to as small an area as possible to prevent damage to property or areas of environment concern (e.g., watercourses); and
- commence recovery of the spill and cleanup operations.

When notified of a spill, the Keystone representative shall immediately ensure that:

- Action is taken to control danger to the public and personnel at the site.
- Spill contingency plans are implemented and necessary equipment and manpower are mobilized.

- Measures are taken to isolate or shutdown the source of the spill.
- All resources necessary to contain, recover and clean up the spill are available.
- Any resources requested by the Contractor from Keystone are provided.
- The appropriate agencies are notified. For spills which occur on public lands, into surface waters or into sensitive areas, the appropriate federal or state managing office shall also be notified and involved in the incident.

For a land spill, berms shall be constructed with available equipment to physically contain the spill. Personnel entry and travel on contaminated soils shall be minimized. Sorbent materials shall be applied or, if necessary, heavily contaminated soils shall be removed to an approved facility. Contaminated sorbent materials and vegetation shall also be disposed of at an approved facility.

For a spill threatening a waterbody, berms or trenches shall be constructed to contain the spill prior to entry into the waterbody. Deployment of booms, skimmers, and sorbent materials shall be necessary if the spill reaches the water. The spilled product shall be recovered and the contaminated area shall be cleaned up in consultation with spill response specialists and appropriate government agencies.

4.0 UPLANDS (AGRICULTURAL, FOREST, PASTURE, RANGE AND GRASS LANDS)

4.1 Interference with Irrigation Systems

If existing irrigation systems (flood irrigation, ditch irrigation, pivot, wheel, or other type of spray irrigation systems), irrigation ditches, or sheet flow irrigation shall be impacted by the construction of the pipeline, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone:

- If it is feasible and mutually acceptable to Keystone and the landowner or landowner's designate, temporary measures shall be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- If the pipeline or temporary work areas intersect an operational (or soon to be operational) pivot or other spray irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.
- If the pipeline or temporary work areas intersect an operational sheet flow irrigation system, Keystone shall establish with the landowner or landowner's designate an acceptable amount of time the irrigation system may be out of service. If an irrigation system interruption results in crop

damages, either on the pipeline construction right-of-way or off the construction right-of-way, the landowner shall be compensated reasonably for all such crop damages.

- Irrigation ditches that are active at the time of construction shall not be stopped or obstructed except for the length of time to install the pipeline beneath the ditch (typically, one day or less) unless otherwise approved or directed by Keystone.

4.2 Clearing

The objective of clearing is to provide a clear and unobstructed right-of-way for safe and efficient construction of the pipeline. The following mitigable measures shall be implemented:

- Construction traffic shall be restricted to the construction right-of-way, existing public roads, and approved private roads.
- Construction right-of-way boundaries including pre-approved temporary workspace shall be clearly staked to prevent disturbance to unauthorized areas.
- If crops are present, they shall be mowed or disced to ground level unless an agreement is made for the landowner to remove.
- Burning is prohibited on cultivated land.
- Construction right-of-way at timber shelterbelts in agricultural areas shall be reduced to the minimum necessary to construct the pipeline.

4.3 Topsoil Removal and Storage

The objective of topsoil handling is to maintain topsoil capability by conserving topsoil for future replacement and reclamation and to minimize the degradation of topsoil from compaction, rutting, loss of organic matter, or soil mixing so that successful reclamation of the right-of-way can occur. The following mitigative measures shall be implemented during topsoil removal and storage unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- In areas designated for topsoil segregation, the actual depth of the topsoil, to a maximum depth of 12 inches, will be stripped from:
    - The area excavated above the pipeline; or
    - The area above the pipeline plus the spoil storage; or
    - The area above the pipeline plus the working side; or
    - Entire ROW

  as required by applicable permit agreements with the landowner or as dictated by site-specific conditions.

- Stripped topsoil is to be stockpiled in a windrow along the edge of the right-of-way. The Contractor shall perform work in a manner to minimize the potential for subsoil and topsoil to be mixed.
- Under no circumstances shall the Contractor use topsoil to fill a low area.
- If required due to excessively windy conditions, topsoil piles shall be tackified using either water or a suitable tackifier (liquid mulch binder).
- Gaps in the rows of topsoil will be left in order to allow drainage and prevent ponding of water adjacent to or on the right-of-way.
- Topsoil shall not be utilized to construct ramps at road or waterbody crossings.
- In areas with defined saline or sodic soil concerns, a triple-ditch method will be used to segregate problem soils as indicated in Detail 67 and 67A.
- If frozen topsoil conditions are encountered during winter construction, specialized construction equipment (i.e. ripping, frozen topsoil cutter, road reclaimer, etc) may be required to adequately segregate and conserve topsoil resources.

4.4 Grading

The objective of grading is to develop a right-of-way that allows the safe passage of equipment and meets the bending limitations of the pipe. The following mitigative measures shall be implemented during grading unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

- All grading shall be undertaken with the understanding that original contours and drainage patterns shall be re-established to the extent practicable..
- Agricultural areas that have terraces shall be surveyed to establish pre-construction contours to be utilized for restoration of the terraces after construction.
- On steep slopes, or wherever erosion potential is high, temporary erosion control measures shall be implemented.
- Bar ditches adjacent to existing roadways to be crossed during construction shall be adequately ramped with grade or ditch spoil to prevent damage to the road shoulder and ditch.
- Where the construction surface remains inadequate to support equipment travel, timber mats, timber riprap, or other method shall be used to stabilize surface conditions.

The Contractor shall limit the interruption of the surface drain network in the vicinity of the right-of-way using the appropriate methods:

- providing gaps in the rows of subsoil and topsoil in order to prevent any accumulation of water on the land;

- preventing obstructions in furrows, furrow drains, and ditches;
- installing flumes and ramps in furrows, furrow drains, and ditches to facilitate water flow across the construction right-of-way and allow for construction equipment traffic; and
- installing flumes over the trench for any watercourse where flow is continuous during construction.

4.5 Temporary Erosion and Sediment Control

4.5.1 General

Temporary erosion and sediment control measures shall be installed immediately after initial disturbance of the soil, maintained throughout construction (on a daily basis), and reinstalled as necessary until replaced by permanent erosion control structures or restoration of the construction right-of-way is complete.

Specifications and configurations for erosion and sediment control measures may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

The Contractor shall inspect all temporary erosion control measures at least daily in areas of active construction or equipment operation, weekly in areas with no construction or equipment operation, and within 24 hours of each significant rainfall event of 0.5 inches or greater. The Contractor shall repair all ineffective temporary erosion control measures as expediently as practicable.

4.5.2 Sediment Barriers

Sediment barriers shall be constructed of silt fence, staked hay or straw bales, compacted earth (e.g., drivable berms across travel lanes), sand bags, or other appropriate materials.

The Contractor shall install sediment barriers in accordance with Details 1 and 2 or as otherwise approved or directed by Keystone. The Contractor is responsible for properly installing, maintaining, and replacing temporary and permanent erosion controls throughout construction and cleanup. In wetland or riparian zones, the Contractor will install sediment control structures along the construction right-of-way edges prior to vegetation removal where practicable. The aforementioned sediment barriers may be used interchangeably or together depending on site-specific conditions. In most cases, silt fence shall be utilized where longer sediment barriers are required.

Sediment barriers shall be installed below disturbed areas where there is hazard of offsite sedimentation. These areas include:

- the base of slopes adjacent to road crossings;

- the edge of the construction right-of-way adjacent to and upgradient of a roadway, flowing stream, spring, wetland, or impoundment;
- trench or test water discharge locations where required;
- where waterbodies or wetlands are adjacent to the construction right-of-way; (the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way)
- across the entire construction right-of-way at flowing waterbody crossings;
- right-of-way immediately upslope of the wetland boundary at all standard (saturated or standing water) wetland crossings as necessary to prevent sediment flow into the wetland; (Sediment control barriers are not required at “dry” wetlands.)
- along the edge of the construction right-of-way within standard (saturated or standing water) wetland boundaries as necessary to contain spoil and sediment within the construction right-of-way. Sediment control barriers are not required at “dry” wetlands (Detail 8).

Sediment barriers placed at the toe of a slope shall be set a sufficient distance from the toe of the slope, if possible, in order to increase ponding volume.

Sediment control barriers shall be placed so as not to hinder construction operations. If silt fence or straw bale sediment barriers (in lieu of drivable berms) are placed across the entire construction right-of-way at waterbodies, wetlands, or upslope of roads, a provision shall be made for temporary traffic flow through a gap for vehicles and equipment to pass within the structure. Immediately following each day’s shutdown of construction activities, a row of straw bales or a section of silt fence shall be placed across the up gradient side of the gap with sufficient overlap at each end of the barrier gap to eliminate sediment bypass flow, followed by bales tightly fitted to fill the gap. Following completion of the equipment crossing, the gap shall be closed using silt fence or straw bale sediment barrier.

The Contractor shall maintain straw bale and silt fence sediment barriers by removing collected sediment and replacing damaged bales. Sediment shall be removed and placed where it shall not reenter the barrier when sediment loading is greater than 40 percent or if directed by Keystone. If straw bale filters cannot be cleaned out due to access problems, the Contractor shall place a new row of sediment barriers upslope.

The Contractor shall use mulch and straw bales that are free of noxious weeds. Mulch or straw bales that contain evidence of noxious weeds or other undesirable species shall be rejected by the Contractor.

The Contractor shall remove sediment barriers, except those needed for permanent erosion and sediment control, during cleanup of the construction right-of-way.

4.5.3 Trench Plugs

The Contractor shall use trench plugs at waterbody and wetland crossings at the direction of the Environmental Inspector to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs shall be of sufficient size to withstand upslope water pressure.

4.5.4 Temporary Slope Breakers (Water Bars)

The Contractor shall install temporary slope breakers on slopes greater than 5% on all disturbed lands at the following recommended spacing:

Slope (%)	Spacing (feet)
5 - 15	300
>15 - 30	200
>30	100

The gradient of each slope breaker shall be 2 to 4 percent.

If so directed by the landowner, the Contractor may not install temporary slope breakers (water bars) in cultivated land.

Temporary slope breakers shall be constructed of soil, silt fence, staked straw bales, sand bags, or similar materials authorized by Keystone.

The Contractor shall direct the outfall of each temporary slope breaker to a stable, well-vegetated area or construct an energy-dissipating device at the end of the slope breaker and off the construction right-of-way as permitted in the landowner agreement as shown in Detail 3. The outfall of each temporary slope breaker shall be installed to prevent sediment discharge into wetlands, waterbodies, or other sensitive resources.

Specifications and configurations for temporary slope breakers may be modified by Keystone as necessary to suit actual site conditions. However, all work shall be conducted in accordance with applicable permits.

4.5.5 Drainage Channels or Ditches

Drainage channels or ditches shall be used on a limited basis to provide drainage along the construction right-of-way and toe of cut slopes as well as to direct surface runoff across the construction right-of-way or away from disturbances and onto natural undisturbed ground. Channels or ditches shall be constructed by the Contractor during grading operations. Where there is inadequate vegetation at the channel or ditch outlet,

sediment barriers, check berms, or other appropriate measures shall be used to control erosion.

4.5.6 Temporary Mulching and Cover Crops

Unless otherwise directed by Keystone, the Contractor shall apply temporary seed and/or mulch on disturbed construction work areas that have been inactive for one month or are expected to be inactive for a month or more. The Contractor shall not apply temporary mulch in cultivated areas unless specifically requested by the landowner or in areas particularly prone to erosion. The Contractor shall not apply mulch within wetland boundaries.

Temporary mulch of straw or equivalent applied on slopes shall be spread uniformly to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. Mulch application on slopes within 100 feet of waterbodies and wetlands shall be increased to an approximate rate of 3 tons per acre.

All seed that is used as a temporary cover crop will be approved and/or provided by Keystone.

4.5.7 Tackifier

When wetting topsoil piles with water does not prevent wind erosion, the Contractor shall temporarily suspend topsoil handling operations and apply a tackifier to topsoil stockpiles at the rate recommended by the manufacturer. The type of Tackifier will be approved by Keystone.

Should construction traffic, cattle grazing, heavy rains, or other related construction activity disturb the tackified topsoil piles and create a potential for wind erosion, additional tackifier shall be applied by the Contractor.

4.6 Stringing

The objective of stringing is to place the line pipe along the construction right-of-way for bending and welding in an expedient and efficient manner.

The Contractor shall utilize one or more of the following mitigative measures as applicable and when necessary to reduce compaction on the working side of the right-of-way or as directed by Keystone. However, all work shall be conducted in accordance with applicable permits.

- prohibiting access by certain vehicles;
- using only machinery possessing low ground pressure (tracks or extra-wide tires);
- limiting access and thus minimizing the frequency of all vehicle traffic;
- digging ditches to improve surface drainage;

- using timber riprap, matting, or geotextile fabric overlain with soil; and
- stopping construction for a period of time.

4.7 Trenching

The objective of trenching is to provide a ditch of sufficient depth and width with a bottom to continuously support the pipeline. During trenching operations, the following mitigative measures shall be implemented unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Where required, subsoil shall be segregated from topsoil in separate, distinct rows with a separation that shall limit any admixing of topsoil and subsoil during handling.
- Triple ditch soil handling will be completed at sites identified by Keystone according to Detail 67 and 67A to prevent soil degradation.
- Gaps must be left in the spoil piles that coincide with breaks in the strung pipe to facilitate natural drainage patterns and to allow the passage of livestock or wildlife.
- Trenching operations shall be followed as closely as practicable by lower in and backfill operations to minimize the length of time the ditch is open.
- Construction debris (e.g., welding debris) and other garbage shall not be deposited in the ditch.
- If trenching, pipe installation and backfill operations take place during frozen soil conditions, final clean-`up (including additional trench compaction, subsoil feathering, final contouring and topsoil replacement) will be delayed until the subsoil and topsoil thaw completely the following spring/summer. A pronounced subsoil berm will be left over the trench line until final clean-up takes place to account for settlement of thawing backfill. Gaps will be left in the berm to maintain cross-ROW drainage

The Contractor shall prepare a blasting plan that is applicable to any locations where blasting will be necessary adjacent to existing high pressure pipelines, overhead or underground utilities, farm operations, or public crossings. The Contractor and its blasting supervisor shall be thoroughly familiar with and comply with the rules and regulations of Occupational Safety and Health Administration (OSHA) and all federal, state, county and local regulations governing blasting operations. Keystone will file the blasting plan with applicable state or local jurisdictions, where required. Excavation and blasting along the ROW may uncover paleontological resources of scientific value. Keystone will consult with the appropriate regulatory agencies in each state on the applicability and requirements for Paleontological Resource Protection Plans. Keystone will prepare and file plans addressing vertebrate fossils with any respective states, as required.

Should blasting be necessary for removal of rock, the following mitigative measures may be implemented:

- The Contractor shall use non-electric initiation systems for all blasting operations. If required by the blasting plan, blasting will be monitored for vibration levels and peak particle velocity. This work shall be performed by a third-party vibration monitoring consultant hired by and reporting to the Constructor Representative. The Contractor shall arrange for detonations to be carried out in cooperation with this consultant.
- Prior to using explosives, the Contractor shall advise residents of the immediate area, in order to prevent any risk of accidents or undue disturbances.
- No blasting shall be done without approval of the Constructor Representative. Prior to any detonation of explosives in the vicinity of a loaded line, dwelling, structure, overhead or underground utility, farm operation, or public crossings, a minimum of 48 hour's notice shall be given to the Constructor Representative, in order that the appropriate people can be notified and the upstream and downstream mainline valves can be staffed.
- The Contractor shall obtain all necessary permits and shall comply with all legal requirements in connection with the use, storage, and transportation of explosives.
- Blasting mats or subsoil may be piled over the trench line to prevent rock from being blown outside the construction right-of-way.
- Each blasting location shall be cleared and cleaned up before and after all blasting operations.
- Blasting shall be carried out during regular, daylight working hours.
- The Contractor shall at all times protect his workers and the public from any injury or harm that might arise from drilling dust and the use of explosives.
- Only workers thoroughly experienced in handling explosives shall be permitted to supervise, handle, haul, load or shoot explosives. In those jurisdictions where the licensing of blasters is mandatory, the Contractor shall provide the Constructor Representative with proof of the required certification for every person so required.
- The drilling pattern shall be set in a manner to achieve smaller rock fragmentation (maximum 1 foot in diameter) in order to use as much as possible of the blasted rock as backfill material after the pipe has been padded in accordance with the specifications.
- Blasting testing of surface-water resources and water wells within 150 feet of the centerline will be performed in compliance with all applicable permits.

4.7.1 Trench Dewatering/Well Points

The Contractor shall make all reasonable efforts to discharge trench water in a manner that avoids damage to adjacent agricultural land, crops, and pasture. Damage includes, but is not limited to, the inundation of crops for more than 24 hours, deposition of sediment in ditches, and the deposition of gravel in fields or pastures.

If trench dewatering is necessary in an area where salt damage to adjacent crops is evident, the Environmental Inspector shall conduct a field conductivity test on the trench water before it is discharged. If the conductivity of the trench water is determined to potentially affect soil quality, it shall not be discharged to areas where salt damage to crops is evident, but shall be directed as feasible so that water flows over a well vegetated, non-cropland area or through an energy dissipater and sediment barrier.

When pumping water from the trench for any reason, the Contractor shall ensure that adequate pumping capacity and sufficient hose is available to permit dewatering as follows:

- No heavily silt-laden trench water shall be allowed to enter a waterbody or wetland directly but shall instead be diverted through a well vegetated area, a geotextile filter bag, or a permeable berm (straw bale or Keystone approved equivalent).
- Trench water shall not be disposed of in a manner which could damage crops or interfere with the functioning of underground drainage systems.

The Contractor shall screen the intake hose and keep the hose either one foot off the bottom of the trench or in a container to minimize entrainment of sediment.

4.8 Welding, Field Joint Coating, and Lowering In

The objectives of welding, field joint coating, and lowering in are to provide continuous segments of pipeline, to provide corrosion protection to the weld areas of the pipeline, and to place the pipeline in the center of the trench, without stress, at the required depth of cover. The following mitigative measures shall be followed during pipe welding, field joint coating, and lowering in, unless otherwise specified by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Shavings produced during beveling of the line pipe are to be removed immediately following this operation to ensure that livestock and wildlife do not ingest this material. When welding operations create a continuous line of pipe that may be left in the right-of-way for an extended period of time due to construction or weather constraints, a gap in the welded pipe shall be provided to allow for access at farm road crossings and for passage of livestock and wildlife.
- Prior to the application of epoxy powder, urethane epoxy, or other approved pipe coatings, a tarp shall be placed underneath the pipe in wetlands to collect any overspray of epoxy powder and liquid drippings. Excess powder, liquid, or other hazardous materials (e.g. brushes, rollers, gloves) shall be continuously collected and removed from the construction right-of-way and disposed of in a manner appropriate for these materials.

4.9 Padding and Backfilling

The objective of padding and backfilling is to cover the pipe with material that is not detrimental to the pipeline and pipeline coating. The following mitigative measures shall be utilized during backfilling, unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Excessive water accumulated in the trench shall be eliminated prior to backfilling.
- In the event it becomes necessary to pump water from open trenches, the Contractor shall pump the water and discharge it in accordance with the requirements of the Stormwater Pollution Prevention Plan (SWPPP) in order to avoid damaging adjacent areas. Detail 5 and Detail 6 provide typical examples of dewatering structures.
- If it is impossible to avoid water-related damages (including inundation of crops for more than 24 hours, deposition of sediment in ditches and other water courses, and the deposition of gravel in fields, pastures, and any water courses), Keystone shall reasonably compensate the landowners for the damage and/or shall correct the damage so as to restore the land, crops, pasture, water courses, etc. to their pre-construction condition.
- All pumping of water shall comply with existing drainage laws and local ordinances relating to such activities and provisions of the Clean Water Act.
- Prior to backfilling, all drain tile shall be permanently repaired, inspected, and the repair documented as described in Section 5.5.
- Prior to backfilling, trench breakers shall be installed on slopes where necessary to minimize the potential for water movement down the ditch and potential subsequent erosion.
- During backfill, the stockpiled subsoil shall be placed back into the trench before replacing the topsoil.
- Topsoil shall not be utilized for padding the pipe.
- Backfill shall be compacted to a minimum of 90% of pre-existing conditions where the trench line crosses tracks of wheel irrigation systems (pivots).
- To reduce the potential for ditch line subsidence, spoil shall be replaced and compacted by backhoe bucket or by the wheels or tracks of equipment traversing down the trench.
- The lesser of 4 feet or the actual depth of topsoil cover, shall not be backfilled with soil containing rocks of any greater concentration or size than existed prior to pipeline construction in the pipeline trench, bore pits, or other excavations.

4.10 Cleanup

The objective of cleanup activities shall be to prepare the right-of-way and other disturbed areas to approximate pre-activity ground contours where appropriate and to replace spoil and stockpiled material in a manner which preserves soil

capability and quality to a degree reasonably equivalent to the original or that of representative undisturbed land. The following mitigative measures shall be utilized during cleanup, unless otherwise approved or directed by Keystone based on specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Cleanup shall occur immediately following backfilling operations when weather or seasonal conditions allow.
- All garbage and construction debris (e.g., lathing, ribbon, welding rods, pipe bevel shavings, pipe spacer ropes, end caps, pipe skids) shall be collected and disposed of at approved disposal sites.
- The right-of-way shall be re-contoured with spoil material to approximate pre-construction contours and as necessary to limit erosion and subsidence. Loading of slopes with unconsolidated spoil material shall be avoided during slope re-contouring. Topsoil shall be replaced after re-contouring of the grade with subsoil. The topsoil shall be replaced on the subsoil storage area and over the trench so that after settling occurs, the topsoil's approximate original depth and contour (with an allowance for settling) shall be achieved.
- Where topsoil has been segregated, subsoil shall not be permanently placed on top of topsoil.
- Surface drainage shall be restored and re-contoured to conform to the adjacent land drainage system.
- Erosion control structures such as permanent slope breakers and cross ditches shall be installed on steep slopes where necessary to control erosion by diverting surface run-off from the right-of-way to stable and vegetated off right-of-way areas.
- During cleanup, temporary sediment barriers such as silt fence and hay bale diversions will be removed; accumulated sediment will re-contoured with the rest of the ROW; and permanent erosion controls will be installed as necessary.
- After construction, all temporary access shall be returned to prior construction conditions unless specifically agreed with the landowner or otherwise specified by Keystone.
- Warning signs, aerial markers, and cathodic protection test leads shall be installed in locations in compliance with U.S. Federal code and in locations that shall not impair farming operations where practicable.
- All bridges, fences and culverts existing prior to construction shall be restored to meet or exceed approximate pre-construction conditions. Caution shall be utilized when re-establishing culverts to ensure that drainage is not improved to a point that would be detrimental to existing waterbodies and wetlands.
- All temporary gates installed during construction shall be replaced with permanent fence unless otherwise requested by the landowner.

4.11 Reclamation and Revegetation

The objectives of reclamation and revegetation are to return the disturbed areas to approximately pre-construction use and capability. This involves the treatment of soil as necessary to preserve approximate pre-construction capability and the stabilization of the work surface in a manner consistent with the initial land use.

The following mitigative measures will be utilized unless otherwise approved or directed by Keystone based on site specific conditions or circumstances. However, all work shall be conducted in accordance with applicable permits.

4.11.1 Relieving Compaction

Compaction will typically be relieved in subsoils that have received substantial construction traffic, as determined by Keystone, prior to replacing and respreading topsoil. Compaction will typically not be relieved in topsoils that have been left in place and that have not been driven on. Any rock that is brought to the surface during decompaction activities will be removed until the quantity, size, and distribution of rock is equivalent to that found on adjacent land as determined by the Environmental Inspector. Compaction will typically be relieved as follows:

- Compacted cropland compacted shall be ripped a minimum of 3 passes at least 18 inches deep and all pasture shall be ripped or chiseled a minimum of three passes at least 12 inches deep before replacing topsoil.
- Areas of the construction right-of-way that were stripped for topsoil salvage shall be ripped a minimum of 3 passes (in cross patterns, as practical) prior to topsoil replacement. The approximate depth of ripping shall be 18 inches (or a lesser depth if damage may occur to existing drain tile systems). After ripping, the subsoil surface shall be graded smooth and any subsoil clumps broken up (disc and harrow) in an effort to avoid topsoil mixing.
- The de-compacted construction right-of-way shall be tested by the Contractor at regular intervals for compaction in agricultural and residential areas. Tests shall be conducted on the same soil type under similar moisture conditions in undisturbed areas immediately adjacent to the right-of-way to approximate pre-construction conditions. Penetrometers or other appropriate devices shall be used to conduct tests
- Topsoil shall be replaced to pre-existing depths once ripping and discing of subsoil is complete up to a maximum of 12 inches. Topsoil compaction on cultivated fields shall be alleviated with cultivation methods by the contractor.
- If there is any dispute between the landowner and Keystone as to what areas need to be ripped or chiseled, the depth at which compacted areas should be ripped or chiseled, or the necessity or

rates of lime and fertilizer application, the appropriate NRCS shall be consulted by Keystone and the landowner.

Plowing under of organic matter including wood chips and manure, or planting of a green crop such as alfalfa to decrease soil bulk density and improve soil structure or any other measures in consultation with the Natural Resource Conservation Service (NCRS) shall be considered if mechanical relief of compaction is deemed not satisfactory.

In the first year after construction, Keystone will inspect the ROW to identify areas of erosion or settling. Subsequently, Keystone will monitor erosion and settling through aerial patrols, which are part of Keystone's Integrity Management Plan, and through landowner reporting. Landowner reporting will be facilitated through use of Keystone's toll-free telephone number, which will be made available to all landowners on the ROW. Landowner reporting also may be facilitated through contact with Keystone's field offices.

Keystone plans to minimize impacts on soil productivity that may result from construction activities, but recognizes that some short- to long-term decreases in agricultural productivity are possible. Keystone recognizes its responsibility to restore agricultural productivity on the pipeline ROW and to compensate landowners for demonstrated decreases in productivity that may result from any degradation of agricultural soils along the ROW.

4.11.2 Rock Removal

- Rocks that are exposed on the surface due to construction activity shall be removed from the right-of-way prior to and after topsoil replacement This effort will result in an equivalent quantity, size and distribution of rocks to that found on adjacent lands, as determined by the Environmental Inspectors.
- Clearing of rocks may be carried out with a mechanical rock picker or by manual means, provided that preservation of topsoil is assured. Rock removed from the right-of-way shall be hauled off the landowner's premises or disposed of on the landowner's premises at a location that is mutually acceptable to the landowner and to Keystone.

4.11.3 Soil Additives

If site-specific conditions warrant and if agreed to by the landowner, the Contractor shall apply amendments (fertilizer and soil pH modifier materials and formulations) commonly used for agricultural soils in the area and in accordance with written recommendations from the local soil conservation authority, land management agencies, or landowner. Amendments shall be incorporated into the normal plow layer as soon as possible after application.

4.11.4 Seeding

- The final seed mix shall be based on input from the local Natural Resource Conservation Service and the availability of seed at the time of reclamation. The landowner may request specific seeding requirements during easement negotiations.
- Certificates of seed analysis are required for all seed mixes to limit the introduction of noxious weeds.
- Seed not utilized within 12 months of seed testing shall be approved by Keystone prior to use. Seeding shall follow cleanup and topsoil replacement as closely as possible. Seed shall be applied to all disturbed surfaces (except cultivated fields unless requested by the landowner) as indicated on the construction drawings
- If mulch was applied prior to seeding for temporary erosion control, the Contractor shall remove and dispose of the excess mulch prior to seedbed preparation to ensure that seedbed preparation equipment and seed drills do not become plugged with excess mulch; and to support an adequate seedbed; and to ensure that seed incorporation or soil packing equipment can operate without becoming plugged with mulch.
- Identified seeding areas shall be seeded as specified by Keystone. Seeding rates shall be based on pure live seed.
- Weather conditions, construction right-of-way constraints, site access, topography and soil type shall influence the seeding method to be used (i.e., drill seeding versus broadcast seeding).
- The Contractor shall delay seeding as directed by Keystone until the soil is in the appropriate condition for seeding.
- The Contractor shall use a Truax brand or Keystone approved equivalent-type drill seeder equipped with a cultipacker designed and equipped to apply grass and grass-legume seed mixtures with mechanisms such as seed box agitators to allow even distribution of all species in each seed mix, with an adjustable metering mechanism to accurately deliver the specified seeding rate and with a mechanism such as depth bands to accurately place the seed at the specified depth.
- The Contractor shall operate drill seeders at an appropriate speed so the specified seeding rate and depth is maintained, as directed by Keystone.
- The Contractor shall calibrate drill seeders so that the specified seeding rate is planted. The row spacing on drill seeders shall not exceed 8 inches.
- The Contractor shall plant seed at depths consistent with the local or regional agricultural practices.

- Broadcast or hydro seeding, used in lieu of drilling, shall utilize NRCS-recommended seeding rates. Where seed is broadcast, the Contractor shall use a harrow, cultipacker, or other equipment immediately following broadcasting to incorporate the seed to the specified depth and to firm the seedbed.
- The Contractor shall delay broadcast seeding during high wind conditions if even distribution of seed is impeded.
- The Contractor shall hand rake all areas that are too steep or otherwise cannot be safely harrowed or cultipacked in order to incorporate the broadcast seed to the specified depth.
- Hydro seeding may be used, on a limited basis, where the slope is too steep or soil conditions do not warrant conventional seeding methods. Fertilizer, where specified, may be included in the seed, virgin wood fiber, tackifier, and water mixture. When hydro-seeding, virgin wood fiber shall be applied at the rate of approximately 3,000 pounds per acre on an air-dry weight basis as necessary to provide at least 75% ground cover. Tackifier shall consist of biodegradable, vegetable-based material and shall be applied at the rate recommended by the manufacturer. The seed, mulch, and tackifier slurry shall be applied so that it forms a uniform, mat-like covering of the ground.
- Keystone shall work with landowners to discourage intense livestock grazing of the construction right-of-way during the first growing season by utilization of temporary fencing or deferred grazing, or increased grazing rotation frequency.

4.11.5 Permanent Erosion and Sediment Control

The Contractor shall restore all existing landowner soil conservation improvements and structures disturbed by pipeline construction to the approximate pre-construction line and grade. Soil conservation improvements and structures include, but are not limited to, grassed waterways, toe walls, drop inlets, grade control works, terraces, levees, and farm ponds.

4.11.5.1 Trench Breakers

The Contractor shall install trench breakers in steep terrain where necessary to limit the potential for trench line erosion and at the base of slopes adjacent to waterbodies and wetlands.

Trench breakers shall be constructed of materials such as sand bags, sand/cement bags, bentonite bags, or other suitable materials by the Contractor (Detail 7). The Contractor shall not use topsoil in trench breakers.

4.11.5.2 Permanent Slope Breakers (Water Bars)

Permanent slope breakers (water bars) shall be constructed of soil or, in some instances, sand bags.

The Contractor shall construct permanent slope breakers on the construction right-of-way where necessary to limit erosion, except in cultivated and residential areas. Slope breakers shall divert surface runoff to adjacent stable vegetated areas or to energy-dissipating devices as shown on Detail 3. In general, permanent slope breakers should be installed immediately downslope of all trench breakers. Permanent slope breakers shall be installed as specified on the construction drawings or generally with a minimum spacing as shown on the following table:

Slope (%)	Spacing (feet)
5 - 15	300
>15 – 30	200
>30	100

The gradient (fall) for each slope breaker shall be two percent to four percent unless otherwise approved by Keystone based on site-specific conditions.

The Contractor shall construct slope breakers to divert surface flow to a stable, well-vegetated area. In the absence of a stable area, the Contractor shall construct appropriate energy-dissipating devices at the end of the slope breaker and beyond the area disturbed by construction.

4.11.5.3 Mulching

The Contractor shall apply mulch on all areas with high erosion potential and on slopes greater than 8 percent unless otherwise approved by Keystone based on site-specific conditions or circumstances. The Contractor shall spread mulch uniformly over the area to cover at least 75 percent of the ground surface at an approximate rate of 2 tons per acre of straw or its equivalent. The Environmental Inspector may reduce the application rate or forego mulching an area altogether if there is an adequate cover of rock or organic debris to protect the slope from erosion, or if annual companion crops have stabilized the soil.

Mulch application includes straw mulch, hydro mulch and tackifier or other materials as approved by Keystone.

The Contractor shall use mulch that is free of noxious weeds.

The Contractor shall apply mulch immediately following seeding. The Contractor shall not apply mulch in wetlands.

If a mulch blower is used, the majority of strands of the mulching material shall not be shredded to less than 8 inches in length to allow anchoring. The Contractor shall anchor mulch immediately after application to minimize loss by wind and water.

When anchoring (straw crimping) by mechanical means, the Contractor shall use a tool specifically designed for mulch anchoring with flat, notched disks to properly crimp the mulch to a depth of 2 to 3 inches. A regular farm disk shall not be used to crimp mulch. The crimping of mulch shall be performed across the slope of the ground, not parallel to it. In addition, in areas of steep terrain, tracked vehicles may be used as a means of crimping mulch (equipment running up and down the hill to leave crimps perpendicular to the slope), provided they leave adequate coverage of mulch.

In soils possessing high erosion potential, the Contractor may be required to make two passes with the mulch-crimping tool; passes must be as perpendicular to the others as possible.

When anchoring with liquid mulch binders (tackifiers), the Contractor shall use a biodegradable tackifier derived from a vegetable-based, organic source. The Contractor shall apply mulch binders at rates recommended by the manufacturer.

The Contractor shall limit the use of tackifiers for anchoring straw and the use of hydromulch and tackifier to areas that are too steep or rocky to safely or effectively operate mechanical mulch-anchoring tools. No asphalt-based tackifiers shall be used on the Project.

4.11.5.4 Erosion Control Matting

Erosion control matting shall be applied where shown on the construction drawings as shown on Detail 4. The Contractor shall anchor the erosion control matting with staples or other approved devices.

The Contractor shall use erosion control matting made of biodegradable, natural fiber such as straw or coir (coconut fiber).

The Contractor shall prepare the soil surface and install the erosion control matting to ensure it is stable and the matting makes uniform contact with the soil of the slope face or stream bank with no bridging of rills, gullies, or other low areas.

4.11.5.5 Riprap and Stream Bank Stabilization

Disturbed banks of streambeds and waterbodies shall be restored to their approximate original contours unless otherwise directed. Erosion protection shall be applied as specified in the construction drawings.

Most restored banks will be protected through the use of flexible channel liners installed as specified in Detail 19.

If the original stream bank is excessively steep and unstable and/or flow conditions are severe, a more stable final contour may be specified and alternate stabilization measures may be installed.

Alternate stabilization measures may consist of rock riprap, bio-stabilization, or engineered structures such as brush layering, logwalls, cribwalls, or vegetated geo-grids. See Details 20, 23, and 24.

Stream bank riprap structures shall consist of a layer of stone underlain with approved filter fabric or a gravel filter blanket. Riprap shall extend from the stabilized streambed to the top of the stream bank. Native rock shall be utilized wherever practicable.

4.11.6 Fences

Upon completion of all backfilling, cleanup, and restoration, including mulching and seeding of the construction right-of-way, permanent repairs shall be made to all fences by using either the original material or good quality new material similar to existing fences.

Historic fences shall be carefully reassembled by hand from the original material. Where the original material has deteriorated to a state that makes it unsalvageable, replacement material similar to the original shall be used if possible.

4.11.7 Farm Terraces

Keystone will work with landowners and farm service agencies to ensure restoration of farm terraces to their pre-construction function. Keystone may elect to negotiate a fair settlement with the landowner to employ a local land leveling contractor to restore the terrace.

Before any groundwork is performed in areas with farm terraces, Keystone will conduct a civil survey to document the location and contours of each terrace. Both the channel contour and the terrace berm will be surveyed within the construction right-of-way and up to 100 feet on either side of the ROW boundaries. The pre-construction survey will

provide a baseline to ensure the proper restoration of the terrace following construction.

The Contractor will maintain the pre-disturbance drainage of water along the terrace channel and will install temporary flume pipe for this purpose. As necessary, temporary erosion control measures such as water bars and sediment barriers will be installed and maintained throughout construction to reduce the potential for soil erosion along or off the construction ROW.

Following installation of the pipe, the trench will be backfilled, and the Contractor will restore the terrace contours as agreed to with the landowner.

Should the landowner agree to have a local contractor restore the terraces, the Contractor will backfill the trench and restore the terrace using typical compaction methods for pipeline construction with the understanding that the landowner's contractor will re-excavate the location and re-install the terrace utilizing land levelling equipment and special compaction methods.

Should the landowner desire the Contractor to restore the terraces, the pipeline contractor will compact the trench before the terrace berm is replaced. Following restoration of the terraces, final contours and grades will be re-surveyed and documented with survey notes. Keystone will perform post-construction monitoring and inspection with the landowner's concurrence. Should the terraces require further work, Keystone will either compensate the landowner to perform the work or arrange for a local contractor to perform the work.

4.11.8 Right-of-Way and Pipeline Markers

Upon completion of all backfilling, cleanup and restoration, including mulching and seeding of the construction right-of-way, and during the time when the Contractor is making permanent repairs to fences, the Contractor shall install pipeline markers on each side of all roads, railroads, fence lines, stream crossings, and other areas where the pipeline markers do not conflict with intended land use.

4.12 Pasture and Range Lands

The following mitigative measures shall be implemented in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Access across the right-of-way during construction shall be provided at locations requested by landowners, if practicable.
- Shavings produced during pipe bevel operations are to be removed immediately to ensure that livestock and wildlife do not ingest this material.

- Litter and garbage shall be collected and removed from the construction site at the end of the day's activities.
- Temporary gates shall be installed at fence lines for access to the construction right-of-way. These gates shall remain closed at all times. Upon completion of construction, the temporary gates shall be removed and the permanent fence replaced.
- Feeding or harassment of livestock or wildlife is prohibited.
- Construction personnel shall not be permitted to have firearms or pets on the construction right-of-way.
- All food and wastes shall be stored and secured in vehicles or appropriate facilities.
- Areas of disturbance in native range shall be seeded with a native seed mix after topsoil replacement.
- Improved pasture shall be seeded with a seed mix approved by individual landowners.

4.13 Forested Lands

Mitigation measures are required to ensure that pipeline construction activities have a minimal impact on forested lands.

Clearing, grubbing, and grading of trees, brush, and stumps shall be performed in accordance with the following mitigative measures in addition to the requirements previously stated in Sections 4.1 thru 4.11 unless otherwise approved or directed by Keystone based on site-specific conditions or circumstances. Keystone will address mitigation, reclamation and remediation measures with individual landowners and comply with any applicable state requirements. These measures include non-vegetative remediation to reverse impacts on windbreaks, shelterbelts, and living snow fences. Where the pipeline follows an existing ROW in forested areas, Keystone attempted to route the pipeline as close as practical to the existing ROW. All work shall be conducted in accordance with applicable permits.

- Prior to the start of clearing activity, right-of-way boundaries, including pre-approved temporary workspaces, shall be clearly staked to prevent disturbance of unauthorized areas.
- If trees are to be removed from the construction right-of-way, Keystone shall consult with the landowner or landowner's designate to see if there are trees of commercial or other value to the landowner. Timber shall be salvaged as per landowner request.
- If there are trees of commercial or other value to the landowner, Keystone shall allow the landowner the right to retain ownership of the trees with the disposition of the trees to be negotiated prior to the commencement of land clearing and included in the easement agreement.
- If not performed by the landowner, the construction right-of-way Contractor may salvage all marketable timber from designated areas.

- Tree stumps shall be grubbed to a maximum of 5 feet on either side of the trench line and where necessary for grading a level surface for pipeline construction equipment to operate safely.
- Keystone shall follow the landowner's or landowner designee's desires as stated in the easement agreement regarding the disposal of trees, brush, and stumps of no value to the landowner by burning, burial, etc., or complete removal from any affected property.
- Timber salvage operations shall use cut-off-type saw equipment. Felling shall be undertaken in a manner that minimizes butt shatter, breakage, and off ROW disturbance. Skidders or alternate equipment shall be used to transport salvaged logs to stacking sites.
- Trees shall be felled to fall toward the center line of the right-of-way to avoid breaking trees and branches off ROW. Leaners (felled trees that inadvertently fall into adjacent undisturbed vegetation) shall be salvaged.
- Trees and slash falling outside the right-of-way shall be recovered and disposed..
- Salvaged logs shall be limbed and topped before removal from the construction right-of-way. Log decks (if required) shall be oriented to best facilitate loading by picker trucks and be located adjacent to the working side of the right-of-way, where possible.
- The Contractor shall not be allowed to dispose of woody debris in wooded areas along the pipeline right-of-way.
- Pruning of branches hanging over the right-of-way shall be done only when necessary for construction. Any branch that is broken or seriously damaged should be cut off near its fork and the collar of the branch preserved.
- All tree wastes, stumps, tree crowns, brushes, branches, and other forest debris shall be either burned, chipped (using a mobile chipper), or removed from the right-of-way according to Keystone instructions contained in the specific mitigation measures. Burial of this waste material on the site by the Contractor shall require the landowner’s authorization. Chips must not be spread over cultivated land. However, they may be spread and incorporated with mineral soil over the forest floor at a density that shall not prevent revegetation of grass.
- Stump removal and brush clearing shall be done with bulldozers equipped with brush rakes to preserve organic matter.
- Decking sites shall be established: (1) approximately 2000 feet apart in timbered areas; (2) on sites located on approved temporary workspace in existing cleared areas; (3) in non-merchantable stands of timber; or (4) if no other options are available, in merchantable timber stands. Deck sites shall be appropriately sized to accommodate the loading equipment.
- If the landowner does not want the timber, the Contractor shall remove decked timber from the construction right-of-way and transport it to a designated all-weather access point or mill

4.14 Residential and Commercial/Industrial Areas

4.14.1 Residential and Commercial Areas

The principal measures that shall be used to mitigate impacts on existing residential and commercial areas include the following unless otherwise directed or approved by Keystone based on site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- notifying landowners prior to construction;
- posting warning signs as appropriate;
- reducing the width of construction right-of-way, if practicable, by eliminating the construction equipment passing lane, reducing the size of work crews, or utilizing the “stove pipe” or “drag section” construction techniques;
- removing fences, sheds, and other improvements as necessary for protection from construction activities;
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;
- fencing the edge of the construction work area that is within 25 feet to a residence for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- limiting the hours during which operations with high-decibel noise levels (i.e., drilling and boring) can be conducted;
- limiting dust impact through prearranged work hours and by utilizing dust minimization techniques;
- ensuring that construction proceeds quickly through such areas, thus minimizing exposure to nuisance effects such as noise and dust;
- maintaining access and traffic flow during construction activities, particularly for emergency vehicles;
- cleaning up construction trash and debris daily;
- fencing or plating open ditches during non-construction activities;
- if the pipeline centerline is within 25 feet of a residence, ensuring that the trench is not excavated until the pipe is ready for installation and that the trench shall be backfilled immediately after pipe installation; and
- immediately after backfilling the trench, restoring all lawn areas, shrubs, specialized landscaping, fences, and other structures within the construction work area to its pre-construction appearance or the requirements of the landowner. Restoration work shall be done by personnel familiar with local horticultural and turf establishment practices.
- to the extent possible, preserving mature trees and landscaping while ensuring the safe operation of construction equipment;

4.14.2 Site-Specific Plans

For any residence or commercial/industrial building closer than 25 feet to the construction work area, Keystone shall prepare a site-specific construction plan. The plan shall include:

- a description of construction techniques to be used;
- a dimensioned site plan that shows, at a minimum:
  - the location of the residence or commercial/industrial area in relation to the new pipeline;
  - the edge of the construction work area;
  - the edge of the new permanent construction right-of-way; and
  - other nearby topographical obstacles including landscaping, trees, structures, roads, parking areas, ditches, and streams; and
- a description of how Keystone would ensure that the trench is not excavated until the pipe is ready for installation and that the trench is backfilled immediately after pipe installation.

4.14.3 Landowner Complaint Resolution Procedure

Keystone shall implement a landowner complaint procedure as follows:

- Landowners should first contact the construction spread office to express their concern over restoration or mitigation of environmental damages on their property. The Construction Manager or his designated representative shall respond to the landowner within 24 hours of receipt of the phone call.
- If the landowner has not received a response or is not satisfied with the response, he can contact Keystone's representative at 1-877-880-4881. The landowner should expect a response within 48 hours.

4.15 Fragile Soil Clean-up and Reclamation/Revegetation

4.15.1 General

Fragile soil types are a result of the high percentage of sand content that exists within the surficial soil. Theses soil types exist within regions found in southern South Dakota and central Nebraska and fragile due to their inherent high wind and water erosion potential, low water holding capacity and arid nature of the region, rolling to steep terrain and usually consists of predominantly native prairie landscapes and supports a variety of uses such as livestock grazing, wildlife habitat and recreational opportunities.

4.15.2 Right-of-way Construction

- KXL will educate construction personnel regarding these areas and the necessity to strictly adhere to Project Best Management Practices (BMPs) designed to minimize impacts.

- Minor route re-alignments will be incorporated through these areas to avoid particularly erosion-prone locations, such as ridge tops and existing blowouts as much as practicable.
- KXL will avoid highly saturated areas, such as wetland, to the maximum extent possible.
- Construction soil handling procedures will strive to reduce the width of disturbance to the native prairie landscape by adopting "Trench-line or Blade-width stripping procedures where practicable.
- Topsoil conservation will be conducted on all areas where excavation occurs.
- Topsoil piles will be protected from erosion through matting, mulching, watering or tackifying as deemed practicable.
- Traffic management limitations will be employed on specific areas possessing high erosion potential or sensitive habitat.

4.15.3 Right-of-Way Reclamation

- Native seed mixes will be developed with input from the local NRCS offices and through collaboration with regional experts. All seed will be certified noxious weed-free and will be calculated on a pure live seed (PLS) basis.
- Straw or native prairie hay may be used as mulch, applied to the right-of-way and crimped into the soil to prevent wind erosion. All mulch will be documented as noxious weed-free.
- Land imprinting may be employed to create impressions in the soil, thereby reducing erosion, improving moisture retention and creating micro-sites for seed germination.
- Sediment logs or straw wattles will be used in place of slope breakers (short terraces) that are constructed of soil. Using sediment logs will result in less soil disturbance to the right-of-way.
- Photodegradable matting will be applied on steep slopes or areas prone to extreme wind exposure such as north- or west-facing slopes and ridge tops. Biodegradable pins will be used in place of metal staples to hold the matting in place.
- Keystone will work with landowners to evaluate fencing the right-of-way from livestock, or alternatively, provide compensation to rest a pasture until vegetation can become established. Management concerns such as livestock access to water or movement within a pasture would be incorporated as necessary.

4.15.4 Post-Construction

Keystone is committed to post-construction monitoring and repair and will monitor reclamation on the right-of-way for several years and repair

erosion and reseed poorly revegetated areas as necessary. During monitoring, landowners are informed of our efforts and intentions.

A noxious weed management plan will be established on these lands pending consultation with state and county experts

4.16 Operations and Maintenance

Operations and maintenance programs, such as vegetation management, pipeline maintenance, integrity surveys, and hydrostatic testing, may have an impact on the final reclamation of the right-of-way. To ensure the integrity of the facility and land surface reclamation of the right-of-way is maintained after completion of construction and that regulatory requirements are adhered to during operations, the following measures shall be implemented unless otherwise directed by Keystone in response to site-specific conditions or circumstances. All work shall be conducted in accordance with applicable permits.

- Keystone shall monitor the pipeline right-of-way and all stream crossings for erosion or other potential problems that could affect the integrity of the pipeline. Any erosion identified shall be reclaimed as expediently as practicable by Keystone or by compensating to the landowner to reclaim the area.
- Trench depressions on ditch line that may interfere with natural drainage, vegetation establishment, or land use shall be repaired as expediently as practicable by Keystone or by compensating the landowner to repair the area.
- Post-construction monitoring inspections shall be conducted after the first growing season to determine the success of revegetation, unless otherwise required by permit. Areas which have not been successfully re-established shall be revegetated by Keystone or by compensation of the landowner to reseed the area. If, after the first growing season, revegetation is successful, no additional monitoring shall be conducted unless otherwise required by permit.
- In non-agricultural areas, revegetation shall be considered successful if, upon visual survey, the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands, unless otherwise required by permit.
- In agricultural areas, revegetation shall be considered successful if crop yields are similar to adjacent undisturbed portions of the same field.
- Restoration shall be considered successful if the surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner or land managing agency), revegetation is successful, and drainage has been restored.
- Weed control measures shall be implemented as required by any applicable plan and in conjunction with the landowner.
- Keystone shall be responsible for correcting tile line or irrigation system

repairs that fail, provided those repairs were made by Keystone. Keystone shall not be responsible for tile line or irrigation system repairs which Keystone compensated the landowner to perform.

- When requested by owners in cultivated land, Keystone shall monitor the yield of land impacted by construction with the help of agricultural specialists. If yield deficiencies are indicated compared to yields on unaffected land, Keystone will compensate the landowner for reduced yields and shall implement procedures to return the land to equivalent capability.
- In residential areas, landowners may use the right-of-way provided they do not interfere with the rights granted to Keystone. Trees, bushes, structures, including houses, tool sheds, garages, poles, guy wires, catch basins, swimming pools, trailers, leaching fields, septic tanks, and any other objects not easily removable, shall not be permitted on the permanent construction right-of-way without the written permission of Keystone, because they could impair access for maintenance of the pipeline.
- Keystone shall maintain communication with the landowner and tenant throughout the operating life of the pipeline to allow expedient communication of issues and problems as they occur. Keystone shall provide the landowner with corporate contact information for these purposes. Keystone shall work with landowners to prevent excessive erosion on lands disturbed by construction. Reasonable methods shall be implemented to control erosion. These may not be implemented if the property across which the pipeline is constructed is bare cropland which the landowner intends to leave bare until the next crop is planted.
- If the landowner and Keystone cannot agree upon a reasonable method to control erosion on the landowner's property, the recommendations of the appropriate NRCS office shall be considered by Keystone and the landowner.

5.0 DRAIN TILE SYSTEMS

5.1 General

If underground drainage tile is damaged by the pipeline installation, it shall be repaired in a manner that ensures the tile line's proper operating condition at the point of repair. Keystone may elect to negotiate a fair settlement with the affected county or landowner for repair of the damaged drain tile. In the event the landowner chooses to have the damaged tile repaired by Keystone, the Contractor shall follow these guidelines and procedures to identify the location of drain tiles, to mitigate damages to drain tiles prior to and during construction, to repair drain tiles damaged during installation of the pipeline, to inspect the proper repair of drain tiles, and to provide post-construction monitoring to determine any impacts caused by repair of drain tiles. Since all public and private drain tile systems are unique, i.e., varying age, depth of cover, type of material, geometry on the land, etc., it is not possible to develop a standard procedure for resolving each county’s or landowner’s drain tile issues. These guidelines provide a basis on which to develop site specific methodology to mitigate damage and to repair drain tiles affected by construction of the Project. A typical right-of-way layout and typical orientation for crossing drain tiles is provided in Detail 25. Typical header and main

crossovers are provided in Details 26 and 27. Actual measures will be developed based on site-specific information unique to specific installations. However, all work will be conducted in accordance with applicable permits.

5.2 Identification and Classification of Drain Tile Systems

Personnel shall attempt to identify and classify existing drain tile systems by meeting with local public officials and county engineers, and individual private landowners and tenants.

5.2.1 Publicly Owned Drain Tiles

Personnel shall identify and meet with the responsible county or local authority responsible for publicly owned drain tiles. Publicly owned drain tiles shall be identified and documented on the Project's 1" = 2000' USGS quad strip maps and additional data collected for input into an electronic spreadsheet by county, township, range, and section; responsible agency; and size, type, and depth of cover (if known). This data shall be cross-referenced to the centerline survey to be completed by Keystone. Additionally, any public records including maps or easement instruments on the drain tiles shall be acquired as well as any requirements of the local authority for installation of the pipeline.

5.2.2 Privately Owned Drain Tiles

Right-of-way agents shall meet with landowners and tenants of privately owned land along the route. As a minimum, the right-of-way agents shall ascertain the data concerning drain tiles outlined in a landowner questionnaire. The questionnaire requests data concerning: type of drain tile system; size, type of material, and depth of cover; preference for repair of drain tiles; and identification of local drain tile contractors. These data shall be collected into an electronic spreadsheet for utilization by right-of-way personnel in negotiating payments for easements and damages and by engineering or construction personnel for inclusion in specifications for the construction Contractor.

5.3 Mitigation of Damage to Drain Tile Systems

Keystone shall undertake mitigation measures to reduce damage to publicly and privately owned drain tile systems prior to and during installation of the pipeline.

5.3.1 Non-interference with Drain Tile

The Project shall be installed at a depth of cover and elevation so as not to interfere with the elevation and grade of existing drain tiles where practicable. Where not practicable, Keystone shall pursue alternative mitigation measures mutually acceptable to the landowner and jurisdictional agencies. Typically, the pipeline shall be installed below the elevation of drain tiles with a minimum clearance of 12 inches. Detail 25, Typical Right-of-Way Layout/Soil Handling, represents a typical drain tile crossing by the

pipeline with additional temporary work space to facilitate handling of topsoil and trench spoil created by the additional depth of cover for the pipeline.

5.3.2 Non-disturbance of Drain Tile Mains

Publicly owned and privately owned drain tile mains shall be identified through the processes identified in Section 5.2. Drain tile mains are essential to the overall drainage system of a land area and if disturbed, may require excessive pumping/dewatering of the pipe trench unless temporarily repaired and maintained until permanently repaired.

Keystone shall review drain tile mains and consider their size, flow rate, type of material, depth of cover, and geographic location. If determined to be practicable and reasonable for construction, the drain tile main shall not be cut and repaired during mainline installation (a pipe section shall be left out and installed by a tie-in crew without damaging the drain tile main).

5.3.3 Relocation or Replacement of Existing Drain Tiles Prior to Construction

In many instances, drain tile systems that have been installed after the installation of adjacent existing pipelines were installed with “headers” parallel to the existing pipeline with periodic jump overs as depicted on Detail 26, Header/Main Crossovers of Keystone XL Pipeline. The distance of these headers from the existing pipeline may vary.

Some of these drain tile headers may be most effectively relocated and/or replaced to the east of the Project. The existing header will be capped and made into a single drain tile as depicted on Detail 27, Relocate/Replace Drainage Header/Main. This could reduce the number of drain tile crossings on a particular landowner’s property by a significant quantity, thereby reducing the risk that repairs will fail.

5.3.4 Future Drain Tiles/Systems

Keystone shall attempt to determine where public agencies and private landowners or tenants are proposing to install drain tile systems in the future. These locations shall be input into an electronic spreadsheet by county, township, range, and section; landowner or responsible public agency; and proposed size and depth of cover. Keystone shall endeavor to construct the pipeline at a depth and elevation to accommodate the future installation of the proposed drain tile systems.

5.3.5 Other Mitigation Measures

Other mitigation measures that may be implemented during installation of the pipeline are as follows:

- not removing topsoil from the working side of the construction right-of-way to prevent crushing of drain tile by heavy equipment;
- spreading ditch and spoil side topsoil (not subsoil) over the working side to provide additional soil depth to protect existing drain tiles;

- restricting the work of the pipe lower in crew if ground conditions are too wet to adequately support the heavy equipment;
- limiting travel of heavy equipment the working lane of the construction right-of-way where possible;
- limiting travel of heavy equipment to one pass over the drain tile per work crew where possible; and
- removing and replacing topsoil during drain tile replacement should tile be crushed on the working side of the right-of-way.

5.4 Responsibility for Repair of Drain Tile Systems

Temporary and permanent drain tile repairs shall be the responsibility of the Contractor. The physical repairs shall be made by qualified and experienced drain tile repair personnel.

5.4.1 Local Drain Tile Contractor Repair

Keystone shall identify and qualify local drain tile contractors in the geographical area of the pipeline route from interviews with local public officials, landowners, tenants, and drain tile contractors. The preferred responsibility for permanent repair of drain tiles shall be for the pipeline Contractor to subcontract the supervision and repair to local reputable drain tile contractors acceptable to the landowners and tenants.

5.4.2 Pipeline Contractor Repair

In the event local drain tile contractors are not available to subcontract the supervision and repair, permanent repair shall be made with the Contractor's supervision, equipment, and labor.

5.4.3 Landowner/Tenant Repair

The landowner or tenant may agree to take responsibility for the permanent repair of his drain tiles if not precluded by regulatory agency. The landowner or tenant shall be requested to ensure his ability to coordinate and complete the drain tile repair in a timely manner to allow the pipeline Contractor to completely backfill the damaged drain tile for repair by landowner/tenant in the immediate future. Keystone shall require that its representative be present to ensure the permanent drain tile repairs are made in accordance with the minimum requirements of this manual.

5.5 Drain Tile Repairs

The Contractor shall endeavour to locate all tile lines within the construction right-of-way prior to and during installation so repairs can be made if necessary.

5.5.1 Temporary Repairs During Construction

Drain tiles damaged or cut during the excavation of the trench shall be marked with a lath and ribbon in the spoil bank. Care shall be taken to

locate markers where the chance of disturbance shall be minimized and a written record maintained of each drain tile crossing. A work crew following the pipeline trench crew shall complete a temporary repair to allow continuing flow. Detail 28, Temporary Drain Tile Repair, depicts the materials and installation procedure to complete the temporary repair. If a drain tile line shall not be temporarily repaired, the open ends of the drain tile shall be screened to prevent entry of foreign materials and small animals.

5.5.2 Permanent Repairs

Permanent repairs shall be made for all drain tiles damaged by installation of the pipeline.

5.5.2.1 Ditch Line Only Repairs

If water is flowing through a damaged tile line, the tile line shall be immediately and temporarily repaired until such time that permanent repairs can be made. If tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repair is made within 7 days of the time damage

occurred. The temporary repair shall be removed just prior to lowering in the pipeline.

Drain tiles must be permanently repaired before the pipeline trench is backfilled and within 14 days of construction completion, weather and soil conditions permitting. All tile lines shall be repaired with materials of the same or better quality as that which was damaged. The drain tile marker shall not be removed until the tile repairs have been inspected, approved, and accepted by Keystone's inspectors, the county inspectors, where applicable, and the landowner or tenant. Detail 29, Permanent Repair Method of Drain Tiles, depicts the minimum materials and installation procedure to complete a permanent repair.

5.5.2.2 Ditch Line and Temporary Work Space Repairs

Prior to making the permanent drain tile repair, the Contractor shall probe a segmented sewer rod with a plug that is not more than 15% smaller than the internal diameter of the drain tile to determine if additional damage has occurred to the drain tile. If the probe does not freely insert into the drain tile across the temporary workspace of pipeline construction, the Contractor shall excavate, expose, and repair the damaged drain tile to its original or better condition.

5.6 Inspection/Acceptance of Drain Tile Repairs

Drain tile repairs shall be inspected by Keystone construction inspectors, county inspectors, as applicable, and the landowner or tenant or his representative.

Keystone shall designate inspector(s) for the sole purpose and responsibility for inspection of all repairs of drain tiles. These inspectors shall be, if possible, employed from local drain tile installation contractors, local farmers with extensive drain tile experience, or previously employed or retired employees of local jurisdictions familiar with drain tile installation and repair. In the event that a sufficient quantity of inspectors from these sources is not available, Keystone shall conduct in-the-field training seminars on drain tile repair for additional inspection personnel.

Inspection personnel shall observe the permanent repair of all drain tiles to ensure the replacement drain tile is: (1) the proper size and type; (2) installed at the proper grade; (3) properly supported and backfill beneath the drain tile is properly placed and compacted; and (4) properly tied into the existing drain tile. The inspection shall be documented on the Drain Tile Inspection Report Form.

A drain tile repair shall not be accepted until Keystone's construction inspector and the landowner or tenant or designated representative approves the inspection form.

6.0 WETLAND CROSSINGS

6.1 General

Wetland boundaries shall be clearly marked in the field with signs and/or highly visible flagging during construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the measures of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Lands shall be implemented to the extent practicable.

A dry wetland is defined in Section 6.5.1. In these wetlands, equipment can traverse the wetland without the support of mats or timber riprap.

A standard wetland environment typically has soils that are saturated and non-cohesive. Difficult trenching conditions are likely resulting in excessively wide trenches. In these wetland environment types, supplemental support in the form of timber riprap or prefabricated equipment mats may be required for construction equipment to safely and efficiently operate.

A flooded wetland involves the presence of standing water over much of the wetland area. Equipment typically cannot traverse the wetland and must generally move around that portion of the area. Access is typically limited to marsh backhoes or equipment working from flexifloats or equivalents.

Keystone may allow modification of the following specifications as necessary to accommodate site-specific conditions or procedures. Any modifications must still comply with all applicable regulations and permits.

6.2 Easement and Workspace

The Contractor shall maintain wetland boundary markers during construction in all areas and until permanent seeding is complete in non-cultivated areas.

The width of the construction right-of-way shall be reduced to 85 feet or less in standard wetlands unless non-cohesive soil conditions require utilization of a greater width and unless the USACE or other regulatory authority authorizes a greater width.

The Contractor shall locate extra work areas (such as staging areas and additional spoil storage areas) shall be at least 10 feet away from wetland boundaries, where topographic conditions permit.

The Contractor shall limit clearing of vegetation between extra work areas and the edge of the wetland to the construction right-of-way and limit the size of extra work areas to the minimum needed to construct the wetland crossing.

6.3 Vehicle Access and Equipment Crossing

The only access roads, other than the construction right-of-way, that the Contractor shall use in wetlands are those existing public roads and private roads acquired by Keystone from the landowner shown on the construction drawings.

To the extent practicable, the Contractor's construction equipment operating in saturated wetlands or wetlands with standing water shall be limited to that needed to clear the construction right-of-way, dig the trench, fabricate and install the pipeline, backfill the trench, and restore the construction right-of-way.

If equipment must operate within a wetland containing standing water or saturated soils, the Contractor shall use the following methods for equipment access unless otherwise approved by Keystone based on site-specific conditions:

- wide-track or balloon-tire construction equipment; and
- conventional equipment operated from timber and slash (riprap) cleared from the right-of-way, timber mats, or prefabricated equipment mats.

6.4 Temporary Erosion and Sediment Control

The Contractor shall install sediment barriers across the entire construction right-of-way immediately upslope of the wetland boundary at all standard wetland crossings, as necessary, to prevent sediment flow into the wetland. Sediment barriers must be properly maintained by the Contractor throughout construction and reinstalled as necessary. In the travel lane, these may incorporate removable sediment barriers or drivable berms. Removable sediment barriers can be removed during the construction day, but shall be re-installed after construction has stopped for the day or when heavy precipitation is imminent. The Contractor shall maintain sediment barriers until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. The Contractor shall not install sediment barriers at wetlands designated as "dry" unless otherwise specified by Keystone.

Where standard wetlands are adjacent to the construction right-of-way, the Contractor shall install sediment barriers along the edge of the construction right-of-way as necessary to prevent a sediment flow into the wetland.

6.5 Wetland Crossing Procedures

The following general mitigative procedures shall be followed by the Contractor in all wetlands unless otherwise approved or directed by Keystone based on site-specific conditions. All work shall be conducted in accordance with applicable permits.

- limit the duration of construction-related disturbance within wetlands to the extent practicable;

- use no more than two layers of timber riprap to stabilize the construction right-of-way;
- cut vegetation off at ground level leaving existing root systems in place and remove it from the wetland for disposal;
- limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working-side of the construction ROW;
- segregate a maximum of 12 inches of topsoil from the area disturbed by trenching in dry wetlands, where practicable;
- restore topsoil to its approximate original stratum, after backfilling is complete;
- dewater the trench in a manner to prevent erosion and heavily silt-laden flowing directly into any wetland or waterbody;
- remove all timber riprap and prefabricated equipment mats upon completion of construction;
- locate hydrostatic test manifolds outside wetlands and riparian areas to the maximum extent practicable;
- prohibit storing hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating activities in a wetland, or within 100 feet of any wetland boundary;
- perform all equipment maintenance and repairs upland locations at least 100 feet from waterbodies and wetlands;
- avoid parking equipment overnight within 100 feet of a watercourse or wetland;
- prohibit washing equipment in streams or wetlands;
- install trench breakers and/or seal the trench to maintain the original wetland hydrology, where the pipeline trench may drain a wetland;
- attempt to refuel all construction equipment in an upland area at least 100 feet from a wetland boundary (otherwise follow the procedures outlined in Section 3); and
- avoid sand blasting in wetlands to the extent practicable. If sandblasting is performed within a wetland, the Contractor shall place a tarp or suitable material in such a way as to collect as much waste shot as possible and dispose of the collected waste. The Contractor shall clean up all visible deposits of wastes and dispose of the waste at an approved disposal facility.

Specific procedures for each type of wetland crossing method are listed below and shall be designated on the construction drawings but may be modified depending on site conditions at the time of construction. All work shall be conducted in accordance with applicable permits.

6.5.1 Dry Wetland Crossing Method

Topsoil shall be segregated. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace.

The dry wetland crossing procedure depicted in Detail 8 shall be used where this type of wetland is identified on the construction drawings. The following are exceptions to standard wetland crossing methods:

- The width of the construction right-of-way for upland construction is maintained through the wetland.
- Where extra work areas (such as staging areas and additional spoil storage areas) are designated on the construction drawings, they may be placed no closer than 10 feet from the wetland's edge.
- Seeding requirements for agricultural lands shall be applied to farmed wetlands.

6.5.2 Standard Wetland Crossing Method

Topsoil stripping is impracticable due to the saturated nature of the soil. Pipe stringing and fabrication may occur within the wetland adjacent to the trench line or adjacent to the wetland in a designated extra workspace. Based upon the length of a standard wetland crossing and presence of sufficient water to float the pipe, the Contractor may elect to install a standard wetland crossing utilizing the “push/pull” method.

The standard wetland crossing procedure depicted in Detail 9 shall be used where this type of wetland is identified on the construction drawings.

Procedures unique to standard wetlands include:

- limiting construction right-of-way width to a maximum of 85 feet unless site conditions warrant a wider width;
- utilizing low-ground-pressure construction equipment or support equipment on timber riprap or timber mats; and
- installing sediment barriers across the entire right-of-way where the right-of-way enters and exits the wetland.

6.5.3 Flooded Push/Pull Wetland Crossing Method

Where standing surface water or high groundwater levels make trenching difficult, trench widths up to 35 feet are common. Topsoil stripping is impossible due to the flooded conditions. Pipe stringing and fabrication is required adjacent to the wetland in a designated extra workspace. Using floatation devices, the pipe string is pushed and pulled from the extra workspace to the trench.

The Push/Pull wetland crossing procedure as depicted in Detail 10 shall be used where water is sufficient to float the pipeline in the trench and other site conditions allow.

Clean metal barrels or Styrofoam floats may be used to assist in the flotation of the pipe. Metal banding shall be used to secure the barrels or floats to the pipe. All barrels, floats, and banding shall be recovered and removed upon completion of lower in. Backfill shall not be allowed before recovery of barrels, floats, and banding.

6.6 Restoration and Reclamation

All timber riprap, timber mats, and prefabricated equipment mats and other construction debris shall be removed upon completion of construction. As much as is feasible, the Contractor shall replace topsoil and restore original contours with no crown over the trench. Any excess spoil shall be removed from the wetland. The Contractor shall stabilize wetland edges and adjacent upland areas by establishing permanent erosion control measures and revegetation, as applicable, during final clean up.

For each standard wetland crossed, the Contractor shall install a permanent slope breaker and trench breaker at the base of slopes near the boundary between the wetland and adjacent upland areas. The Contractor shall locate the trench breaker immediately upslope of the slope breaker.

The Contractor shall not use fertilizer, lime, or mulch in wetlands unless required in writing by the appropriate land management agency.

All wetland areas within conservation lands or easements will be restored to a level consistent with any additional criteria established by the relevant managing agency.

7.0 WATERBODIES AND RIPARIAN AREAS

7.1 General

The Contractor shall comply with requirements of all permits issued for the waterbody crossings by federal, state or local agencies.

Waterbody includes any areas delineated as jurisdictional natural or artificial stream, river, or drainage, and other permanent waterbodies such as ponds and lakes:

- Minor Waterbody includes all waterbodies less than or equal to 10 feet wide at the water's edge at the time of construction.
- Intermediate Waterbody includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction.
- Major Waterbody includes all waterbodies greater than 100 feet wide at the water's edge at the time of construction.

In the event a waterbody crossing is located within or adjacent to a wetland crossing, the Contractor, to the extent practicable, shall implement the provisions of both Section 6 - Wetland Crossings and Section 7 - Waterbodies and Riparian Areas.

The Contractor shall supply and install advisory signs in a readily visible location along the construction right-of-way at a distance of approximately 100 feet on each side of the crossing and on all roads which provide direct construction access to waterbody crossing sites. Signs shall be supplied, installed, maintained, and then removed upon completion of the Project. Additionally, signs shall be supplied and installed by the Contractor on all intermediate and major waterbodies accessible to recreational boaters warning boaters of pipeline construction operations.

The Contractor shall not store hazardous materials, chemicals, fuels, lubricating oils, or perform concrete coating within 100 feet of any waterbody. The Contractor shall not refuel construction equipment within 100 feet of any waterbody. If the Contractor must refuel construction equipment within 100 feet of a waterbody, it must be done in accordance with the requirements outlined in Section 3. All equipment maintenance and repairs will be performed in upland locations at least 100 feet from waterbodies and wetlands. All equipment parked overnight shall be at least 100 feet from a watercourse or wetland, if possible. Equipment shall not be washed in streams or wetlands.

Throughout construction, the Contractor shall maintain adequate flow rates to protect aquatic life and to prevent the interruption of existing downstream uses.

Keystone may allow modification of the following specifications as necessary to accommodate specific situations or procedures. Any modifications must comply with all applicable regulations and permits. Keystone will complete site-specific

crossing plans for certain waterbody crossings if required by the applicable regulatory agencies during federal or state permitting processes.

7.2 Easement and Work Space

The permanent easement, temporary work space, additional temporary work space, and any special restrictions shall be depicted on the construction drawings. The work shall be contained within these areas and be limited in size to the minimum required to construct the waterbody crossing.

The Contractor shall locate all extra work areas (such as staging areas and additional spoil storage areas) at least 10 feet from the water's edge if practicable.

At all waterbody crossings, the Contractor shall install flagging across the construction right-of-way at least 10 feet from the water's edge prior to clearing and ensure that riparian cover is maintained where practicable during construction.

7.3 Vehicle Access and Equipment Crossings

The Contractor shall inspect equipment for fluid leaks prior to entering or crossing over waterbodies.

Equipment bridges shall be installed at all flowing waterbodies and as directed by the Keystone EI. Equipment crossings shall be constructed as described in Details 16, 17
and/or 18.

Equipment crossings shall be perpendicular to drainage bottoms wherever possible.

Erosion and sediment control barriers will be installed and maintained around vehicle access points as necessary to prevent sediment from reaching the waterway.

The Contractor shall be responsible for the installation, maintenance, and removal of all temporary access crossings including portable bridges, bridges made from timber or mats, flumes, culverts, sand bags, subsoil, coarse granular material, and riprap.

The Contractor shall ensure that culverts and flumes are sized and installed of sufficient diameter to accommodate the existing flow of water and those that may potentially be created by sudden runoffs. Flumes shall be installed with the inlet and outlet at natural grade if possible.

Where bridges, culverts or flumes are installed across the work area, the Contractor shall be responsible for maintaining them (e.g. preventing collapse, clogging or tilting). All flumes and culverts shall be removed as soon as possible upon completion of construction.

The width of the temporary access road across culverts and flumes and the design of the approaches and ramps shall be adequate for the size of vehicle and equipment access required. The ramps shall be of sufficient depth and constructed to prevent collapse of the flumes, and the approaches on both sides of the flume shall be feathered.

Where culverts are installed for access, the culvert shall be of sufficient length to convey the stream flow through the construction zone.

The Contractor shall maintain equipment bridges to prevent soil from entering the waterbody.

7.4 Waterbody Crossing Methods

Construction methods pertinent to waterbody crossings are presented below. Selection of the most appropriate method at each crossing shall be depicted on the construction drawings but may be amended or changed based on site-specific conditions (i.e., environmental sensitivity of the waterbody, depth, and rate of flow, subsurface soil conditions, and the expected time and duration of construction) at the time of crossing. Construction will involve dry-ditch techniques at crossings where the timing of construction does not adequately protect environmentally sensitive waterbodies, as determined by the appropriate regulatory authority. Where required, horizontal directional drilling (HDD) will be used at designated major and sensitive waterbodies crossings. Each waterbody crossing shall be accomplished using one of the following construction methods:

- Non-flowing Open Cut Crossing Method - (Detail 11)
- Flowing Open Cut Crossing Method – Minor, Intermediate or Major Waterbody - (Detail 12)
- Flowing Stream Crossing – Dry Flume Method - (Detail 13)
- Flowing Stream Crossing – Dry Dam-and-Pump Method - (Detail 14)
- Horizontal Directional Drill Crossing - (Detail 15)
- Horizontal Bore Crossing - (Detail 21)

In conjunction with the appropriate jurisdictional agency, Keystone will develop specific crossing plans for major water bodies that contain recreationally or commercially important fisheries, or are classified as special use. Keystone will consult with state fisheries agencies with respect to applicable construction windows for each crossing and develop specific construction and crossing methods for open cuts in conjunction with USACE permitting and USFWS consultation.

7.4.1 Non-flowing Open Cut Crossing Method

The Contractor shall utilize the Non-flowing Open Cut Crossing Method (Detail 11) for all waterbody crossings (ditches, gullies, drains, swales, etc.) with no perceptible flow at the time of construction. Should site conditions change and the waterbody is flowing at the time of

construction, the Contractor shall install the crossing utilizing the Flowing Open Cut Crossing Method (Detail 12) unless otherwise approved by Keystone.

7.4.2 Flowing Open Cut Crossing Method of Minor, Intermediate, and Major Waterbodies

For minor waterbody crossings, except where the flume method is used, the Contractor shall complete construction in the waterbody (not including blasting, if required) as shown on Detail 12 within 24 hours if practicable.

For intermediate waterbodies, the Contractor shall attempt to complete trenching and backfill work within the waterbody (not including blasting if required) within 48 hours if practicable as shown on Detail 12.

The Contractor shall construct each major waterbody crossing in accordance with a site-specific plan as shown in the construction drawings. The Contractor shall complete in-stream construction activities as expediently as practicable.

7.4.3 Flowing Stream Crossing – Dry Flume Method

Where required, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Flume Method as shown on Detail 13 with the following "dry ditch" techniques:

- Flume pipe shall be installed after blasting (if necessary), but before any trenching.
- Sand bag, sand bag and plastic sheeting diversion structure, or equivalent shall be used to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required in order to achieve an effective seal).
- Flume pipe(s) shall be aligned to prevent bank erosion and streambed scour.
- Flume pipe shall not be removed during trenching, pipe laying, or backfilling activities, or initial streambed restoration efforts.
- All flume pipes and dams that are not also part of the equipment bridge shall be removed as soon as final clean up of the stream bed and bank is complete.

7.4.4 Flowing Stream Crossing – Dry Dam-and-Pump Method

Where specified in the construction drawings, the Contractor shall utilize the Flowing Open Cut Crossing – Dry Dam-and-Pump Method as shown on Detail 14. The dam-and-pump crossing method shall meet the following performance criteria:

- sufficient pumps to maintain 1.5 times the flow present in the stream at the time of construction;

- at least one back up pump available on site;
- dams constructed with materials that prevent sediment and other pollutants from entering the waterbody (e.g., sandbags or clean gravel with plastic liner);
- screen pump intakes installed;
- streambed scour prevented at pump discharge; and
- dam and pumps shall be monitored to ensure proper operation throughout the waterbody crossing.

7.4.5 Horizontal Directional Drill Crossings

Where required, the horizontal directional drill method as shown on Detail 15 shall be utilized for designated major and sensitive waterbodies. The Contractor shall construct each directional drill waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

Drilling fluids and additives utilized during implementation of a directional drill shall be non-toxic to the aquatic environment.

The Contractor shall develop a contingency plan to address a frac-out during a directional drill. The plan shall include instructions for monitoring during the directional drill and mitigation in the event that there is a release of drilling fluids. Additionally, the waterbody shall be monitored downstream by the Contractor for any signs of drilling fluid.

The Contractor shall dispose of all drill cuttings and drilling mud as permitted by the appropriate regulatory authority at a Keystone-approved location. Disposal options may include spreading over the construction right-of-way in an upland location approved by Keystone or hauling to an approved licensed landfill or other site approved by Keystone.

7.4.6 Horizontal Bore Crossings

Where required, the horizontal bore method as shown on Detail 21 shall be utilized for crossing waterbodies. The Contractor shall construct each horizontal bore waterbody crossing in accordance with a site specific plan as shown in the construction drawings.

7.5 Clearing

Except where rock is encountered and at non-flowing open cut crossings, all necessary equipment and materials for pipe installation must be on site and assembled prior to commencing trenching in a waterbody. All staging areas for materials and equipment shall be located at least 10 feet from the waterbody edge. The Contractor shall preserve as much vegetation as possible along the waterbody banks while allowing for safe equipment operation.

Clearing and grubbing for temporary vehicle access and equipment crossings shall be carefully controlled to minimize sediment entering the waterbody from the construction right-of-way.

Clearing and grading shall be performed on both sides of the waterbody prior to initiating any trenching work. All trees shall be felled away from watercourses.

Plant debris or soil inadvertently deposited within the high water mark of waterbodies shall be promptly removed in a manner that minimizes disturbance of the waterbody bed and bank. Excess floatable debris shall be removed above the high water mark from areas immediately above crossings.

Vegetation adjacent to waterbody crossings by horizontal directional drill or boring methods shall not be disturbed except by hand clearing as necessary for drilling operations.

7.6 Grading

The construction right-of-way adjacent to the waterbody shall be graded so that soil is pushed away from the waterbody rather than towards it whenever possible.

In order to minimize disturbance to woody riparian vegetation within extra workspaces adjacent to the construction right-of-way at waterbody crossings, the Contractor shall minimize grading and grubbing of waterbody banks. To the extent practicable, grubbing shall be limited to the ditch line plus an appropriate width to accommodate safe vehicle access and the crossing.

7.7 Temporary Erosion and Sediment Control

The Contractor shall install and maintain sediment barriers across the entire construction right-of-way at all flowing waterbody crossings.

The Contractor shall install sediment barriers immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete.

Where waterbodies are adjacent to the construction right-of-way, the Contractor shall install and maintain sediment barriers along the edge of the construction right-of-way as necessary to contain spoil and sediment within the construction right-of-way.

7.8 Trenching

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

All equipment and materials shall be on site before trenching in the active channel of all minor waterbodies containing state-designated fisheries, and in

intermediate and major waterbodies. All activities shall proceed in an orderly manner without delays until the trench is backfilled and the stream banks stabilized. The Contractor shall not begin in-stream activity until the in-stream pipe section is complete and ready to be installed in the waterbody.

The Contractor shall use trench plugs at the end of the excavated trench to prevent the diversion of water into upland portions of the pipeline trench and to keep any accumulated upland trench water out of the waterbody. Trench plugs must be of sufficient size to withstand upslope water pressure.

The Contractor shall conduct as many in-stream activities as possible from the banks of the waterbodies. The Contractor shall limit the use of equipment operating in waterbodies to that needed to construct each crossing.

The Contractor shall place all spoil from minor and intermediate waterbody crossings and upland spoil from major waterbody crossings in the construction right-of-way at least 10 feet from the water's edge or in additional extra work areas. No trench spoil, including spoil from the portion of the trench across the stream channel, shall be stored within a waterbody unless the crossing cannot be reasonably completed without doing so.

The Contractor shall install and maintain sediment barriers around spoil piles to prevent the flow of spoil into the waterbody.

Spoil removed during ditching shall be used to backfill the trench usually with a backhoe, clamshell, or a dragline working from the waterbody bank. Sand, gravel, rockshield, or fill padding shall be placed around the pipe where rock is present in the channel bottom.

7.9 Pipe Installation

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

A "free stress" pipe profile shall be used at all minor, intermediate, and major waterbodies with gradually sloping stream banks. The "box bend" pipe profile may be used for intermittent and major waterbodies with steep stream banks.

The trench shall be closely inspected to confirm that the specified cover and adequate bottom support can be achieved, and shall require Keystone approval prior to the pipe being installed. Such inspections shall be performed by visual inspection and/or measurement by a Keystone representative. In rock trench, the ditch shall be adequately padded with clean granular material to provide continuous support for the pipe.

The pipe shall be pulled into position or lowered into the trench and shall, where necessary, be held down by suitable negative buoyancy control, as-built recorded and backfilled immediately to prevent the pipe from floating.

The Contractor shall provide sufficient approved lifting equipment to perform the pipe installation in a safe and efficient manner. As the coated pipe is lowered in,

it shall be prevented from swinging or rubbing against the sides of the trench. Only properly manufactured slings, belts, and cradles suitable for handling coated pipe shall be used. All pipes shall be inspected for coating flaws and/or damage as it is being lowered into the trench. Any damage to the pipe or coating shall be repaired.

7.10 Backfilling

The following requirements apply to all waterbody crossings except those being installed by the non-flowing open cut crossing method.

Trench spoil excavated from waterbodies shall be used to backfill the trench across waterbodies.

After lowering in is complete, but before backfilling, the line shall be re-inspected to ensure that no skids, brush, stumps, trees, boulders, or other debris is in the trench. If discovered, such materials or debris shall be removed from the trench prior to backfilling.

For each major waterbody crossed, the Contractor shall install a trench breaker at the base of slopes near the waterbody unless otherwise directed by Keystone based on site specific conditions. The base of slopes at intermittent waterbodies shall be assessed on site and trench breakers installed only where necessary.

Slurred muck or debris shall not be used for backfill. At locations where the excavated native material is not acceptable for backfill or must be supplemented, the Contractor shall provide granular material approved by Keystone.

If specified in the construction drawings, the top of the backfill in the stream shall be armored with rock riprap or bio-stabilization materials as appropriate.

7.11 Stabilization and Restoration of Stream Banks and Slopes

The Contractor will restore the contours of the bed and banks of all waterways immediately after pipe installation and backfill, except over the travel lane. Travel lanes and bridges may stay in place until hydrostatic testing and cleanup are complete. All materials used to support construction activities will be removed from waterbodies and wetlands, including, but not limited to, flumes, mats, plastic sheeting, and sandbags.

The stream bank contour shall be re-established. All debris shall be removed from the streambed and banks. Stream banks shall be stabilized and temporary sediment barriers shall be installed within 24 hours of completing the crossing if practicable.

Approach slopes shall be graded to an acceptable slope for the particular soil type and surface run off controlled by installation of permanent slope breakers. Where considered necessary, the integrity of the slope breakers shall be ensured by lining with erosion control blankets.

Immediately following reconstruction of the stream banks, the Contractor shall install seed and flexible channel liners on waterbody banks as shown in Detail 19.

If the original stream bank is excessively steep and unstable or flow conditions are severe, or if specified on the construction drawings, the banks shall be stabilized with rock riprap, gabions, stabilizing cribs, or bio-stabilization measures to protect backfill prior to reestablishing vegetation.

Stream bank riprap structures shall consist of a layer of stone, underlain with approved filter fabric or a gravel filter blanket in accordance with Detail 20. Riprap shall extend from the stabilized streambed to the top of the stream bank. Where practicable, native rock shall be utilized.

Bio-stabilization techniques which may be considered for specific crossings are shown in Details 23 and 24.

The Contractor shall remove equipment bridges as soon as possible after final clean up.

8.0 HYDROSTATIC TESTING

8.1 Testing Equipment Location

The Contractor shall provide for the safety of all pipeline construction personnel and the general public during hydrostatic test operations by placing warning signs in populated areas.

The Contractor shall locate hydrostatic test manifolds 100 feet outside wetlands and riparian areas to the maximum extent practicable.

8.2 Test Water Source and Discharge Locations

Keystone is responsible for acquiring all permits required by federal, state and local agencies for procurement of water and for the discharge of water used in the hydrostatic testing operation. Keystone shall provide the Contractor with a copy of the appropriate withdrawal/discharge permits for hydrostatic test water. The Contractor shall keep water withdrawal/discharge permits on site at all times during testing operations.

Any water obtained or discharged shall be in compliance with permit notice requirements and with sufficient notice for Keystone's Testing Inspector to make water sample arrangements prior to obtaining or discharging water. Keystone will obtain water samples for analysis from each source before filling the pipeline. In addition, water samples will be taken prior to discharge of the water, as required by state and federal permits.

In some instances sufficient quantities of water may not be available from the permitted water sources at the time of testing. Withdrawal rates may be limited as stated by the permit. Under no circumstances shall an alternate water source be used without prior authorization from Keystone.

The Contractor shall be responsible for obtaining any required water analyses from each source to be used in sufficient time to have a lab analysis performed prior to any filling operations. The sample bottle shall be sterilized prior to filling with the water sample. The analysis shall determine the pH value and total suspended solids. Each bottle shall be marked with:

- source of water with pipeline station number;
- date taken;
- laboratory order number; and
- name of person taking sample.

Staging/work areas for filling the pipeline with water will be located a minimum of 100 feet from the waterbody or wetland boundary if topographic conditions permit. The Contractor will install temporary sediment filter devices adjacent to all streams to prevent sediments from leaving the construction site.

The Contractor shall screen the intake hose to prevent the entrainment of fish or debris. The hose shall be kept at least 1 foot off the bottom of the waterbody. Refueling of construction equipment shall be conducted a minimum distance of 100 feet from the stream or a wetland. Pumps used for hydrostatic testing within 100 feet of any waterbody or wetland shall be operated and refueled in accordance with Section 3.

During hydrostatic test water withdrawals, the Contractor will maintain adequate flow rates in the waterbody to protect aquatic life and provide for downstream uses, in compliance with regulatory and permit requirements.

The Contractor shall not use chemicals in the test water. The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film or sheen on the surface of the receiving water.

Selected road, railroad, and river crossing pipe sections may be specified to be pre-tested for a minimum of 4 hours. The water for pre-testing of any road and railroad crossings shall be hauled by a tanker truck from an approved water source. Water for pre-testing of a river crossing may be hauled or taken from the respective river if it is an approved water source. Since the volume of water utilized in these pre-tests shall be relatively small, the water shall be discharged overland along the construction right-of-way and allowed to soak into the ground utilizing erosion and sediment control mitigative measures.

Selection of final test water sources will be determined based on site conditions at the time of construction and applicable permits.

8.3 Filling the Pipeline

After final positioning of the pipe, the Contractor shall fill the pipe with water. Pipe ends shall not be restrained during the fill. The fill pump shall be set on a metal catch pan of sufficient dimensions to contain all leaking lubricants or fuel and prevent them from entering the water source. The suction inlet must be placed in a screened enclosure located at a depth that shall not allow air to be drawn in with the water. The screened enclosure shall be such that the fill water is free of organic or particulate matter.

The Contractor shall provide a filter of the back flushing or cartridge type with a means of cleaning without disconnecting the piping. The filter shall have the specifications of 100 mesh screen. If the cartridge type is used, a sufficient quantity of cartridges shall be on hand at the filter location. The Contractor shall install the filter between the fill pump and the test header. The Contractor shall be responsible for keeping the back flush valve on the filter closed during the filling operation. The Contractor shall be responsible for the proper disposal of materials back flushed from the filter or filter cartridges. The Contractor shall not be allowed to back flush the filter into the stream or other water source.

During water-filling of the pipeline, the Contractor shall employ fill pumps capable of injecting water into the pipeline at a maximum rate of approximately 0.7 to 1.0 mile per hour, except as limited by permits or the maintenance of adequate flow rates in the waterbody, as follows:

Nominal OD	Max GPM
36”	3000

The Contractor shall maintain flow rates as necessary to protect aquatic life, provide for all waterbody uses, and provide for downstream withdrawals of water by existing users.

In areas where zebra mussels are known to occur, all equipment used during the hydrostatic test withdrawal and discharge will be thoroughly cleaned before being used at subsequent hydrostatic test locations to prevent the transfer of zebra mussels or their larvae (veligers) to new locations.

8.4 Dewatering the Pipeline

The Contractor shall comply with state-issued NPDES permits for discharging test water.

The Contractor shall not discharge any water containing oil or other substances that are in sufficient amounts as to create a visible color film on the surface of the receiving water.

The Contractor shall not discharge into state-designated exceptional value waters, waterbodies which provide habitat for federally listed threatened or endangered species, or waterbodies designated as public water supplies, unless appropriate federal, state, and local permitting agencies grant written permission.

To avoid impacts from introduced species, no inter-basin transfers (discharge) of hydrostatic test water will occur.

The discharge operation will be monitored and water samples will be taken prior to the beginning of the discharge to ensure that it complies with the Project and permit requirements. If required by state permits, additional water quality testing will be conducted during discharge, in accordance with permit conditions.

The Contractor shall calculate, record, and provide to Keystone the day, date, time, location, total volume, maximum rate, and methods of all water discharged to the ground or to surface water in association with hydrostatic testing.

The Contractor shall regulate the pig velocity discharge rate (3000 gpm maximum), use energy dissipation devices, and install sediment barriers, as necessary, to prevent erosion, streambed scour, suspension of sediments, or excessive stream flow. Water must be disposed of using good engineering judgment so that all federal, state, and local environmental standards are met. Dewatering lines shall be of sufficient strength and be securely supported and tied down at the discharge end to prevent whipping during this operation.

To reduce the velocity of the discharge, The Contractor shall utilize an energy-dissipating device described as follows:

8.4.1 Splash Pup

A splash pup consists of a piece of large diameter pipe (usually over 20" outside diameter) of variable length with both ends partially blocked that is welded perpendicularly to the discharge pipe. As the discharge hits against the inside wall of the pup, the velocity is rapidly reduced and the water is allowed to flow out either end. A variation of the splash pup concept, commonly called a diffuser, incorporates the same design, but with capped ends and numerous holes punched in the pup to diffuse the energy.

8.4.2 Splash Plate

The splash plate is a quarter section of 36-inch pipe welded to a flat plate and attached to the end of a 6-inch discharge pipe. The velocity is reduced by directing the discharge stream into the air as it exits the pipe. This device is also effective for most overland discharge.

8.4.3 Plastic Liner

In areas where highly erodible soils exist or in any low flow drainage channel, it is a common practice to use layers of Visqueen (or any of the new construction fabrics currently available) to line the receiving channel for a short distance. One anchoring method may consist of a small load of rocks to keep the fabric in place during the discharge. Additional best management practices, such as the use of plastic sheeting or other material to prevent scour, will be used as necessary to prevent excessive sedimentation during dewatering.

8.4.4 Straw Bale Dewatering Structure

Straw bale dewatering structures are designed to dissipate and remove sediment from the water being discharged. Straw bale structures are used for on land discharge of wash water and hydrostatic test water and in combination with other energy dissipating devices for high volume discharges. A straw bale dewatering structure is shown In Detail 6. A dewatering filter bags may be sued as an alternative to show bale dewatering structures. A dewatering filter bag is shown in Detail 5.

THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

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Detail 2	Typical Straw or Hay Bail Barrier
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Detail 7	Typical Permanent Trench Breakers
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Detail 23	Streambank Reclamation - Log Wall
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Detail 67	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch
Detail 67A	Topsoil Conservation Ditch & Spoil Stripping Triple Ditch

NOTE: **The following typical drawings are included for ease of reference.**

- Details 1 through 31 can be found in the Construction Mitigation and Reclamation Plan

REVISIONS
01 2008-11-05 REVISED TITLES, ADDED/DEL. DETAILS
02 2010-10-08 REVISED TITLES
03 2010-10-11 REVISED TITLE BLOCK

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DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL INDEX

SCALE: N.T.S. | DWG No 4359-03-ML-00-700 | REV 03

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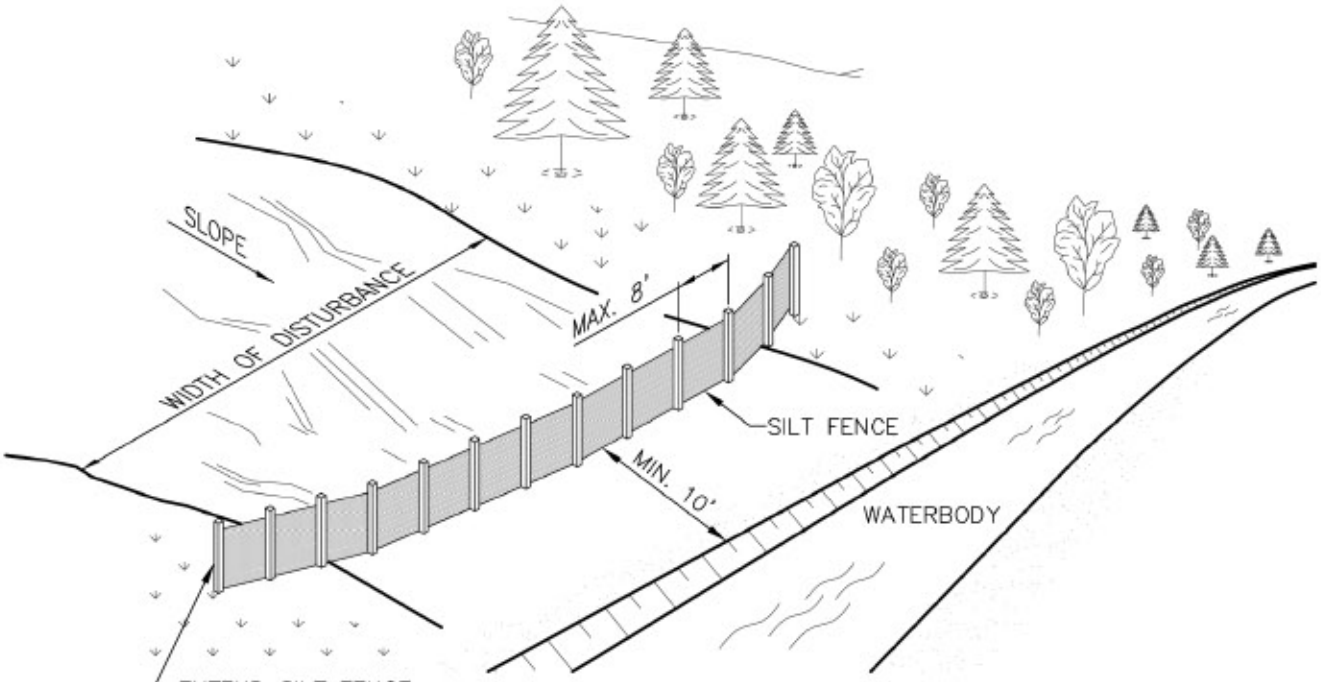
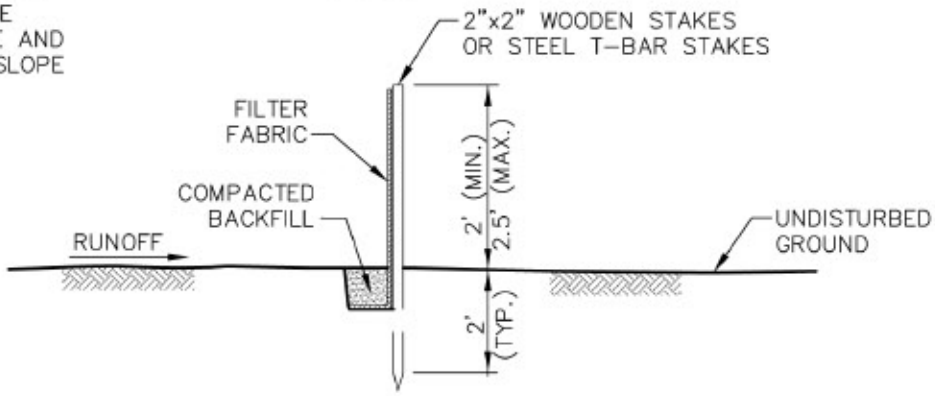


PLAN



SECTION "A–A"

NOTES:

1. MATERIAL SHOULD BE WOVEN GEOTEXTILE FABRIC SUCH AS EXXON GTF 180 OR MIRAFI 600X, OR AN APPROVED EQUIVALENT. SECONDARY REINFORCEMENT, SUCH AS A CONSTRUCTION BARRIER FENCE OR WIRE MESH CAN ALSO BE USED BEHIND THE FILTER FABRIC.
2. SILT FENCE TO BE REINFORCED WITH 2"x2" WOODEN STAKES OR STEEL T-BAR STAKES PLACED EVERY 8' OR CLOSER AS CONDITIONS REQUIRE.
3. ATTACH FILTER FABRIC AT EACH POST AT A MINIMUM OF 3 LOCATIONS.
4. THE FILTER FABRIC MINIMUM LENGTH OF 1' IS TO BE ANCHORED IN A TRENCH WITH WELL COMPACTED BACKFILL OVER THE FABRIC TO PREVENT UNDERMINING.
5. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE SILT FENCE SHALL BE TURNED AND EXTENDED UPSLOPE.
6. SILT FENCES ARE TO BE CHECKED AND MAINTAINED ON A REGULAR BASIS. REMOVE ANY BUILD-UP OF SEDIMENT. REPLACE DAMAGED OR INEFFECTIVE SILT FENCE AS SOON AS POSSIBLE.
7. WHERE ANCHORING CONDITIONS FOR THE SILT FENCE ARE POOR, PLACE STRAW BALES ON DOWNSTREAM SIDE OF THE SILT FENCE.
8. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 REVISED TITLE BLOCK

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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 1 TYPICAL SILT FENCE BARRIER		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-701	REV 03

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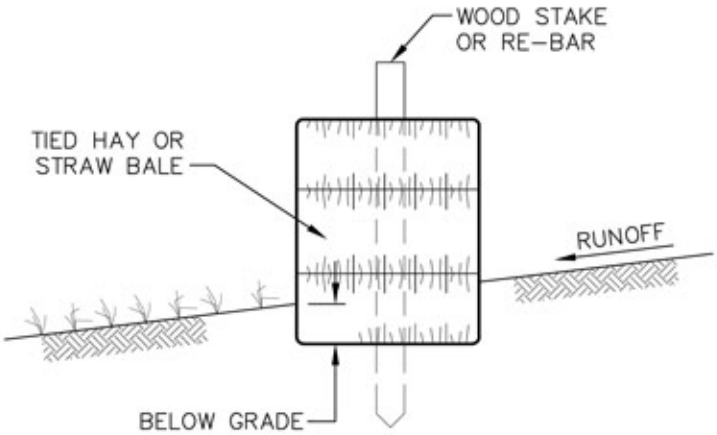
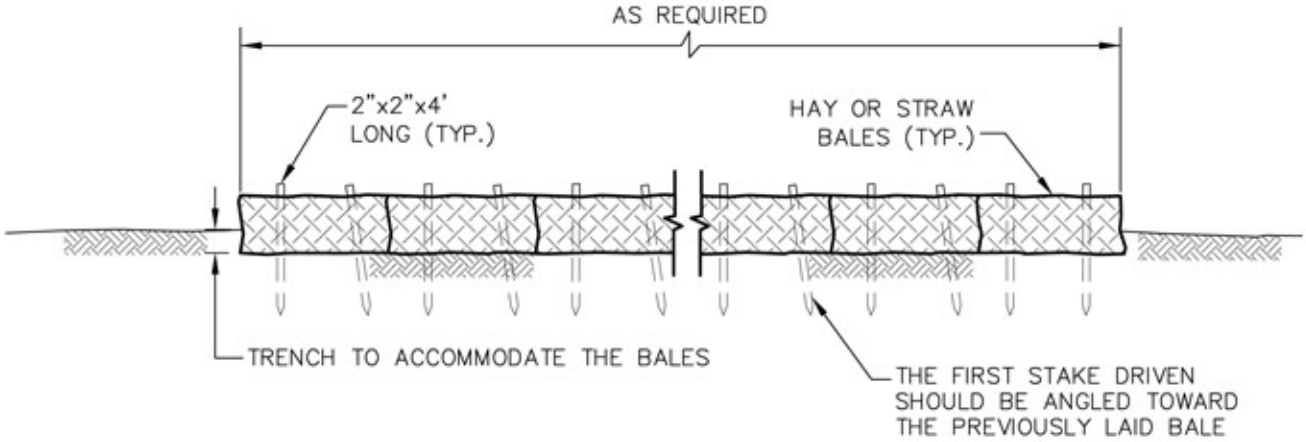


SECTION



SECTION

NOTES:

1. TO ELIMINATE POSSIBLE END FLOW, BOTH ENDS OF THE STRAW BALE BARRIER SHOULD BE TURNED AND EXTENDED UPSLOPE.
2. EACH BALE SHOULD BE SECURED BY AT LEAST 2 STAKES. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. ANY GAPS CAN BE FILLED IN BY WEDGING LOOSE STRAW BETWEEN THE BALES. STAKES SHOULD BE DRIVEN. REBAR OR STANDARD "T" OR "U" STEEL POSTS CAN BE USED AS STAKES, BUT IT SHOULD BE NOTED THAT THEY MAY POSE A HAZARD TO EQUIPMENT IF THE BALES DISINTEGRATE.
3. COMPACT THE EXCAVATED SOIL AGAINST THE UPHILL SIDE OF THE BARRIER TO PREVENT PIPING.
4. STRAW OR HAY BALE BARRIERS REQUIRE CONTINUAL MAINTENANCE TO REMOVE COLLECTED SEDIMENT AND REPLACE DAMAGED BALES AS SOON AS POSSIBLE. PAY CLOSE ATTENTION TO THE REPAIR OF DAMAGED BALES, END RUNS AND UNDERCUTTING BENEATH BALES.
5. INSTALLATION TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
03 2010-10-11 UPDATED DRAWING NOTES

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	TITLE: DETAIL 2 TYPICAL STRAW OR HAY BALE BARRIER		
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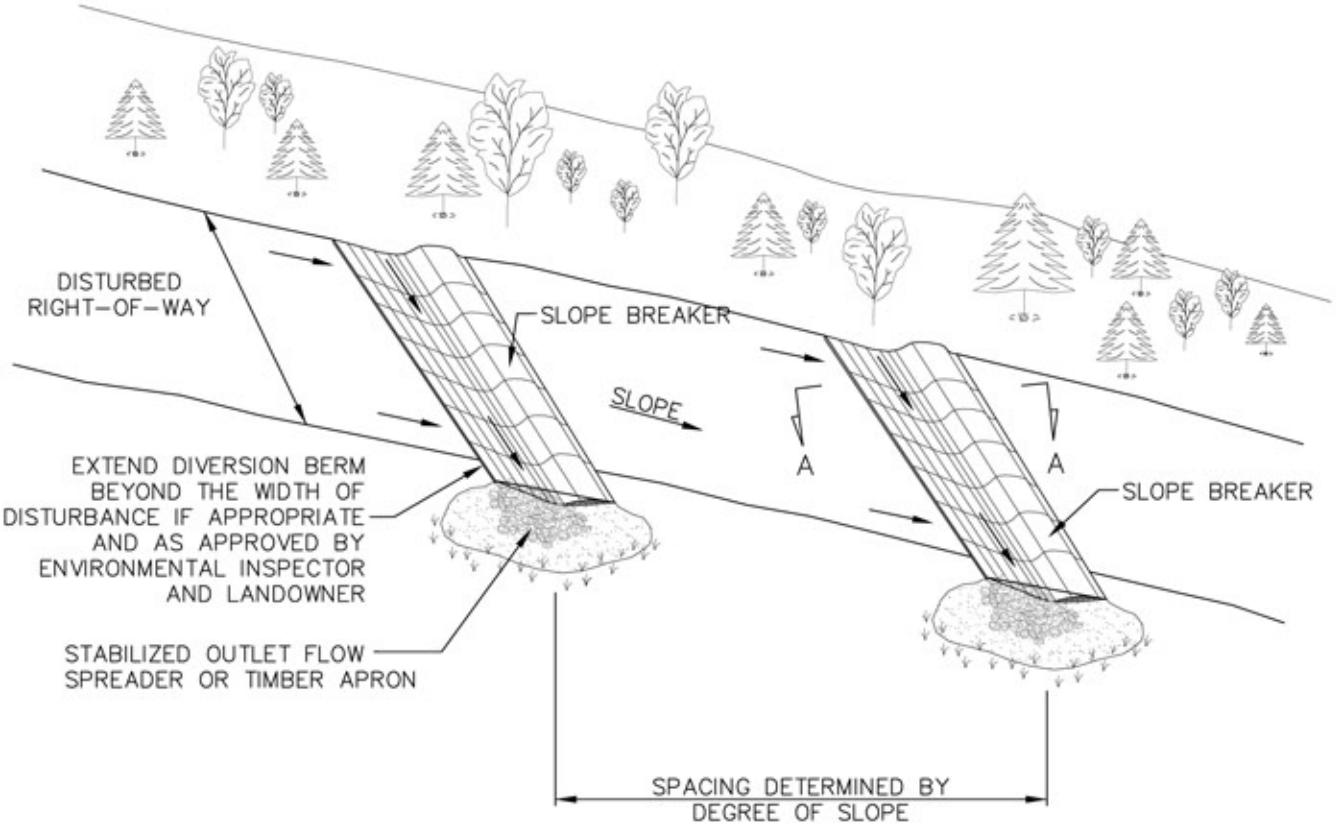
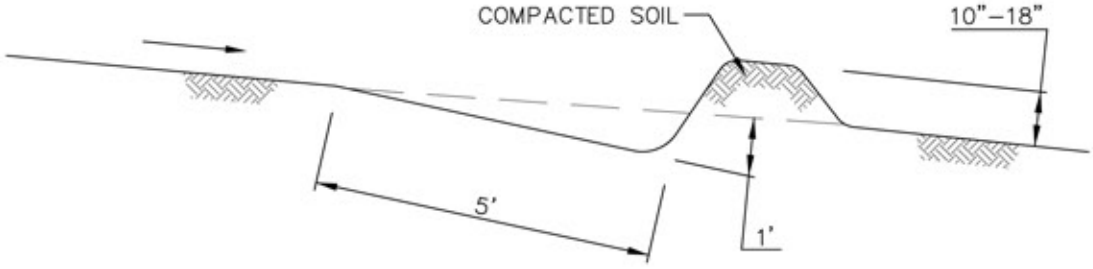


PLAN



NOTES:

1. PERMANENT SLOPE BREAKERS TO PROVIDE POSITIVE DRAINAGE TO A STABILIZED OUTLET.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
3. THE CONTRACTOR SHALL INSTALL TEMPORARY AND PERMANENT SLOPE BREAKERS ON SLOPES GREATER THAN APPROXIMATELY 5% ON ALL DISTURBED LANDS AT THE FOLLOWING RECOMMENDED SPACING:

SLOPE (%)	SPACING (FEET)
5-15	300
>15-30	200
>30	100

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
02 2010-10-08 UPDATED DRAWING NOTES
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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 3
TEMPORARY/PERMANENT SLOPE BREAKER DETAIL
(WATER BARS)

SCALE: N.T.S. | DWG No: 4359-03-ML-05-703 | REV: 03

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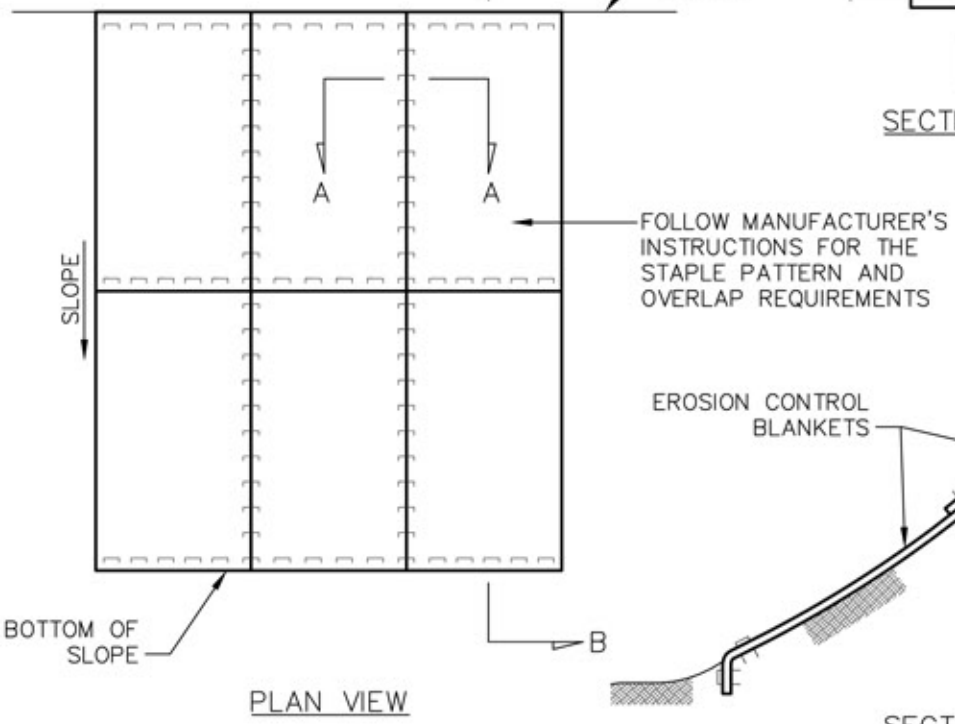
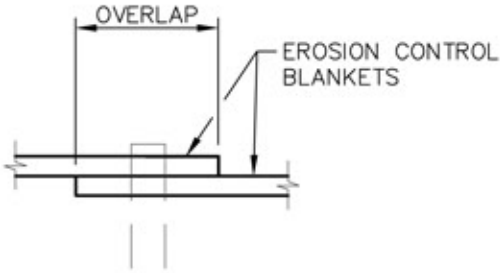
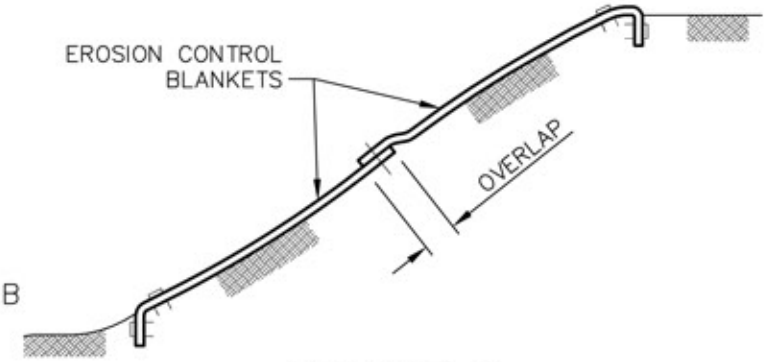


PLAN VIEW



SECTION A–A



SECTION B–B

NOTES:

1. INSTALL MATTING IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING MATTING, INCLUDING GRADING, REMOVAL OF LARGE ROCKS AND DEBRIS, AND THE APPLICATION OF SEED AND FERTILIZER IF NOT USING PRE–SEEDED MATTING.
3. EROSION CONTROL MATTING SHALL EXTEND COMPLETELY ACROSS DISTURBED AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE MATTING IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL THE MATTING DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
6. AS AN ALTERNATIVE TO STAPLES, WOODEN STAKES OR BIO–DEGRADEABLE PINS CAN BE USED WHERE SPECIFIED BY THE COMPANY.
7. ENSURE COMPLETE CONTACT BETWEEN THE MATTING AND THE SLOPE FACE. ADDITIONAL STAPLES CAN BE USE TO ELIMINATE GAPS.
8. INSTALLATION SPECIFICATIONS TO BE MODIFIED BY THE PROJECT AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008–11–04 MODIFIED DRAWING NOTES
02 2010–10–08 UPDATED DRAWING NOTES
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	TITLE: DETAIL 4 EROSION CONTROL MATTING INSTALLATION		
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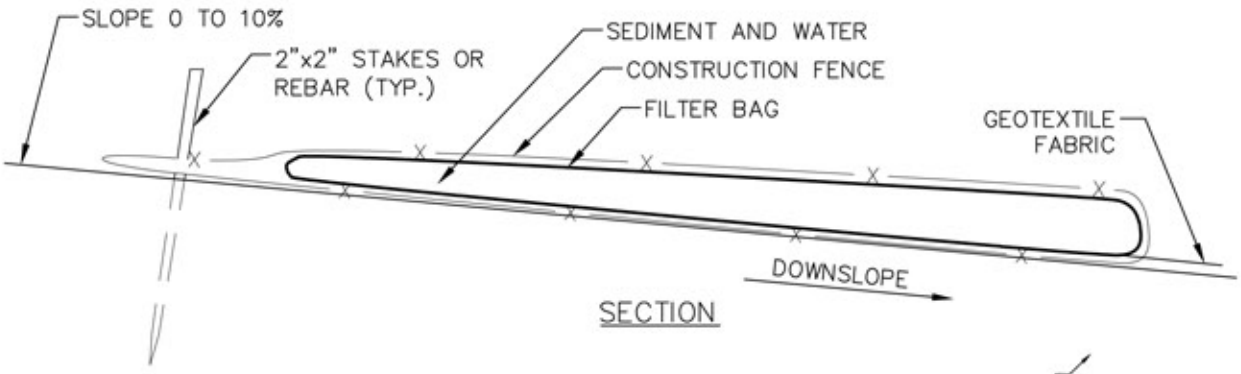

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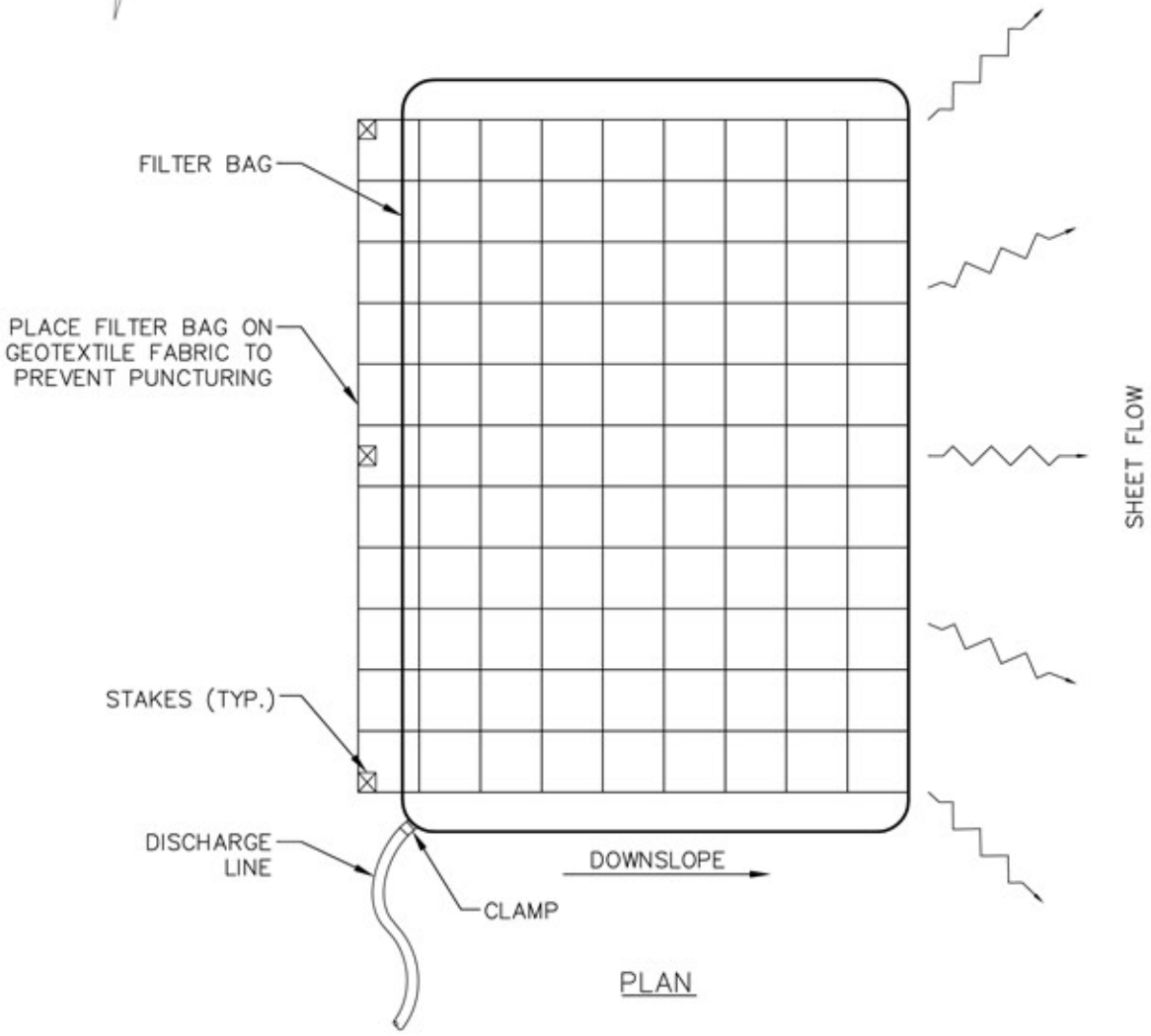

PLAN

NOTES:

1. MANUFACTURED NONWOVEN (FELT) FILTER BAGS ARE A SUITABLE ALTERNATIVE TO STRAW BALE STRUCTURES FOR TRENCH DEWATERING. FILTER BAGS SHALL BE INSTALLED AS SPECIFIED BY THE MANUFACTURER.
2. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

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01 2008-11-04 MODIFIED DRAWING NOTES
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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 5
TYPICAL DEWATERING FILTER BAG

SCALE N.T.S. | DWG No 4359-03-ML-05-705 | REV 02

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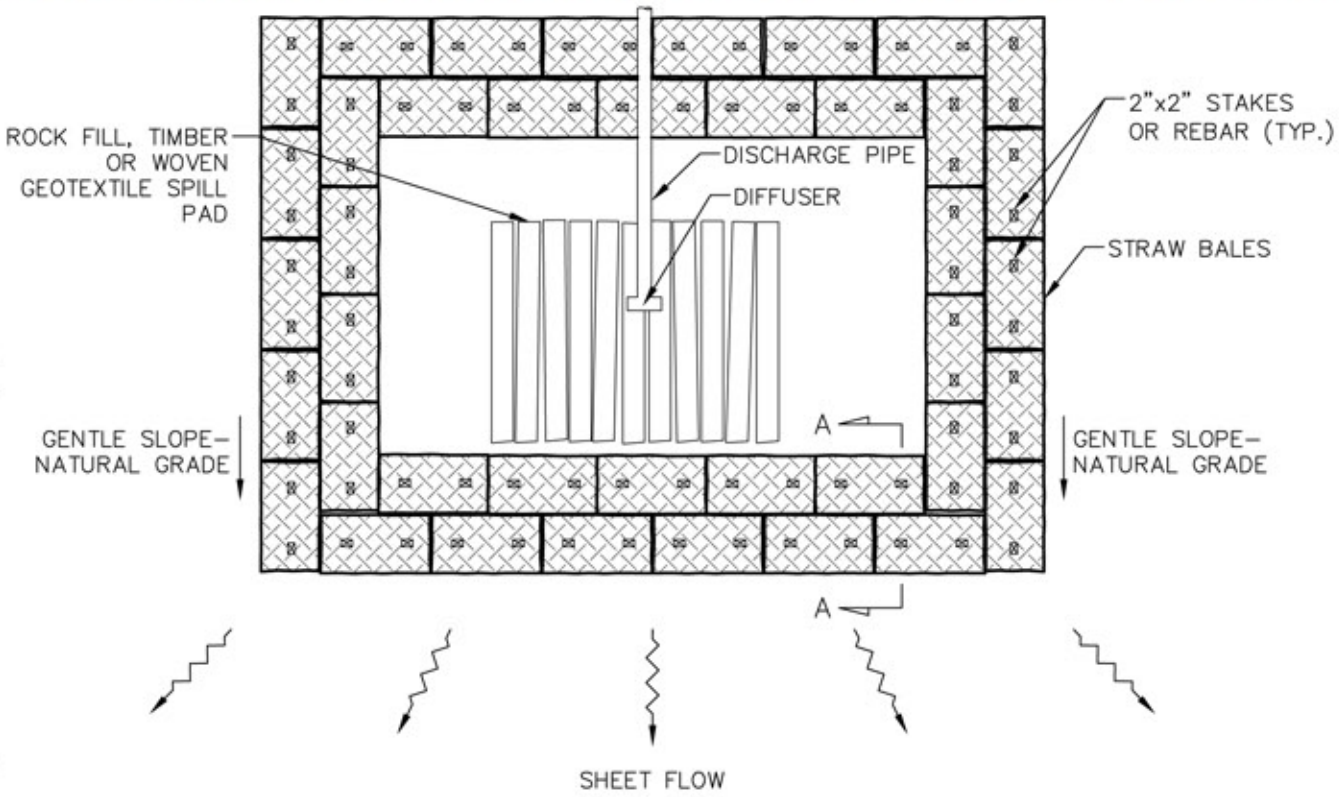

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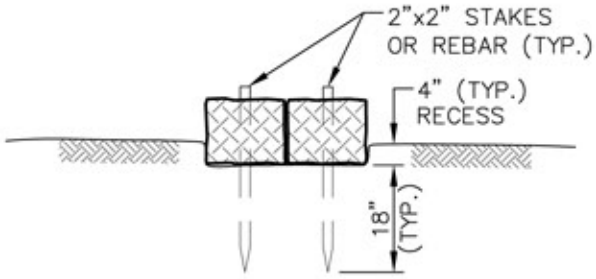

SECTION A–A

NOTES:

1. INSTALL A STRAW BALE DEWATERING STRUCTURE WHEREVER IT IS NECESSARY AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR TO PREVENT THE FLOW OF HEAVILY SILT LADEN WATER INTO WATERBODIES OR WETLANDS.
2. DISCHARGE SITE SHOULD BE WELL VEGETATED AND LOCATED AT LEAST 50 FEET FROM ANY WATERBODY. THE TOPOGRAPHY OF THE SITE SHOULD BE SUCH THAT WATER WILL FLOW INTO THE DEWATERING STRUCTURE AND AWAY FROM ANY WORK AREAS. THE AREA DOWNSLOPE FROM THE DEWATERING SITE MUST BE REASONABLY FLAT OR STABILIZED BY VEGETATION OR OTHER MEANS TO ALLOW THE FILTERED WATER TO CONTINUE AS SHEET FLOW.
3. DIRECT THE PUMPED WATER ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL, WEIGHTED TIMBERS, OR A WOVEN GEOTEXTILE STAKED TO THE GROUND SURFACE, SUCH AS MIRAFI 600X, TERRAFIX 400W, OR A COMPANY APPROVED EQUIVALENT. BEYOND THE SPILL PAD FORCE THE DISCHARGE WATER INTO SHEET FLOW USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
4. DISCHARGE RATES SHOULD BE SUCH THAT THE CAPACITY OF THE STRUCTURE WILL NOT BE EXCEEDED.
5. DISCHARGE WATER SHALL BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD USING A COMBINATION OF STRAW BALES AND THE NATURAL TOPOGRAPHY. RECESS STRAW BALES. DRIVE TWO (2) STAKES OR REBAR INTO EACH BALE TO ANCHOR THEM IN PLACE.
6. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 MODIFIED DRAWING NOTES
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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 6 TYPICAL STRAW BALE DEWATERING STRUCTURE		
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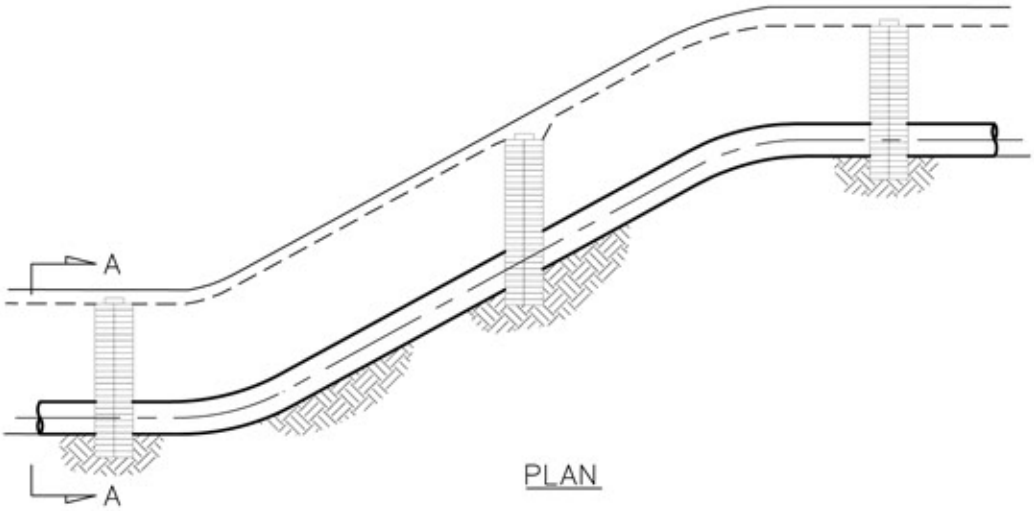
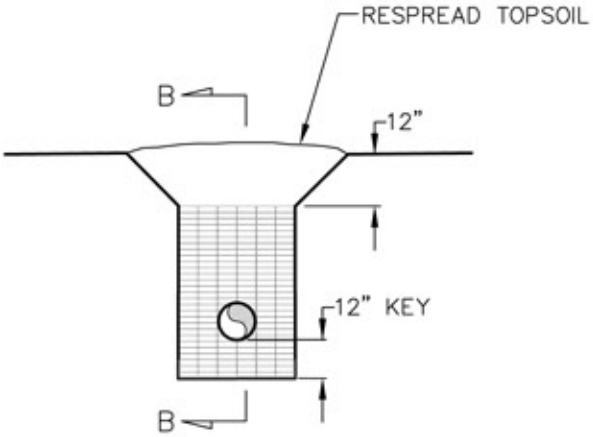
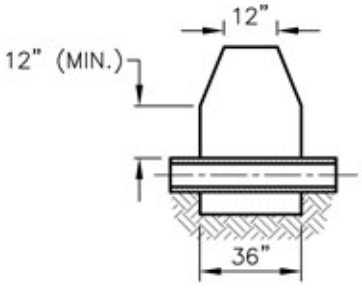


PLAN



SECTION A–A



SECTION B–B

NOTES:

1. TRENCH BREAKERS TO BE INSTALLED AS SHOWN ON THE CONSTRUCTION DRAWINGS, WHERE DESCRIBED IN THE PLAN, AND AS DIRECTED.
2. OPEN WEAVE HEMP OR JUTE SACKS SHALL BE FILLED WITH AN AVERAGE 55 LBS. MIXTURE OF:
   1) ONE (1) PART CEMENT AND SIX (6) PARTS SAND OR SUBSOIL, OR
   2) ONE (1) PART CEMENT, THREE (3) PARTS FLYASH, AND FIVE (5) PARTS SAND OR SUBSOIL
   3) SAND WITH JUST SUFFICIENT WATER TO PERMIT MIXTURE TO EXUDE AND BOND SACKS TOGETHER. TOPSOIL IS NOT TO BE USED IN SACKS.
3. KEY EACH TRENCH BREAKER A MINIMUM OF ONE (1) FT. INTO BOTTOMS AND SIDES OF TRENCH.
4. FOAM TRENCH BREAKERS MAY BE USED IN LIEU OF SAND SACK TRENCH BREAKERS.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.
6. TRENCH BREAKERS SHALL BE INSTALLED SUCH THAT THE TOP OF EACH DOWNSLOPE BREAKER IS ABOVE THE BOTTOM OF THE NEXT UPSLOPE BREAKER.

REVISIONS
01 2008–11–04 UPDATED DRAWING NOTES
02 2010–10–11 UPDATED PLAN DETAIL

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 7
TYPICAL PERMANENT TRENCH BREAKER

SCALE N.T.S. | DWG No 4359–03–ML–05–707 | REV 02

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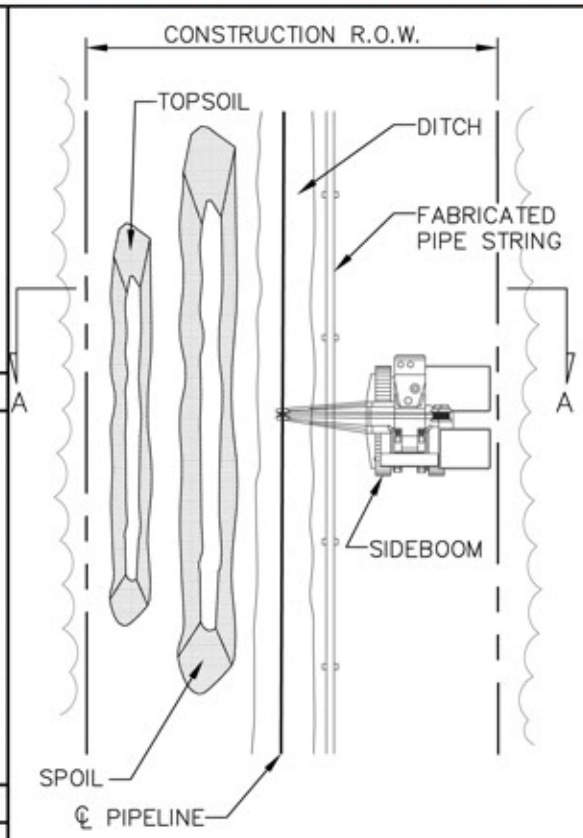
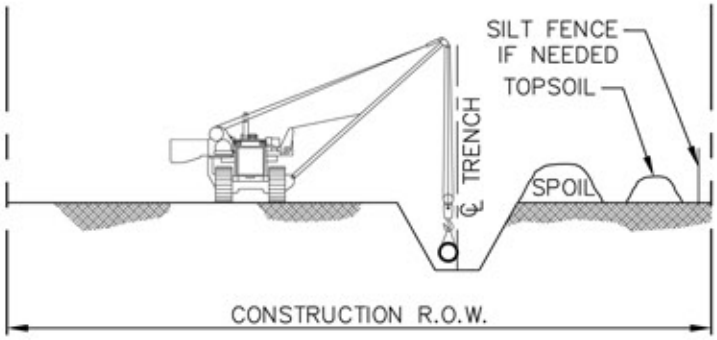


PLAN VIEW



SECTION "A–A"

CONSTRUCTION PROCEDURES:

1. IF THE WETLAND IS BEING CULTIVATED AND FARMED, NO WETLAND CONSTRUCTION PROCEDURES ARE REQUIRED.
2. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
3. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS APPROXIMATELY 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
4. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. CONSTRUCT WHEN DRY, IF POSSIBLE. IF SITE BECOMES WET AT TIME OF TRENCHING, AVOID SOIL COMPACTION BY UTILIZING TIMBER RIP–RAP OR PREFABRICATED EQUIPMENT MATS.
7. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWN SLOPE EDGE OF RIGHT–OF–WAY ALONG WETLAND EDGE IF NEEDED TO CONTAIN SPOIL WITHIN RIGHT–OF–WAY.
8. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND REMOVE STUMPS FROM WETLAND FOR DISPOSAL.
9. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES.
10. TRENCH THROUGH WETLANDS.
11. PIPE SECTION TO BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
12. LOWER–IN PIPE. PRIOR TO BACKFILLING TRENCH, IF REQUIRED, TRENCH PLUGS SHALL BE INSTALLED AS REQUIRED. BACKFILL TRENCH.
13. RESTORE GRADE TO NEAR PRE–CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL.
14. IF UTILIZED, REMOVE TIMBER MATS OR PRE–FABRICATED MATS FROM WETLANDS UPON COMPLETION.
15. IN THE ABSENCE OF A DETAILED REVEGETATION PLANS, APPLY A TEMPORARY COVER CROP AS DIRECTED BY KEYSTONE.

REVISIONS
01 REVISED NOTES 3 & 4
02 2010–10–08 UPDATED DRAWING NOTES
03 2010–10–11 UPDATED DRAWING NOTES

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DESIGNER: JMP (NAME) 2010–10–21 (DATE)

CHECKED BY: WSF | DESIGN CHECKER: RW | P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 8 "DRY" WETLAND CROSSING METHOD

SCALE N.T.S. | DWG No 4359–03–ML–03–701 | REV 03

TC_A4_BR.DWG 8.5X11

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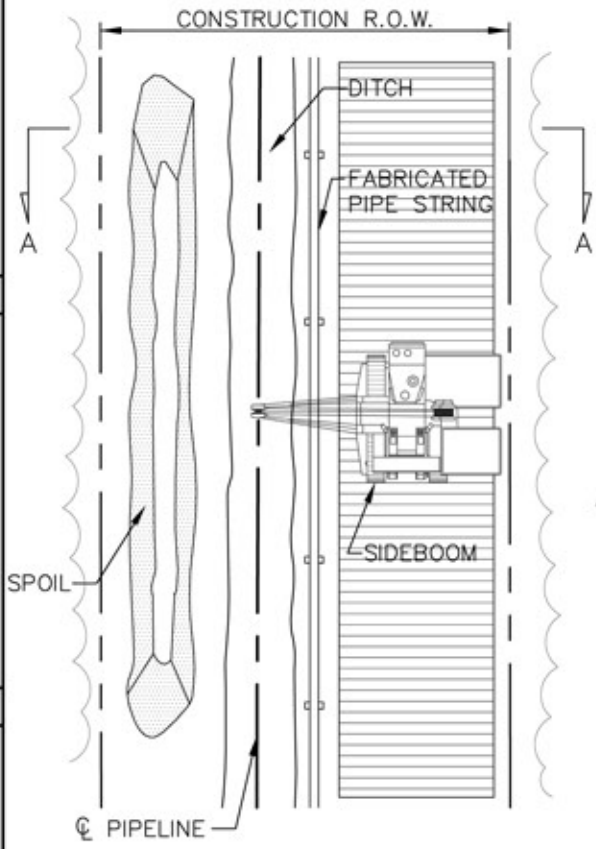
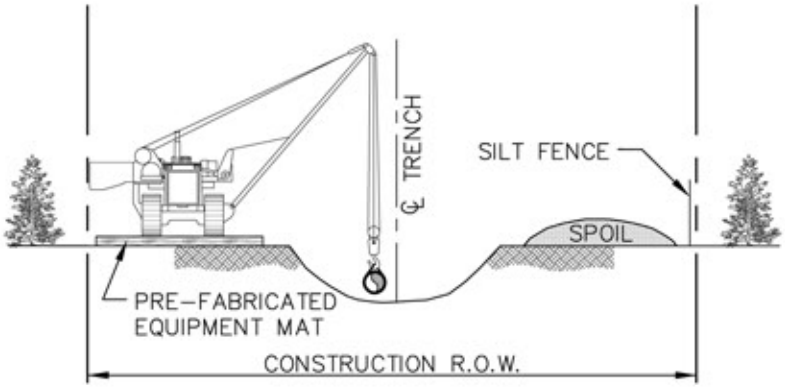


PLAN VIEW



SECTION A–A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY IF DIRECTED BY THE PROJECT.
4. INSTALL TIMBER MATS/RIPRAP THROUGH ENTIRE WETLAND AREA. EQUIPMENT NECESSARY FOR RIGHT-OF-WAY CLEARING MAY MAKE ONE (1) PASS THROUGH THE WETLAND BEFORE MATS ARE INSTALLED.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT DOWNSLOPE EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE AS REQUIRED.
6. RESTRICT ROOT GRUBBING TO ONLY THAT AREA OVER THE DITCHLINE AND DITCH SPOIL AREAS AND REMOVED FROM WETLAND FOR DISPOSAL.
7. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
8. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
9. LEAVE HARD PLUGS AT EDGE OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND AND ADJACENT TO ALIGNMENT, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN.
11. TRENCH THROUGH WETLANDS.
12. LOWER-IN PIPE, INSTALL TRENCH PLUGS AT WETLAND EDGES AS REQUIRED AND BACKFILL IMMEDIATELY.
13. REMOVE TIMBER MATS OR PRE-FABRICATED MATS FROM WETLAND UPON COMPLETION.
14. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL IF SALVAGED AND INSTALL PERMANENT EROSION CONTROL.

REVISIONS
01 REVISED NOTES 2 & 3
02 2010-10-11 UPDATED DRAWING NOTES

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CHECKED BY: WSF

DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 9 STANDARD WETLAND CROSSING METHOD

SCALE N.T.S. | DWG No 4359-03-ML-03-702 | REV 02

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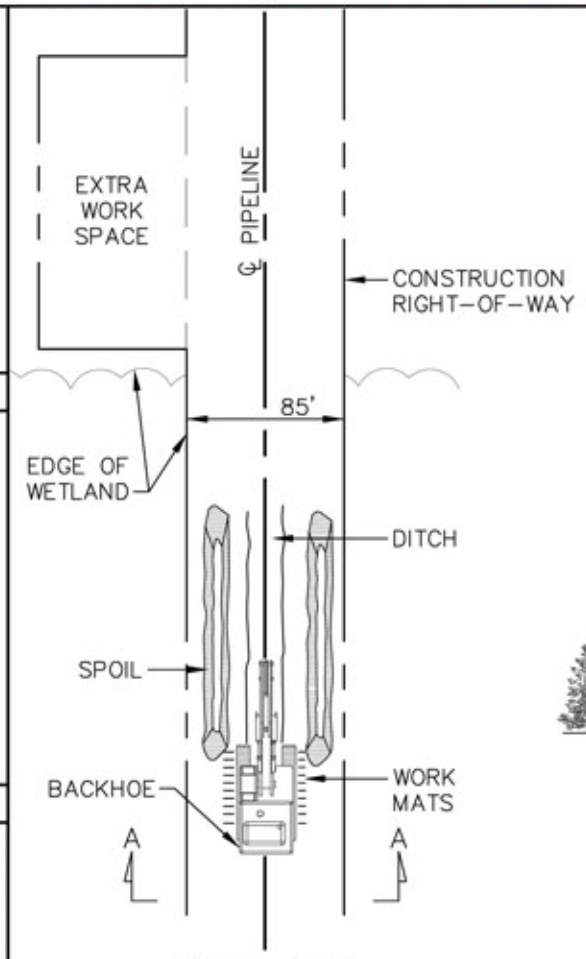
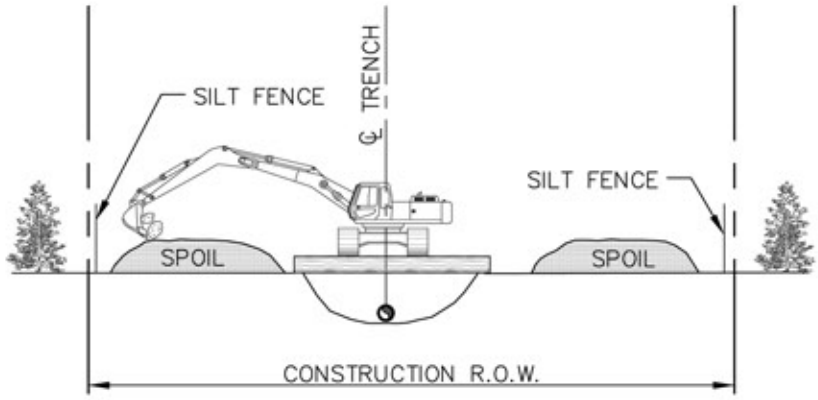


PLAN VIEW



SECTION A–A

CONSTRUCTION PROCEDURES:

1. FLAG WETLAND BOUNDARIES PRIOR TO CLEARING.
2. NO REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER THE PROJECT'S SPILL PREVENTION PROCEDURES.
3. INSTALL TEMPORARY SLOPE BREAKER UPSLOPE WITHIN 100 FEET OF WETLAND BOUNDARY AS DIRECTED BY THE PROJECT.
4. RESTRICT ROOT GRUBBING TO ONLY THE AREA OVER THE DITCHLINE.
5. DO NOT TRENCH WETLAND UNTIL PIPE IS READY TO INSTALL.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY FABRICATED TIMBER MATS OR FLOATS TO EXCAVATE TRENCH. IF FABRICATED TIMBER MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MAT FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS (STRAW BALES AND/OR SILT FENCE) AT EDGE OF RIGHT-OF-WAY AND ALONG WETLAND EDGE IF PRACTICAL.
9. FABRICATE PIPE IN STAGING AREA OUTSIDE THE WETLAND IN THE EXTRA WORK SPACE AS INDICATED ON THE CONSTRUCTION DRAWINGS.
10. LEAVE HARD PLUGS AT THE EDGE OF THE WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
11. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS AT WETLAND EDGES WHERE REQUIRED AND BACKFILL IMMEDIATELY.
12. REMOVE TIMBER MATS OR PRE-FABRICATED MATS OF NON-NATIVE MATERIAL FROM WETLANDS UPON COMPLETION.
13. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
14. THE CONSTRUCTION RIGHT-OF-WAY FOR THIS TYPE OF CONSTRUCTION SHALL BE 85 FEET.

REVISIONS	
01	REVISED NOTES 2, 3 & 13
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JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 10 PUSH/PULL WETLAND CROSSING METHOD		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-703	REV 02

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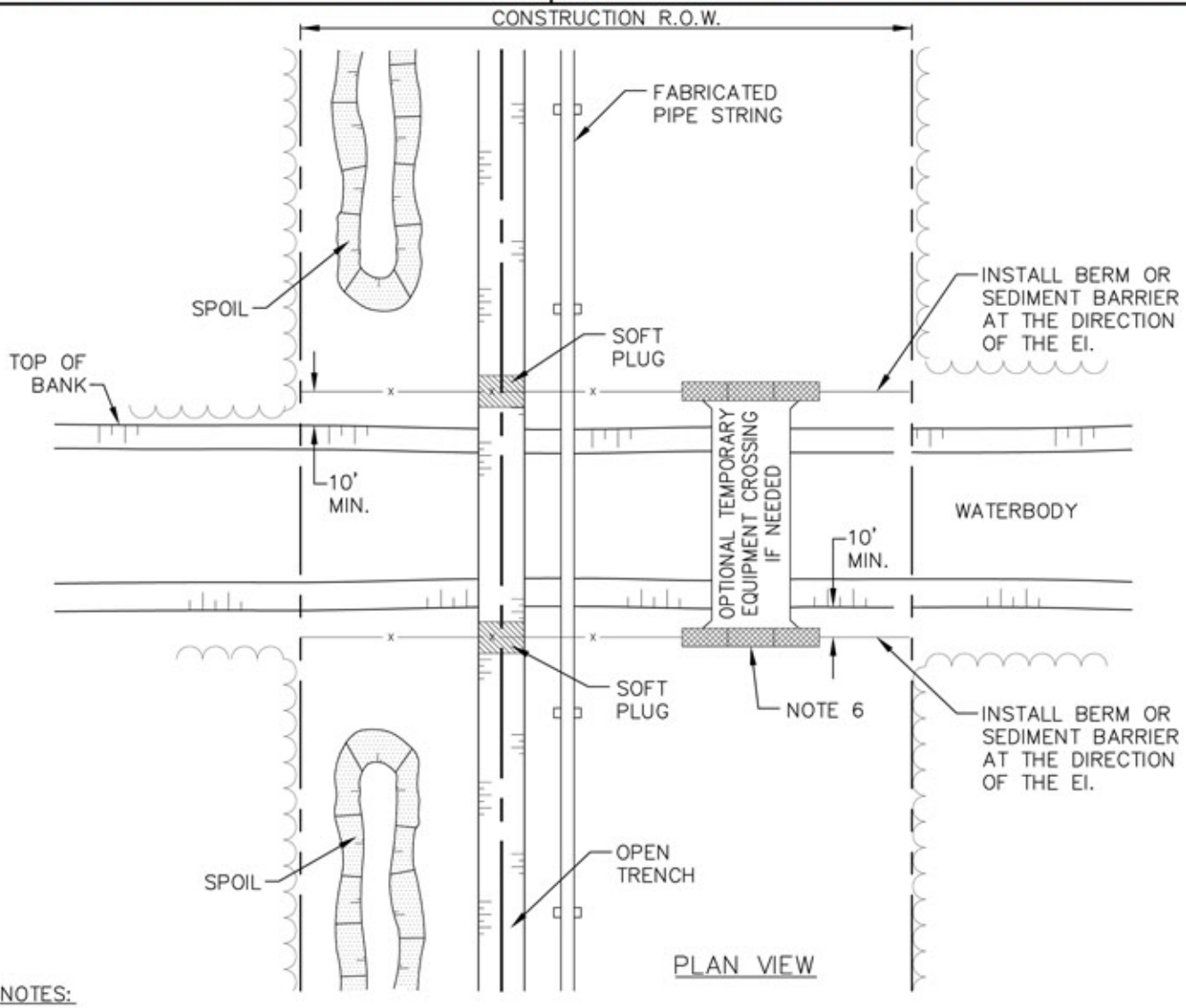

NOTES:

1. THIS METHOD APPLIES TO DRY WASHES, SWALES, INCISED DRAINAGES AND DITCHES WITH NO PERCEPTIBLE FLOW AT TIME OF CROSSING. IF FLOWS ARE PRESENT DURING CONSTRUCTION REFER TO DETAIL 12. CLEARING AND GRADING, TOPSOIL SALVAGE AND TOPSOIL STRIPPING DEPTHS SHALL BE THE SAME AS INDICATED FOR ADJACENT UPLAND UNLESS OTHERWISE DIRECTED BY KEYSTONE.
2. EI TO FLAG THE ORDINARY HIGH WATER MARK (OHWM) PRIOR TO CLEARING.
3. INSTALL SILT FENCE OR A BERM AT DIRECTION OF KEYSTONE EI TO PREVENT RUNOFF FROM ROW TO ADJACENT, UNDISTURBED DRAINAGE.
4. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL SHALL NOT BE STOCKPILED ACROSS THE DRAINAGE CHANNEL AND SHALL BE PLACED A MINIMUM OF 15 FEET FROM THE OHWM OR TO SUIT CONDITIONS AND PROTECT THE DRAINAGE AS DETERMINED BY KEYSTONE.
5. INSTALL TEMPORARY SLOPE BREAKERS WHERE IDENTIFIED BY THE EI.
6. TRENCH, STRING PIPE, AND BACKFILL USING STANDARD UPLAND CONSTRUCTION PROCEDURES UNLESS OTHERWISE DIRECTED BY KEYSTONE.
7. RESTORE WATERCOURSE CHANNEL AND BANKS (EXCEPT TRAVEL LANE IF USED) TO APPROXIMATE PRE-CONSTRUCTION PROFILE IMMEDIATELY AFTER PIPE IS LOWERED IN AND BACKFILLED. INSTALL PERMANENT EROSION CONTROLS WHERE DIRECTED BY KEYSTONE.
8. REMOVE ANY TEMPORARY CROSSING STRUCTURES AND/OR GRAVEL.

REVISIONS | 01 UPDATED DRAWING NOTES | 02 2010-10-08 UPDATED DRAWING NOTES | 03 2010-10-11 UPDATED DRAWING NOTES

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 11 TYPICAL OPEN CUT WET CROSSING METHOD NON-FLOWING WATERBODY		
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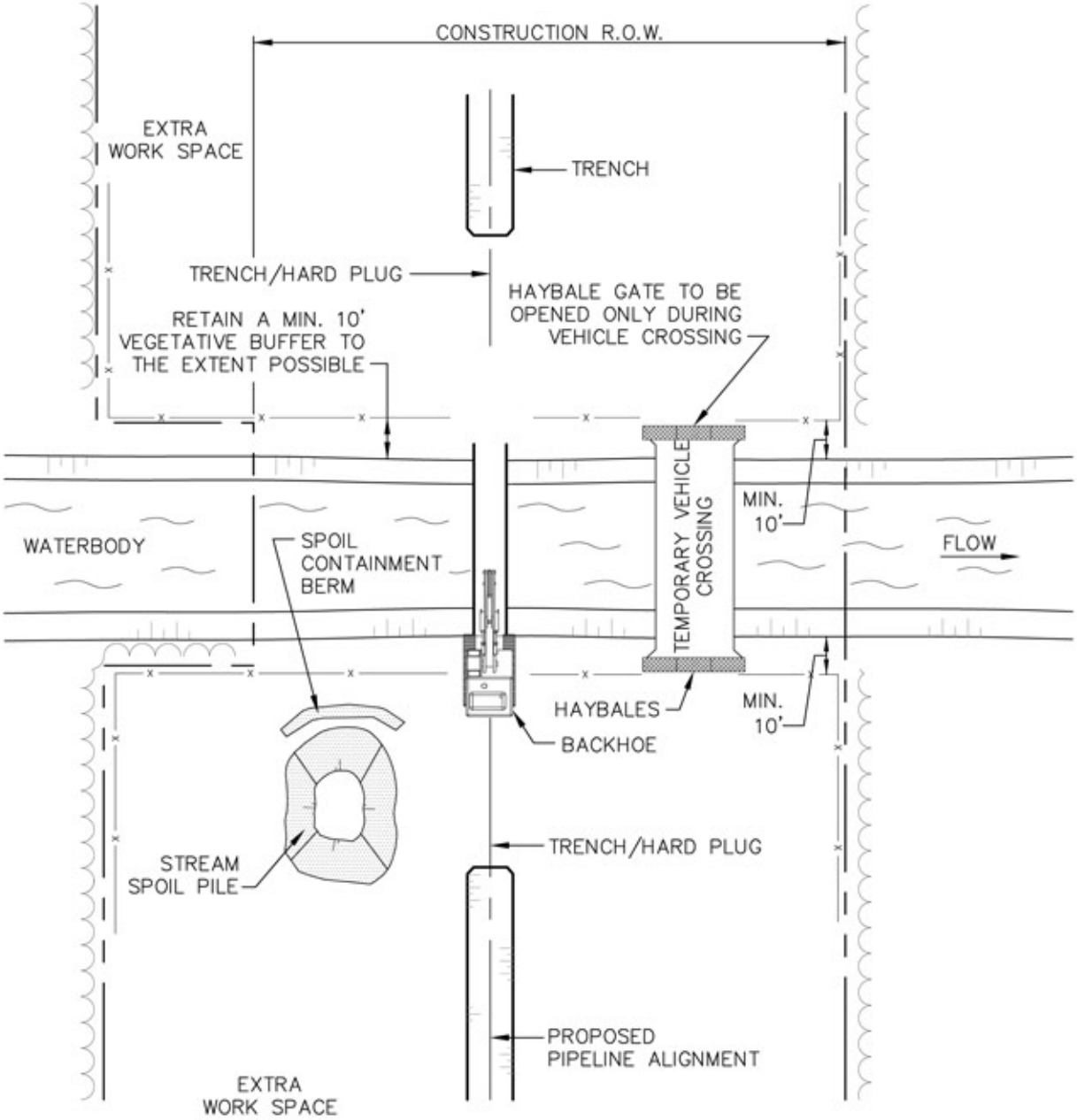

PLAN VIEW

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 12 TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY		
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CONSTRUCTION PROCEDURES:

1. RIGHT-OF-WAY BOUNDARIES AND WORK SPACE LIMITS SHALL BE CLEARLY DELINEATED. STAGING FOR MAKEUP SHALL BE LOCATED A MINIMUM OF 10 FEET FROM WATERBODY.

2. CLEARING LIMITS WILL BE CLEARLY DELINEATED AND 10 FOOT VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREA AND THE WATERBODY SHALL BE MAINTAINED TO THE EXTENT POSSIBLE. ALL CLEARING SHALL BE MINIMIZED TO THE EXTENT POSSIBLE AND TO ONLY THAT NECESSARY FOR CONSTRUCTION. WOODY VEGETATION SHALL BE CUT AT GROUND LEVEL AND THE STUMPS/ROOTS LEFT IN PLACE TO THE EXTENT POSSIBLE.

3. TOPSOIL SHALL BE STRIPPED FROM THE DITCH LINE IN ALL WETLANDS RIPARIAN.

4. CONTRACTOR SHALL INSTALL SIGNS APPROXIMATELY 100 FEET MINIMUM FROM EACH WATERBODY AND WETLAND TO IDENTIFY THE HAZARDOUS MATERIALS EXCLUSION AREA.

5. EROSION AND SEDIMENT CONTROL
   a. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS WATERBODY OR WETLAND.

   b. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY OR INDIRECTLY INTO THE WATERBODY. ALL EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO SUIT ACTUAL SITE CONDITIONS. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION.

   c. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED CONSTRUCTION RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.

   d. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATER CROSSING IS INSTALLED AND BACKFILLED.

   e. TRENCH BREAKERS ARE TO BE INSTALLED AT THE SAME SPACING AND IMMEDIATELY UPSLOPE OF PERMANENT SLOPE BREAKERS, OR AS DIRECTED BY THE COMPANY.

6. CONTRACTOR SHALL MAINTAIN HARD PLUGS IN THE DITCH AT THE WATERBODY UNTIL JUST PRIOR TO PIPE INSTALLATION. CONTRACTOR SHALL EXCAVATE TRENCH AND INSTALL PIPE AS EXPEDIENTLY AS PRACTICAL TO REDUCE THE DURATION OF WORK ACTIVITIES IN THE WATERBODY BED.

7. CONTRACTOR SHALL PLACE TRENCH SPOIL ONLY IN CERTIFICATED WORK SPACE AND A MINIMUM OF 10 FEET FROM THE WATERBODY BANKS TO PREVENT ENTRY OF SPOIL INTO THE WATERBODY. SPOIL SHALL BE CONTAINED AS NECESSARY USING EITHER A STRAW BALE BARRIER OR AN EARTH/ROCK BERM.

8. CONTRACTOR SHALL RESTORE THE WATERBODY AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, UNLESS OTHERWISE APPROVED BY THE COMPANY. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED. ANY MATERIALS PLACED IN THE WATERBODY TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATERBODY AND WETLAND BOUNDARIES UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

9. VEHICLE CROSSING CAN BE CONSTRUCTED USING EITHER A FLUME CROSSING OR A TEMPORARY BRIDGE. VEHICLE CROSSING ONLY REQUIRED IF STREAM SUPPORTS A STATE DESIGNATED FISHERY.

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		TITLE: DETAIL 12A TYPICAL OPEN CUT WET CROSSING METHOD FLOWING WATERBODY – CONSTRUCTION PROCEDURES		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-706	REV 01

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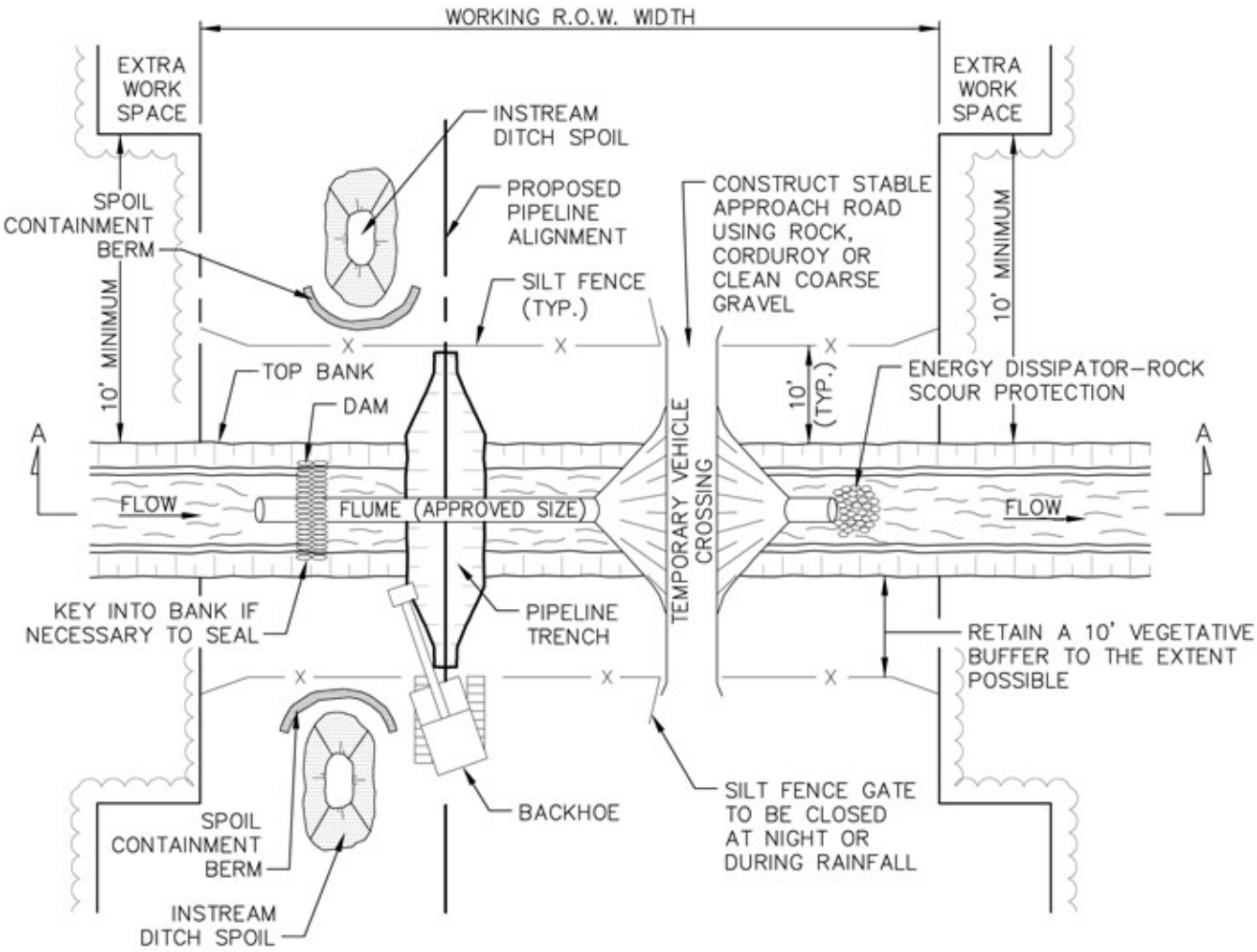
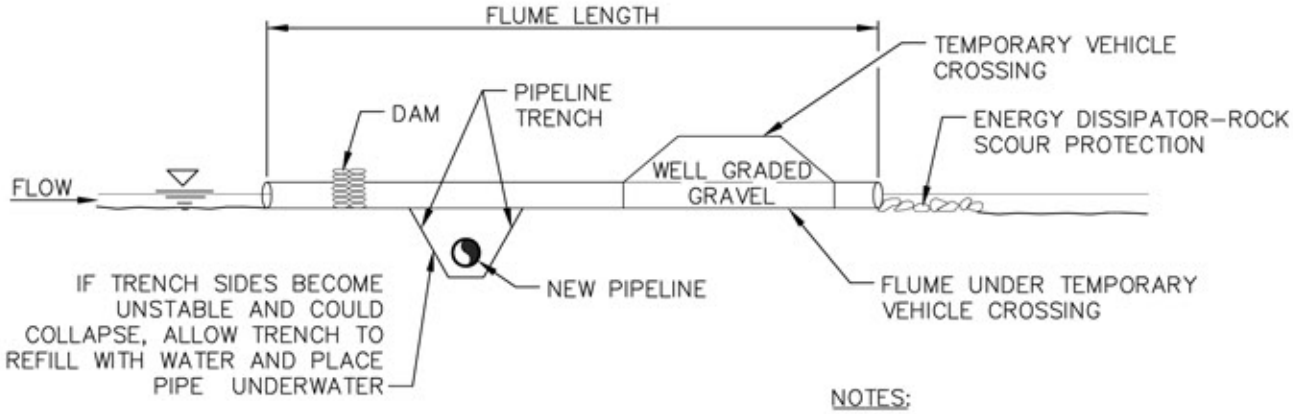


PLAN VIEW



SECTION A–A

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT–OF–WAY CONCEPTUAL ONLY.
2. SEE DETAIL 13A FOR CONSTRUCTION PROCEDURES.

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P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 13
TYPICAL DRY FLUME CROSSING METHOD

SCALE N.T.S. | DWG No 4359–03–ML–03–707 | REV 01

TC_A4_BR.DWG 8.5X11

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CONSTRUCTION PROCEDURES:

1. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURE NEEDED TO PROTECT WATER QUALITY.
2. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE FLUME MUST BE ON-SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER WORK.
3. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FT. VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE OR STRAW BALE BARRIER UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE.
4. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED OR ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
5. PIPE SHALL BE STRUNG AND WELDED FOR READY INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
6. FLUME CAPACITY DURING DRY CROSSING SHALL BE SUFFICIENT TO ACCOMMODATE 1.5 TIMES THE FLOW MEASURED AT THE TIME OF CONSTRUCTION PROVIDED THAT THE FLUMES WILL BE IN PLACE NOT MORE THAN 96 HOURS AND NO PRECIPITATION IS FORECAST. FLUME CAPACITY FOR VEHICLE ACCESS SHALL BE SUFFICIENT TO PASS THE 2 YEAR DESIGN FLOW OR THE FLOW REASONABLY EXPECTED TO OCCUR DURING THE INSTALLATION. EXCESS FLUMES REQUIRED FOR LONGER TERM ACCESS SHALL BE CAPPED DURING DRY CROSSING PROCEDURES.
7. ENSURE THAT THE DAMS AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION.
8. FLUMES ARE TO BE SET WITH 10 PERCENT OF THEIR DIAMETER BELOW STREAMBED LEVEL WHERE SOIL CONDITIONS PERMIT (OTHERWISE INSTALLED AT STREAM GRADE AND SLOPE.)
9. PLACE IMPERVIOUS DAMS AT EACH END OF THE FLUME, UPSTREAM FIRST, THEN DOWNSTREAM. ACCEPTABLE ALTERNATIVES INCLUDE GRAVEL WITH RIP-RAP PROTECTION, SAND BAGS, STEEL PLATE AND ROCKFILL. DURING INSTALLATION, INSTALL AN IMPERVIOUS MEMBRANE, IF NECESSARY, TO LIMIT LEAKAGE. DAMS MAY NEED KEYING INTO THE BANK AND STREAMBED.
   EXCAVATE TRENCH THROUGH PLUGS AND UNDER FLUME FROM BOTH SIDES. WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
   a. LOWER IN PIPE BY PASSING UNDER FLUME AND BACKFILL IMMEDIATELY WITH SPOIL MATERIAL.
   b. IT IS NOT NECESSARY TO DEWATER THE IN-STREAM TRENCH, HOWEVER, DISPLACED WATER SHALL BE PUMPED TO A STABLE UPLAND AREA TO AVOID OVERTOPPING OF DAMS DURING PIPE PLACEMENT.
   c. IF THE SPOIL MATERIAL IS NOT SUITABLE, USE IMPORTED CLEAN GRANULAR MATERIAL.
   d. IF BLASTING IS REQUIRED, USE CONTROLLED BLASTING TECHNIQUES TO PREVENT DAMAGE TO THE FLOW CONVEYANCE SYSTEM. ALTERNATIVELY, BLASTING MAY BE ACCOMPLISHED PRIOR TO THE FLUME INSTALLATION BY DRILLING THROUGH THE OVERBURDEN.
10. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL SHALL BE CONTAINED TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
11. DEWATERING OF THE ONLAND TRENCH SHOULD OCCUR IN A STABLE VEGETATED AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DIRECTED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY.
12. FLUMES SHOULD BE REMOVED AS SOON AS POSSIBLE, WHEN NO LONGER REQUIRED FOR PIPE LAYING OR FOR ROAD ACCESS, IN THE FOLLOWING MANNER:
   a. REMOVE THE VEHICLE CROSSING RAMP. BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE FLOW CONDITIONS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.) TO THE MAXIMUM EXTENT POSSIBLE BEFORE REMOVING THE DAMS.
   b. REMOVE DOWNSTREAM DAM.
   c. REMOVE UPSTREAM DAM.
   d. REMOVE FLUME.
   e. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.
13. RESTORE THE STREAMBED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 13A TYPICAL DRY FLUME CROSSING METHOD – CONSTRUCTION PROCEDURES		
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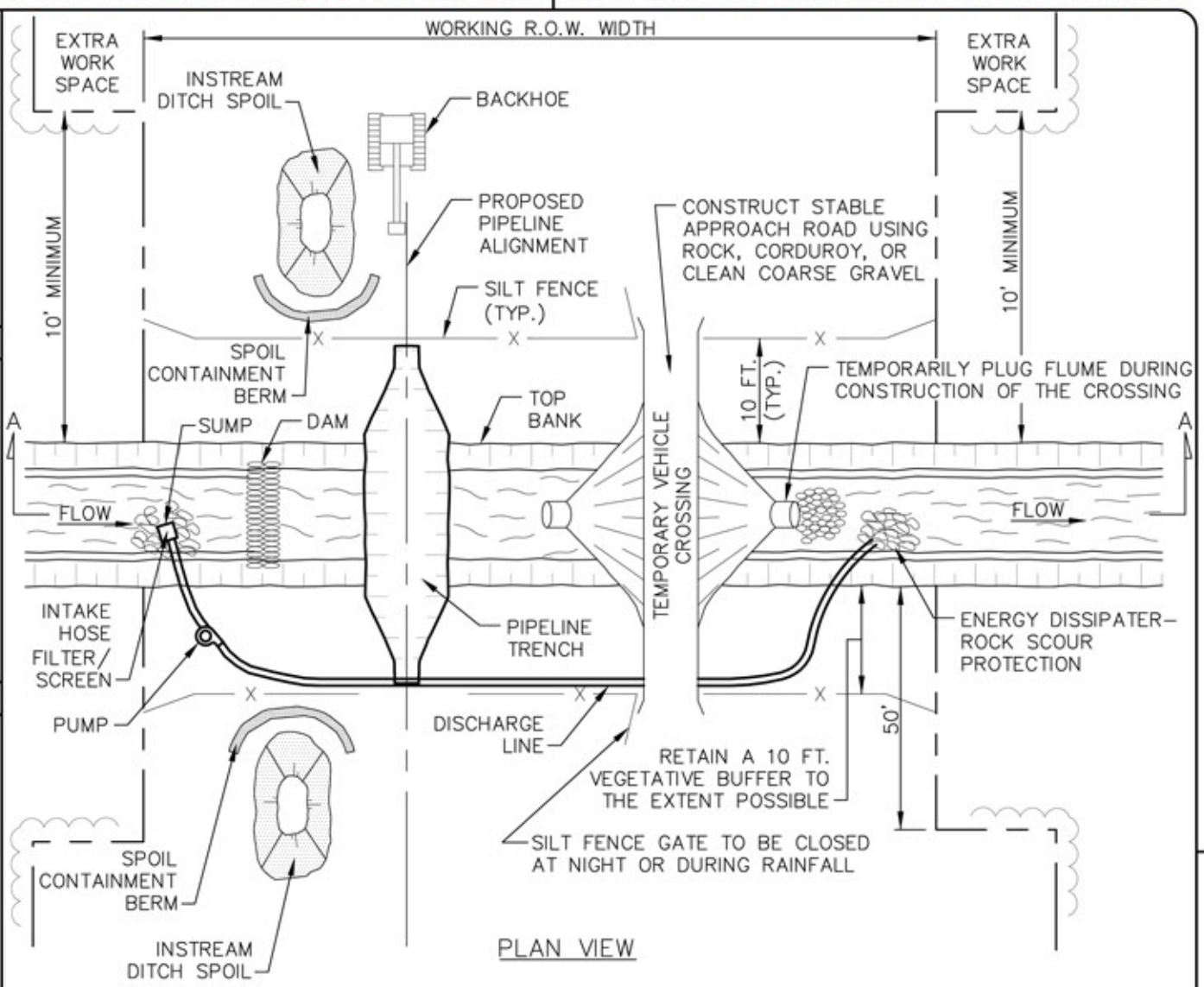
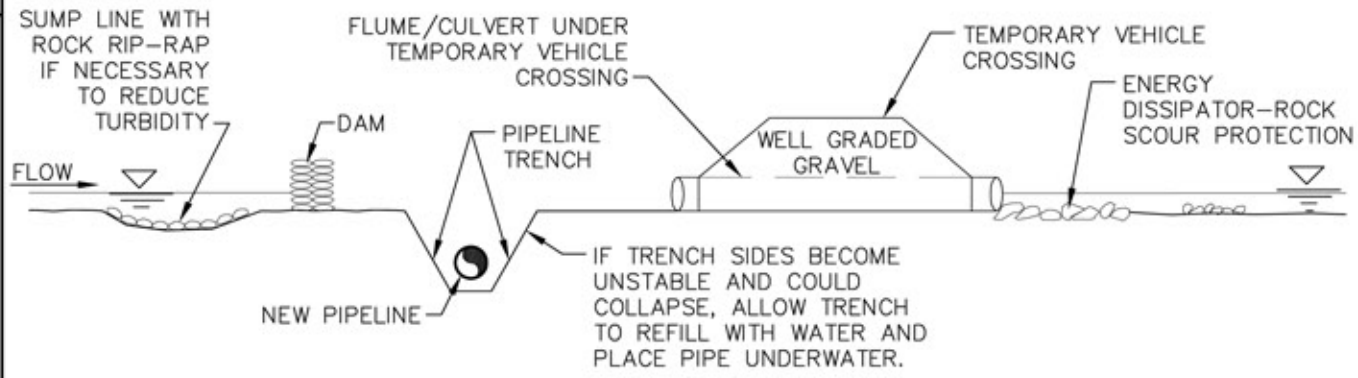


PLAN VIEW



SECTION A-A

NOTES:

1. PIPELINE PLACEMENT WITHIN RIGHT-OF-WAY CONCEPTUAL ONLY.
2. SEE DETAIL 14A FOR CONSTRUCTION PROCEDURES.

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KEYSTONE XL PROJECT

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TITLE

DETAIL 14
TYPICAL DAM AND PUMP CROSSING

SCALE N.T.S. | DWG No 4359-03-ML-03-709 | REV 01

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CONSTRUCTION PROCEDURES:

1. WHERE NECESSARY, OBTAIN PRIOR APPROVAL BEFORE USING THE DAM AND PUMP METHOD.
2. IF THERE IS ANY FLOW IN THE WATERCOURSE, INSTALL PUMPS TO MAINTAIN STREAMFLOW AROUND THE BLOCKED OFF SECTIONS OF CHANNEL. THE PUMP IS TO HAVE 1.5 TIMES THE PUMPING CAPACITY OF ANTICIPATED FLOW. A SECOND STANDBY PUMP OF EQUAL CAPACITY IS TO BE READILY AVAILABLE AT ALL TIMES. AN ENERGY DISSIPATER IS TO BE BUILT TO ACCEPT PUMP DISCHARGE WITHOUT STREAMBED OR STREAMBANK EROSION. IF THE CROSSING IS PROLONGED BEYOND ONE DAY THE OPERATION NEEDS TO BE MONITORED OVERNIGHT.
3. SCHEDULE INSTREAM ACTIVITY FOR LOW FLOW PERIODS IF POSSIBLE.
4. MARK OUT AND MAINTAIN LIMITS OF AUTHORIZED WORK AREAS WITH FENCING OR FLAGGING TAPE TO AVOID UNNECESSARY DISTURBANCE OF VEGETATION. ENSURE EQUIPMENT OPERATORS WORKING ON THE CROSSING HAVE BEEN BRIEFED ABOUT THIS PLAN AND THE MEASURES NEEDED TO PROTECT WATER QUALITY. INSTALL PRE-WORK SEDIMENT CONTROL MEASURES AS SPECIFIED IN THE PLAN. ALL NECESSARY EQUIPMENT AND MATERIALS TO BUILD THE DAMS AND TO PUMP WATER MUST BE ON SITE OR READILY AVAILABLE PRIOR TO COMMENCING IN-WATER CONSTRUCTION. PIPE SHOULD BE STRUNG, WELDED AND COATED AND READY FOR INSTALLATION PRIOR TO WATERCOURSE TRENCHING.
5. CONTRACTOR SHALL SUPPLY, INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES, AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS STREAM.
   a. NO HEAVILY SILT LADEN WATER SHALL BE DISCHARGED DIRECTLY INTO THE STREAM.
   b. EROSION AND SEDIMENT CONTROL STRUCTURE LOCATIONS AS DEPICTED ARE APPROXIMATE AND MAY BE ADJUSTED AS DIRECTED BY THE COMPANY INSPECTOR TO ACTUAL SITE CONDITIONS.
   c. SILT FENCE OR STRAW BALE INSTALLATIONS SHALL INCLUDE REMOVABLE SECTIONS TO FACILITATE ACCESS DURING CONSTRUCTION. UTILIZE STRAW BALE BARRIERS ONLY IN LIEU OF A SILT FENCE WHERE FREQUENT ACCESS IS REQUIRED.
   d. SEDIMENT LADEN WATER FROM TRENCH DEWATERING SHALL BE DISCHARGED TO A WELL VEGETATED UPLAND AREA INTO A STRAW BALE DEWATERING STRUCTURE OR GEOTEXTILE FILTER BAG.
   e. SEDIMENT CONTROL STRUCTURES MUST BE IN PLACE AT ALL TIMES ACROSS THE DISTURBED PORTIONS OF THE RIGHT-OF-WAY EXCEPT DURING EXCAVATION/INSTALLATION OF THE CROSSING PIPE.
   f. SOFT DITCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE MAINLINE DITCH FROM THE RIVER CROSSING UNTIL THE RIVER CROSSING IS INSTALLED AND BACKFILLED.
6. TO THE EXTENT POSSIBLE, MAINTAIN A MINIMUM 10 FEET VEGETATIVE BUFFER STRIP BETWEEN DISTURBED AREAS AND THE WATERCOURSE. INSTALL AND MAINTAIN A SILT FENCE UPSLOPE OF THE BUFFER STRIP ON EACH SIDE OF THE WATERCOURSE. THE SILT FENCE SHOULD INCORPORATE REMOVABLE "GATES" AS REQUIRED TO ALLOW ACCESS WHILE MAINTAINING EASE OF REPLACEMENT FOR OVERNIGHT OR DURING PERIODS OF RAINFALL.
7. CONSTRUCT A TEMPORARY SUMP UPSTREAM OF THE DAM AND LINE WITH ROCKFILL IF A NATURAL POOL DOES NOT EXIST. INSTALL THE PUMP OR PUMP INTAKE IN THE POOL OR SUMP. DISCHARGE WATER ONTO AN ENERGY DISSIPATER DOWNSTREAM OF THE WORK AREA.
8. EXCAVATED MATERIAL MUST NOT BE STOCKPILED WITHIN 10 FT. OF THE WATERCOURSE. THIS MATERIAL MUST BE CONTAINED WITHIN BERM CONTAINMENT, WITH SECONDARY SILT FENCE PROTECTION TO PREVENT SATURATED SOIL FROM FLOWING BACK INTO THE WATERCOURSE.
9. CHEMICALS, FUELS, LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT REFUELED WITHIN 100 FT. OF THE WATERBODY. PUMPS ARE TO BE REFUELED AS PER THE SPCC PLANS.
10. STAGING AREAS ARE TO BE LOCATED AT LEAST 10 FT. FROM THE WATER'S EDGE (WHERE TOPOGRAPHIC CONDITIONS PERMIT) AND SHALL BE THE MINIMUM SIZE NEEDED.
11. DAMS ARE TO BE MADE OF STEEL PLATE, INFLATABLE PLASTIC DAM, SAND BAGS, COBBLES, WELL GRADED COARSE GRAVEL FILL, OR ROCK FILL. DAMS MAY NEED KEYING INTO THE BANKS AND STREAMBED. ENSURE THAT THE DAM AND VEHICLE CROSSING ARE LOCATED FAR ENOUGH APART TO ALLOW FOR A WIDE EXCAVATION. CAP FLUMES USED UNDER VEHICLE CROSSING DURING DRY CROSSING.
12. DEWATER AREA BETWEEN DAMS IF POSSIBLE. DEWATERING SHOULD OCCUR IN A STABLE VEGETATIVE AREA A MINIMUM OF 50 FT. FROM ANY WATERBODY. THE PUMP DISCHARGE SHOULD BE DISCHARGED ONTO A STABLE SPILL PAD CONSTRUCTED OF ROCKFILL SANDBAGS, OR TIMBERS TO PREVENT LOCALIZED EROSION. THE DISCHARGE WATER SHOULD ALSO BE FORCED INTO SHEET FLOW IMMEDIATELY BEYOND THE SPILL PAD BY USING STRAW BALES AND THE NATURAL TOPOGRAPHY DISCHARGED WATER SHALL NOT BE ALLOWED TO FLOW INTO ANY WATERCOURSE OR WETLAND. IF IT IS NOT POSSIBLE TO DEWATER THE EXCAVATION DUE TO SOILS WITH A HIGH HYDRAULIC CONDUCTIVITY, THE EXCAVATION AND PIPE PLACEMENT IS TO BE CARRIED OUT IN THE STANDING WATER. PUMP ANY DISPLACED WATER AS DESCRIBED ABOVE TO PREVENT OVERTOPPING OF DAMS.
13. EXCAVATE TRENCH THROUGH PLUGS AND STREAMBED FROM BOTH SIDES, RE-POSITIONING DISCHARGE HOSE AS NECESSARY. LOWER THE PIPE IN THE TRENCH AND BACKFILL IMMEDIATELY. DURING THIS OPERATION WORK IS TO BE COMPLETED AS QUICKLY AS POSSIBLE.
14. CONTRACTOR SHALL RESTORE THE STREAM BED AND BANKS TO APPROXIMATE PRE-CONSTRUCTION CONTOURS, BUT NOT TO EXCEED 2 HORIZONTAL TO 1 VERTICAL.
   a. CONTRACTOR SHALL INSTALL PERMANENT EROSION AND SEDIMENT CONTROL STRUCTURES AS INDICATED ON A SITE SPECIFIC BASIS. IN THE ABSENCE OF SITE SPECIFIC INFORMATION, A FLEXIBLE CHANNEL LINER SUCH AS NAG C125 OR C350 WHICH IS CAPABLE OF WITHSTANDING ANTICIPATED FLOW SHALL BE INSTALLED. ALTERNATIVELY, ROCK RIP-RAP SHALL BE INSTALLED.
   b. ANY MATERIALS PLACED IN THE STREAM TO FACILITATE CONSTRUCTION SHALL BE REMOVED DURING RESTORATION. BANKS SHALL BE STABILIZED AND TEMPORARY SEDIMENT BARRIERS INSTALLED AS SOON AS POSSIBLE AFTER CROSSING, BUT WITHIN 24 HOURS OF COMPLETING THE CROSSING.
   c. MAINTAIN A SILT FENCE OR STRAW BALE BARRIER ALONG THE WATER COURSE UNTIL VEGETATION IS ESTABLISHED IN ADJACENT DISTURBED AREAS.
15. WHEN THE STREAMBED HAS BEEN RESTORED, THE CREEK BANKS ARE TO BE CONTOURED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH FLOW VELOCITY BETWEEN DAMS (E.G., EROSION CONTROL BLANKETS, CRIBBING, ROCK RIP-RAP, ETC.). THE DAMS ARE TO BE REMOVED DOWNSTREAM FIRST. KEEP PUMP RUNNING UNTIL NORMAL FLOW IS RESUMED. COMPLETE BANK TRIMMING AND EROSION PROTECTION. IF SANDBAGS ARE USED FOR THE DAMS, PLACE AND REMOVE BY HAND TO AVOID EQUIPMENT BREAKING BAGS.

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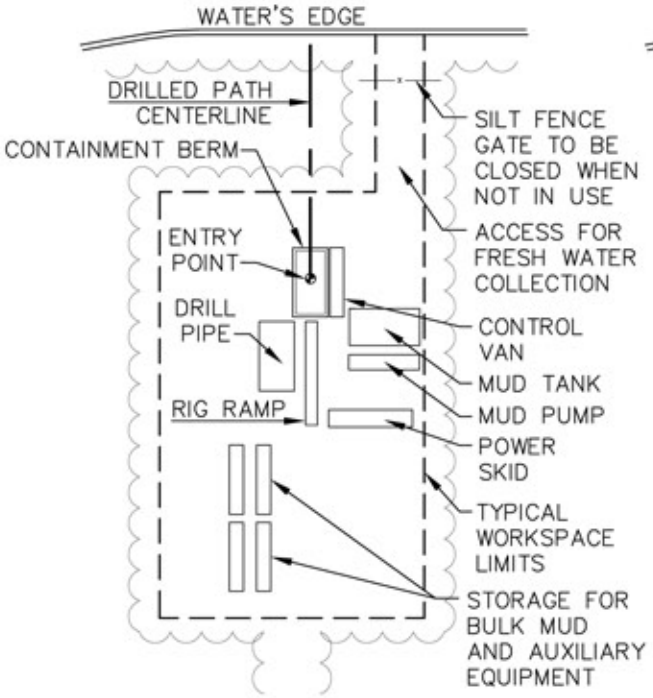
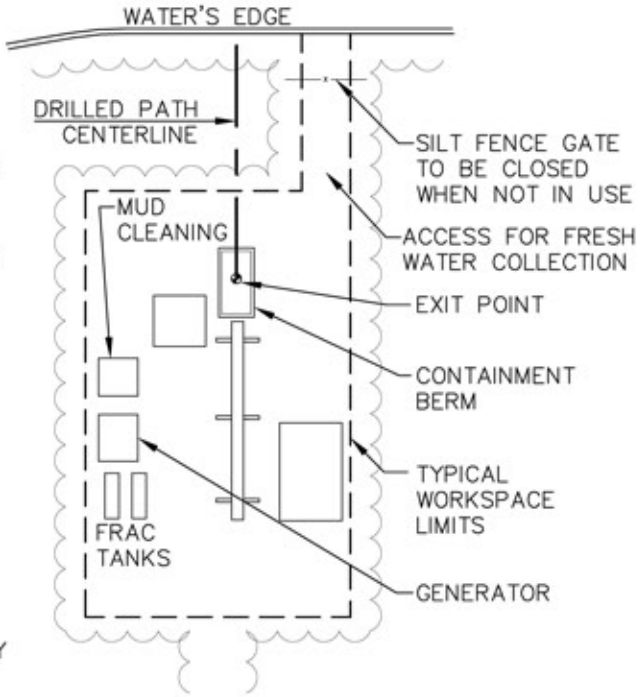


SITE PLAN
ENTRY SIDE



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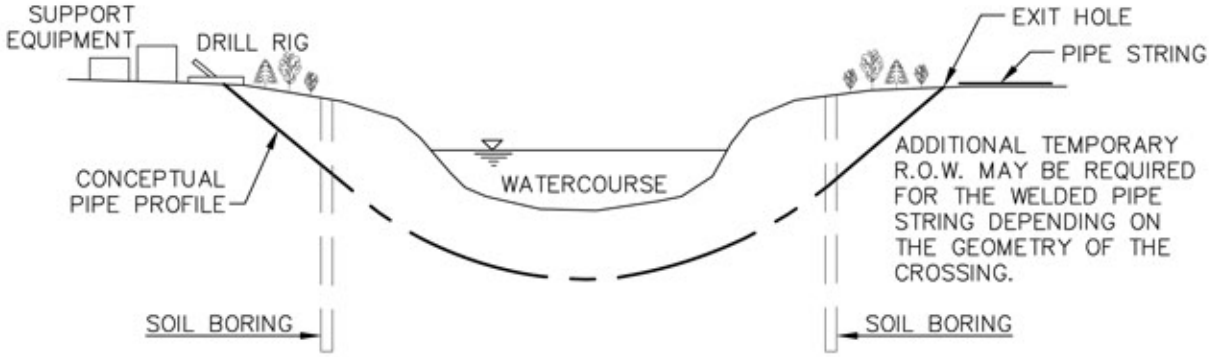

PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. LIMIT CLEARING BETWEEN DRILL ENTRY AND EXIT POINT TO HAND CUTTING BRUSH FOR TRACKING WIRES.
2. ENSURE THAT ONLY BENTONITE-BASED DRILLING MUD IS USED.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.

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	TITLE: DETAIL 15 TYPICAL HORIZONTAL DRILL (HDD) SITE PLAN & PROFILE		
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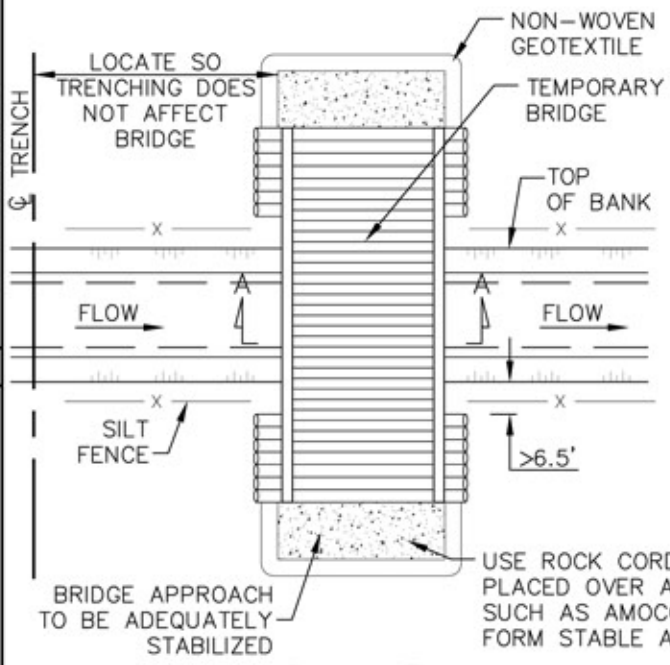
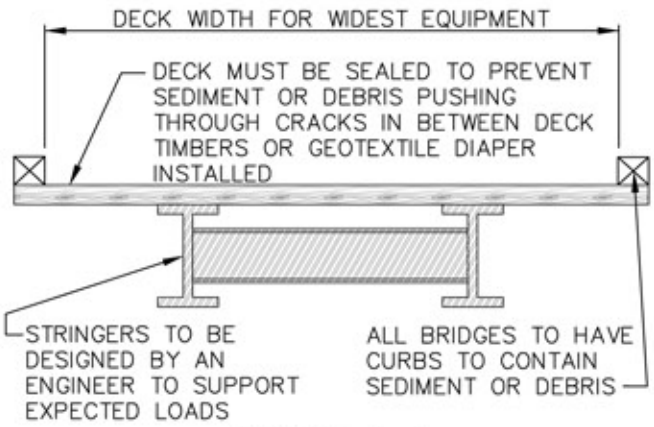
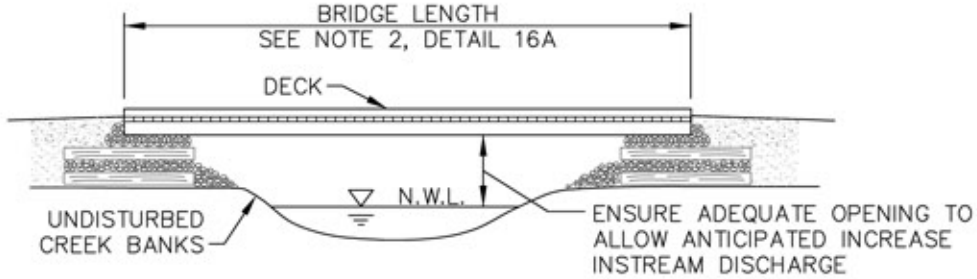


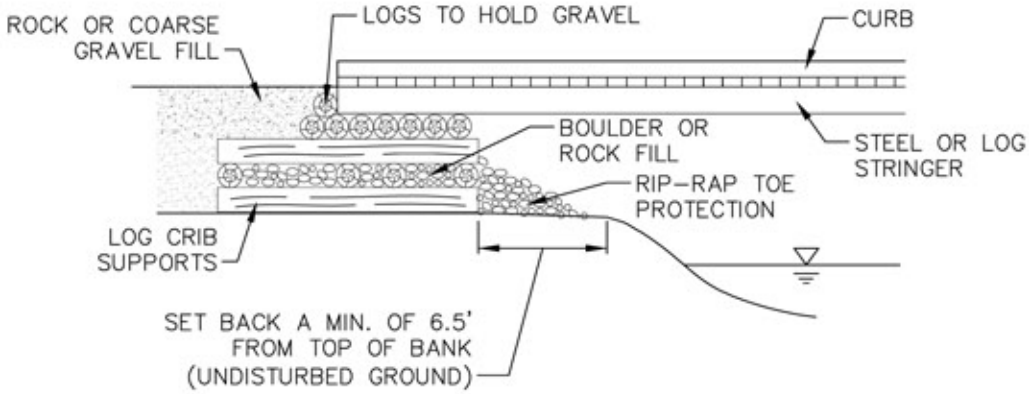
PLAN VIEW



SECTION A–A



BRIDGE PROFILE



TYPICAL TEMPORARY CRIB ABUTMENT

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KEYSTONE XL PROJECT

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TITLE: DETAIL 16 TYPICAL TEMPORARY BRIDGE CROSSING

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CONSTRUCTION PROCEDURES:

IN GENERAL TERMS, THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION PROCEDURES THAT ARE RECOMMENDED TO BE FOLLOWED FOR TEMPORARY BRIDGE CROSSINGS:

1. A PORTABLE BRIDGE, FLEXI-FLOAT OR FLUMED VEHICLE CROSSING MAY BE SUBSTITUTED FOR THE TEMPORARY BRIDGE. IT IS IMPORTANT THAT THE SIZE OF THE TOTAL OPENING BE SELECTED SO THE STRUCTURE CAN SAFELY PASS FLOOD FLOWS THAT CAN REASONABLY BE EXPECTED TO OCCUR DURING THE LIFE OF THE CROSSING.

2. DETERMINE BRIDGE LENGTH REQUIRED AND FOLLOW EITHER METHOD A) OR B) FOR DETERMINING THE OPENING SIZE. IF A) IS FOLLOWED, A MINIMUM 6.5 FT. SETBACK FROM TOP OF BANK MUST BE PRESERVED AS A "NO DISTURBANCE AREA". IF ABUTMENTS OR PIERS IN THE STREAMBED ARE REQUIRED, METHOD B) IS TO BE FOLLOWED.

3. INSTALL THE BRIDGE IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. STRINGERS MUST BE DESIGNED TO SUPPORT THE LOADS EXPECTED ON THE BRIDGE. CURBS MUST BE INSTALLED ALONG THE EDGE OF THE DECK TO CONTAIN SEDIMENT AND DEBRIS ON THE BRIDGE. FASTENERS CONNECTING COMPONENTS MUST BE STRONG ENOUGH TO HOLD THEM IN POSITION DURING THE LIFE OF THE BRIDGE. CRIBS ARE TO BE FILLED WITH ROCK OR COBBLE. RIP-RAP EROSION PROTECTION IS TO BE PLACED AROUND THE CRIBS AND ON ANY FILL SLOPES PROJECTING INTO THE WATERBODY.

4. ROAD APPROACHES LEADING TO THE BRIDGE MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER TO REDUCE SEDIMENT AND DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS. THIS MAY REQUIRE USING MATERIALS SUCH AS GRAVEL, ROCK OR CORDUROY. DO NOT USE SOIL TO CONSTRUCT OR STABILIZE EQUIPMENT BRIDGES. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO KEEP SEDIMENT ON LAND (E.G., SILT FENCING, FILTER CLOTH, RIP-RAP, SEED AND MULCH, ETC.)

5. MAINTAIN A SILT FENCE ON EACH SIDE OF THE WATERBODY EXTENDING A MINIMUM OF 10 FEET BEYOND THE WIDTH OF DISTURBANCE UNTIL VEGETATION HAS BEEN ESTABLISHED IN UPSLOPE AREAS.

6. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE ANY BUILD-UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL IN A LOW LYING AREA AT LEAST 100 FEET FROM THE WATERBODY.

7. REMOVE TEMPORARY CROSSINGS AS SOON AS POSSIBLE AFTER FINAL CLEAN-UP. MATERIALS PLACED ALONG THE WATERBODY SHOULD BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL SHOULD NOT OCCUR OUTSIDE THE CONSTRUCTION WINDOWS. SURPLUS GRAVEL IS TO BE SPREAD ON THE RIGHT-OF-WAY AS GRAVEL SHEETING, IF GRADATION IS SUITABLE, OR MOVED AT LEAST 100 FEET FROM TOP OF BANK FOR DISPOSAL. BRIDGE MATERIALS ARE TO BE REMOVED FROM THE CROSSING AREA. THE WATERBODY BED AND BANKS ARE TO BE RESTORED TO A STABLE ANGLE AND PROTECTED WITH EROSION RESISTANT MATERIAL COMPATIBLE WITH THE EXPECTED FLOW CONDITIONS.

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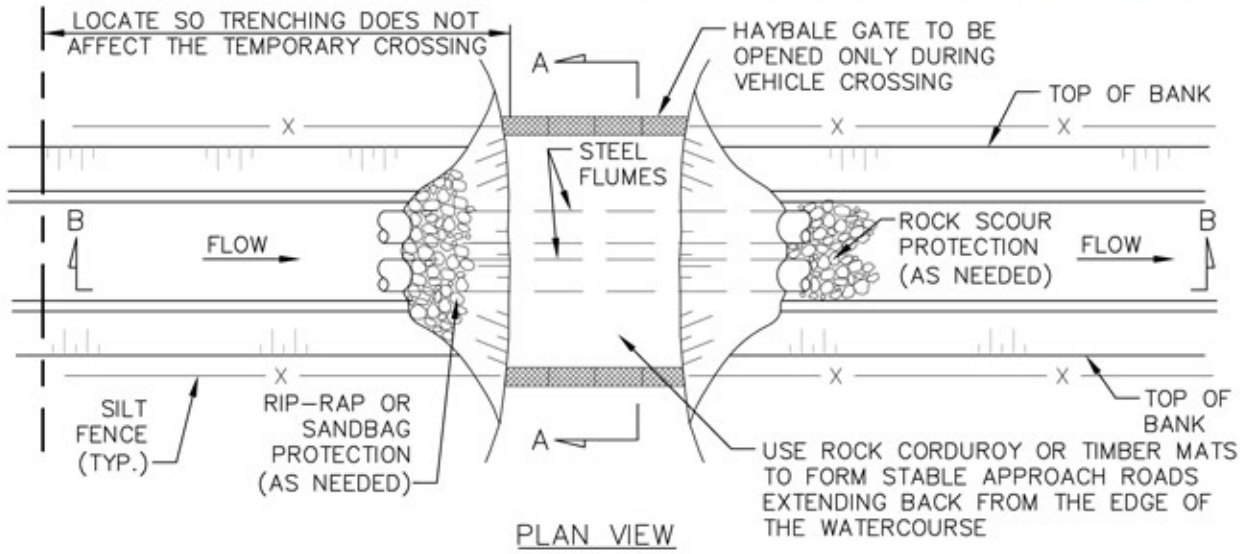
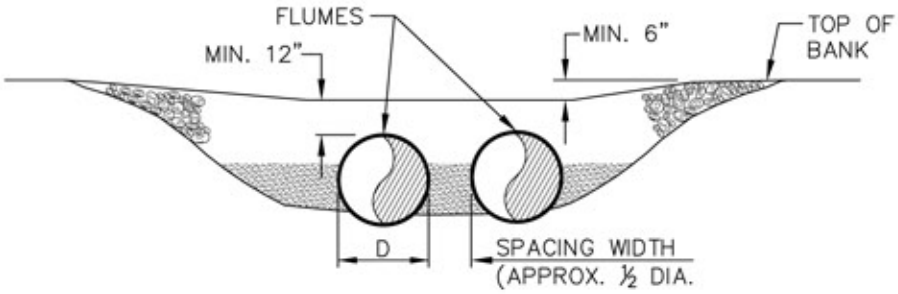
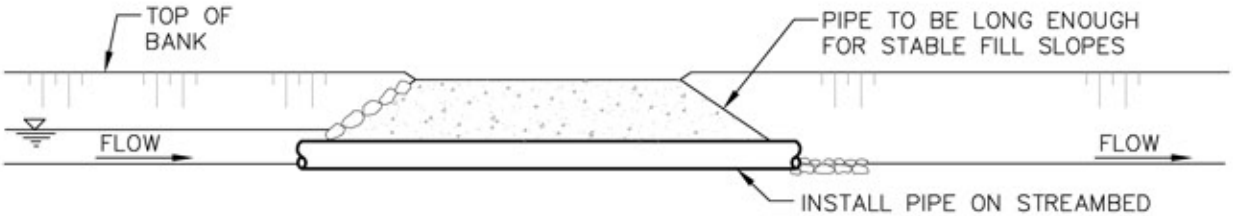


PLAN VIEW



SECTION A–A



SECTION B–B

CONSTRUCTION PROCEDURES:

THE FOLLOWING IS A SEQUENCE OF CONSTRUCTION AND PROCEDURES MEASURES TO BE FOLLOWED AT ALL TEMPORARY FLUME VEHICLE CROSSINGS.

1. A PORTABLE FLEXI–FLOAT, OR TEMPORARY BRIDGE MAY BE SUBSTITUTED FOR THE TEMPORARY FLUME CROSSING.
2. THE LENGTH OF THE FLUME SHALL BE SUFFICIENT TO SPAN THE ENTIRE AREA REQUIRED FOR VEHICULAR ACCESS, EXTENDING 4 FEET BEYOND TOE OF FILL MATERIAL, SO TRENCHING WILL NOT AFFECT THE ROAD CROSSING. A LONGER PIPE IS TO BE USED, IF NEEDED, TO MAINTAIN STABLE SIDE SLOPES. FLUME CAPACITY TO BE BASED ON THE 2–YEAR DESIGN FLOW OR MAXIMUM FLOW ANTICIPATED TO OCCUR DURING INSTALLATION, AS SPECIFIED IN CONSTRUCTION DOCUMENTS.
3. WHERE PRACTICAL, BACKFILL AROUND THE PIPES AT THE ROAD WITH CLEAN, COARSE ROCK FILL MATERIAL. IF SCOUR IS POSSIBLE, RIP–RAP IS TO BE PLACED ON THE WATERBODY BED DOWNSTREAM OF THE PIPE OUTLET EXTENDING A MINIMUM OF TWO PIPE DIAMETERS. ALTERNATIVELY, TIMBER EQUIPMENT MATS, SAND BAGS OR TIMBER CORDUROY MAY BE USED TO FORM THE TRAVEL SURFACE.
4. TO REDUCE DEBRIS ENTERING THE WATERBODY FROM EQUIPMENT TRACKS, THE APPROACH ROAD LEADING TO THE CULVERT CROSSING MUST BE RAISED AND STABLE SO EQUIPMENT LOADS ARE SUPPORTED A SUFFICIENT DISTANCE BACK FROM THE WATER. IF CUTS ARE NEEDED TO OBTAIN A SATISFACTORY GRADE, THEY ARE TO BE DUG WITH SIDE DITCHES AND STABLE SLOPES. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED TO LIMIT THE POTENTIAL FOR SEDIMENT TO ENTER THE WATERBODY (E.G., CHECK DAMS, SILT FENCE, RIP–RAP, SEED AND MULCH, SEDIMENT TRAPS, ETC.).
5. PERIODICALLY CHECK THE TEMPORARY CROSSING INSTALLATION AND REMOVE ANY BUILD–UP OF SEDIMENT OR DEBRIS ON THE BRIDGE. DISPOSE OF THIS MATERIAL AT LEAST 100 FEET FROM THE WATERBODY AND ABOVE THE HIGH WATER LEVEL.
6. FOLLOWING COMPLETION OF THE CROSSING, REMOVE ROCKFILL IN/OR AROUND FLUME PIPES FROM THE WATERBODY OR WETLAND.
7. RESTORE STREAM BANKS AND WATERBODY BOTTOM.

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JMP (NAME) 2010–10–21 (DATE)		FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 17 TYPICAL FLUME BRIDGE CROSSING		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–03–714	REV 01

TC_A4_BR.DWG 8.5X11

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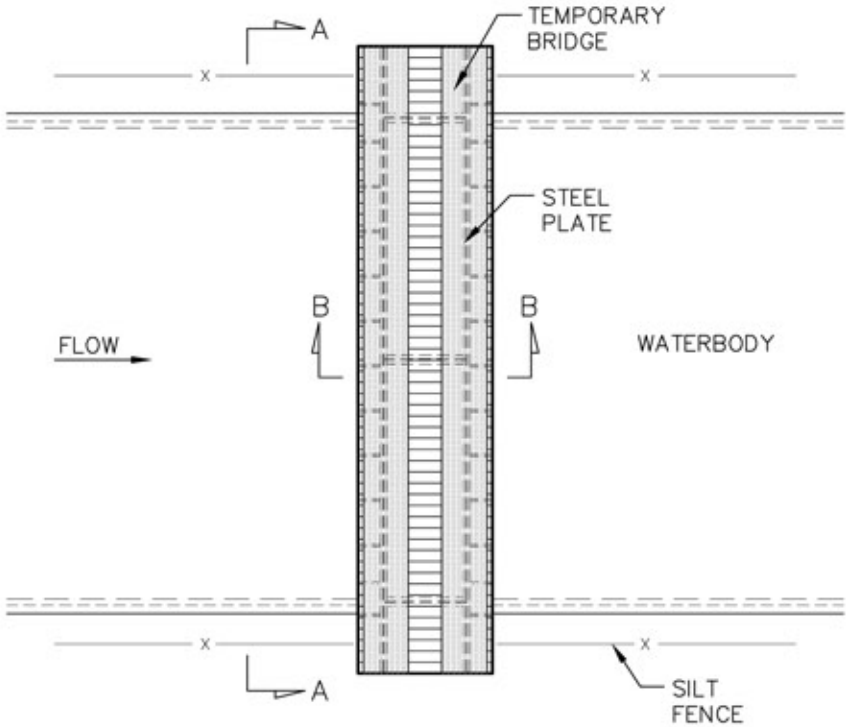
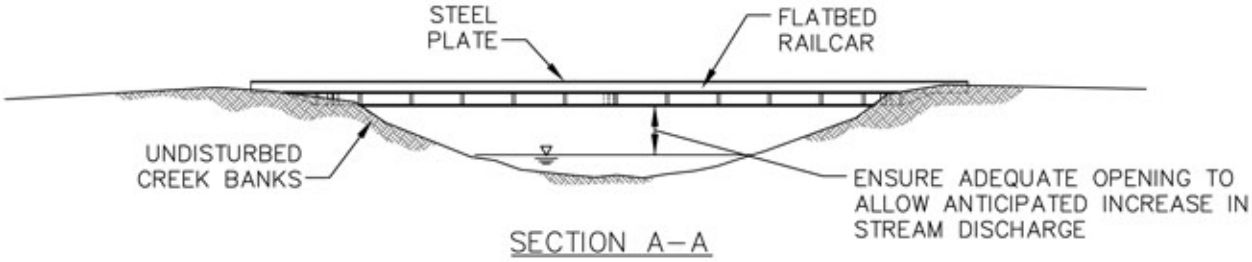
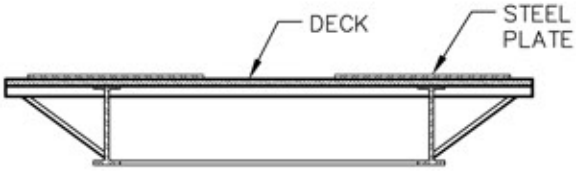


PLAN VIEW



SECTION A–A



SECTION B–B

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DESIGNER: JMP (NAME) 2010–10–21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 18 TYPICAL RAILCAR BRIDGE CROSSING		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–03–715 REV 01

TC_A4_BR.DWG 8.5X11

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CONSTRUCTION PROCEDURES:

1. THIS TYPICAL DRAWING PROVIDES FOR A RAILCAR BRIDGE EQUIPMENT CROSSING.

2. BRIDGE SHOULD BE A MINIMUM OF 12 FEET LONGER THAN BANK TO BANK WIDTH.

3. BEST MANAGEMENT PRACTICES UTILIZING EROSION CONTROL DEVICES, SUCH AS HAY BALES AND SILT FENCE ARE REQUIRED TO PREVENT SEDIMENTATION OF THE STREAM. EROSION PROTECTION SHALL BE PLACED ON THE STREAM BANKS.

4. DURING FINAL CLEAN-UP, REMOVE TEMPORARY EQUIPMENT CROSSINGS AS SOON AS POSSIBLE. INSTALLED MATERIALS, SUCH AS HAY BALES AND SILT FENCE MUST BE REMOVED AND DISPOSED IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS AND REQUIREMENTS. THE STREAMBED, BANKS AND AREAS AFFECTED BY CONSTRUCTION OF THE TEMPORARY EQUIPMENT CROSSING SHOULD BE RESTORED TO A STABLE CONDITION. IF REQUIRED TO PREVENT TRANSPORT OF SEDIMENTATION TO THE STREAM, SILT FENCE SHOULD BE INSTALLED AT THE TOP OF THE BANKS.

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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 18A
TYPICAL RAILCAR BRIDGE CROSSING – CONSTRUCTION PROCEDURES

SCALE N.T.S. | DWG No 4359-03-ML-03-716 | REV 01

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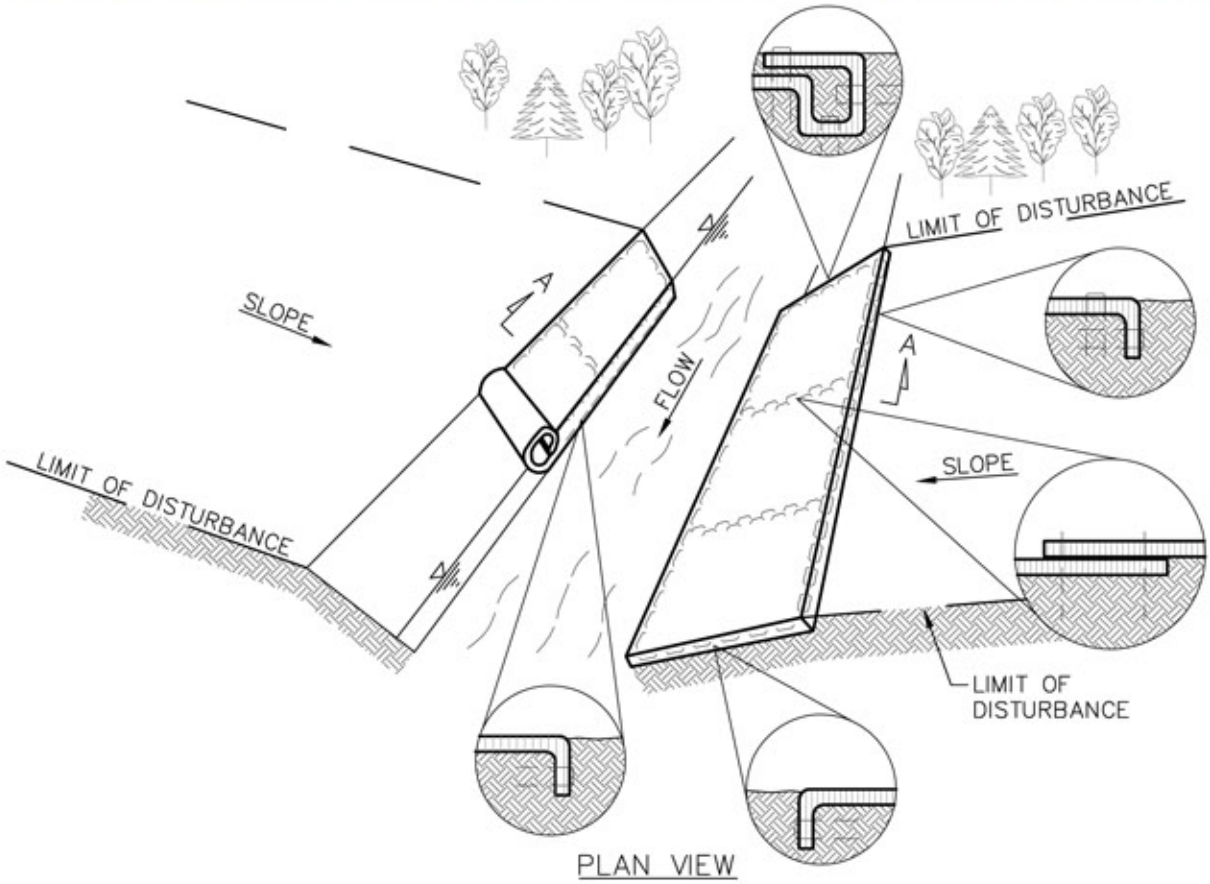

PLAN VIEW

SECTION A–A

NOTES:

1. INSTALL AND ANCHOR LINERS FOLLOWING MANUFACTURER'S INSTRUCTIONS.
2. PREPARE SOIL BEFORE INSTALLING CHANNEL LINER, INCLUDING THE APPLICATION OF
3. SEED. CHANNEL LINERS SHOULD EXTEND COMPLETELY ACROSS DISTURBED BANK AREAS TO PROTECT ERODIBLE SURFACES.
4. BEGIN AT THE END OF THE CHANNEL BY ANCHORING THE LINER IN A TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
5. ROLL LINER IN DIRECTION OF WATER FLOW.
6. INSTALL LINERS END–OVER–END (SHINGLE STYLE) WITH OVERLAP USING A DOUBLE ROW OF STAGGERED STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FEET INTERVALS. USE A ROW OF STAPLES 4 INCHES BELOW THE FIRST ROW IN A STAGGERED PATTERN.
8. INSTALL CHANNEL LINER TO THE TOP OF THE DEFINED CHANNEL SECTION. TWO OR MORE ROWS OF BLANKETS MAY BE NECESSARY, THESE LINERS MUST BE OVERLAPPED 4 INCHES AND STAPLED.
9. THE CHANNEL LINER SHOULD EXTEND TO THE BASE OF THE CHANNEL AND STAPLED. FOR CHANNELS WITH VERY LITTLE OR NO FLOW, EXTEND A MINIMUM OF 1 FOOT BELOW THE LOW WATER LEVEL AND STAPLE IN PLACE.
10. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008–11–04 UPDATED DRAWING NOTES
02 2010–10–11 REVISED TITLE BLOCK

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JMP (NAME)	2010–10–21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 19 FLEXIBLE CHANNEL LINER INSTALLATION		
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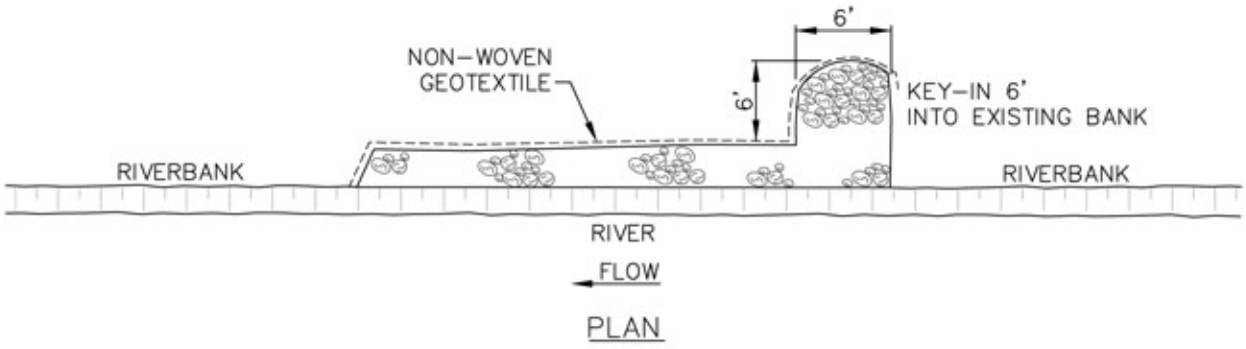
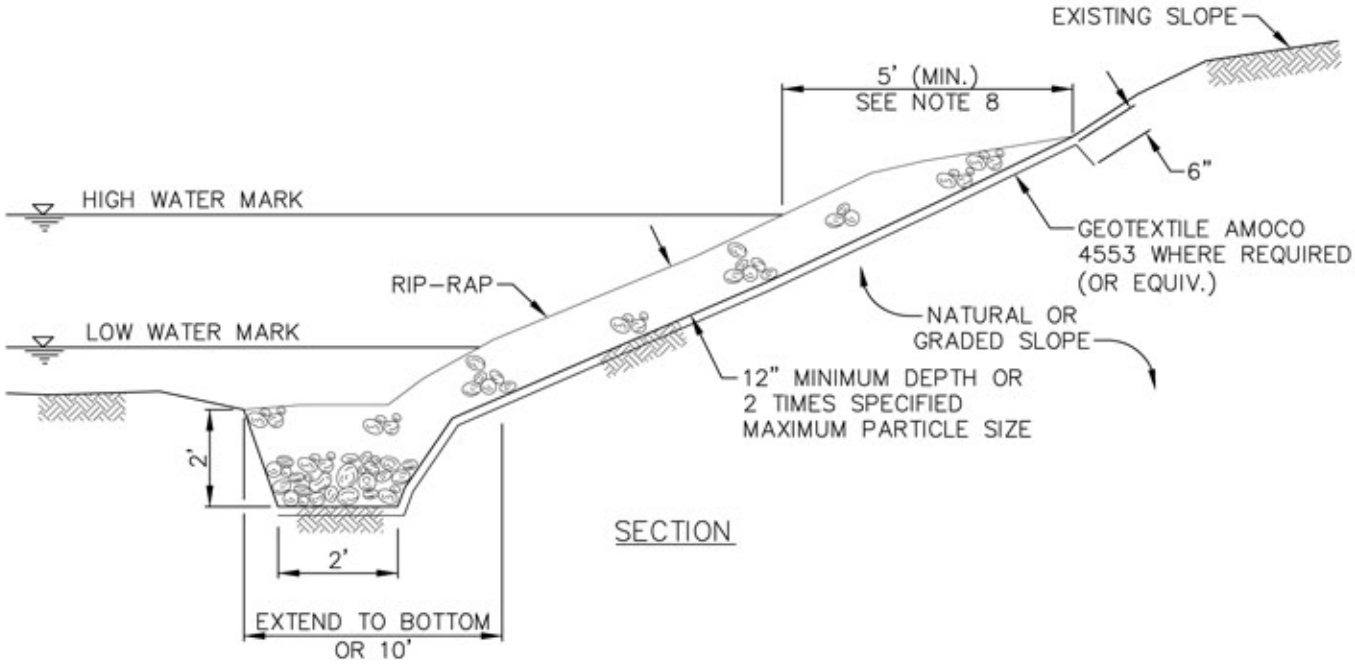


PLAN



SECTION

NOTES:

1. REMOVE ALL STUMPS, ORGANIC MATERIAL AND PREPARE BANKS TO A STABLE CONFIGURATION TO A MAXIMUM SLOPE OF 2 HORIZONTAL TO 1 VERTICAL.
2. CONSTRUCT TOE TRENCH TO KEY IN BOTTOM OF RIP-RAP PROTECTION.
3. INSTALL FILTER CLOTH (GEOTEXTILE), SUCH AS AMOCO 4553 OR EQUIVALENT, UNDER ROCK WHERE SPECIFIED OR AS DIRECTED BY THE COMPANY. ADJOINING EDGES OF CLOTH SHALL OVERLAP A MINIMUM OF 12".
4. ROCK UTILIZED FOR RIP-RAP SHALL CONSIST OF SOUND, DURABLE ROCK, AND RESISTANT TO WEATHERING. INDIVIDUAL PIECES SHOULD BE ANGULAR, BLOCK SHAPED AND HAVE A MINIMUM SPECIFIC GRAVITY OF 2.2.
5. INSTALL RIP-RAP TO A THICKNESS OF APPROXIMATELY 2 TIMES THE MAXIMUM EQUIVALENT DIAMETER OF THE RIP-RAP. EACH LOAD SHOULD BE WELL GRADED. A WELL GRADED MIXTURE IS COMPOSED 60% (MINIMUM) OF LARGER SIZES WITH 40% OF SMALLER SIZES TO FILL THE VOIDS.
6. SIZE OF RIP-RAP IS DEPENDENT UPON THE PREDICTED FLOW CONDITIONS.
7. KEY IN THE EDGES OF THE RIP-RAP AND FILTER CLOTH TO NATURAL GROUND CONTOURS SO THAT UNDERMINING DOES NOT OCCUR.
8. RIP-RAP IS TO BE INSTALLED TO 2 FEET. ABOVE THE NORMAL HIGH WATER MARK OR 5 FEET ALONG THE SLOPE, WHICHEVER IS LESS.
9. INSTALLATION SPECIFICATIONS TO BE MODIFIED TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 20 TYPICAL ROCK RIP-RAP

SCALE: N.T.S. | DWG No: 4359-03-ML-05-709 | REV: 02

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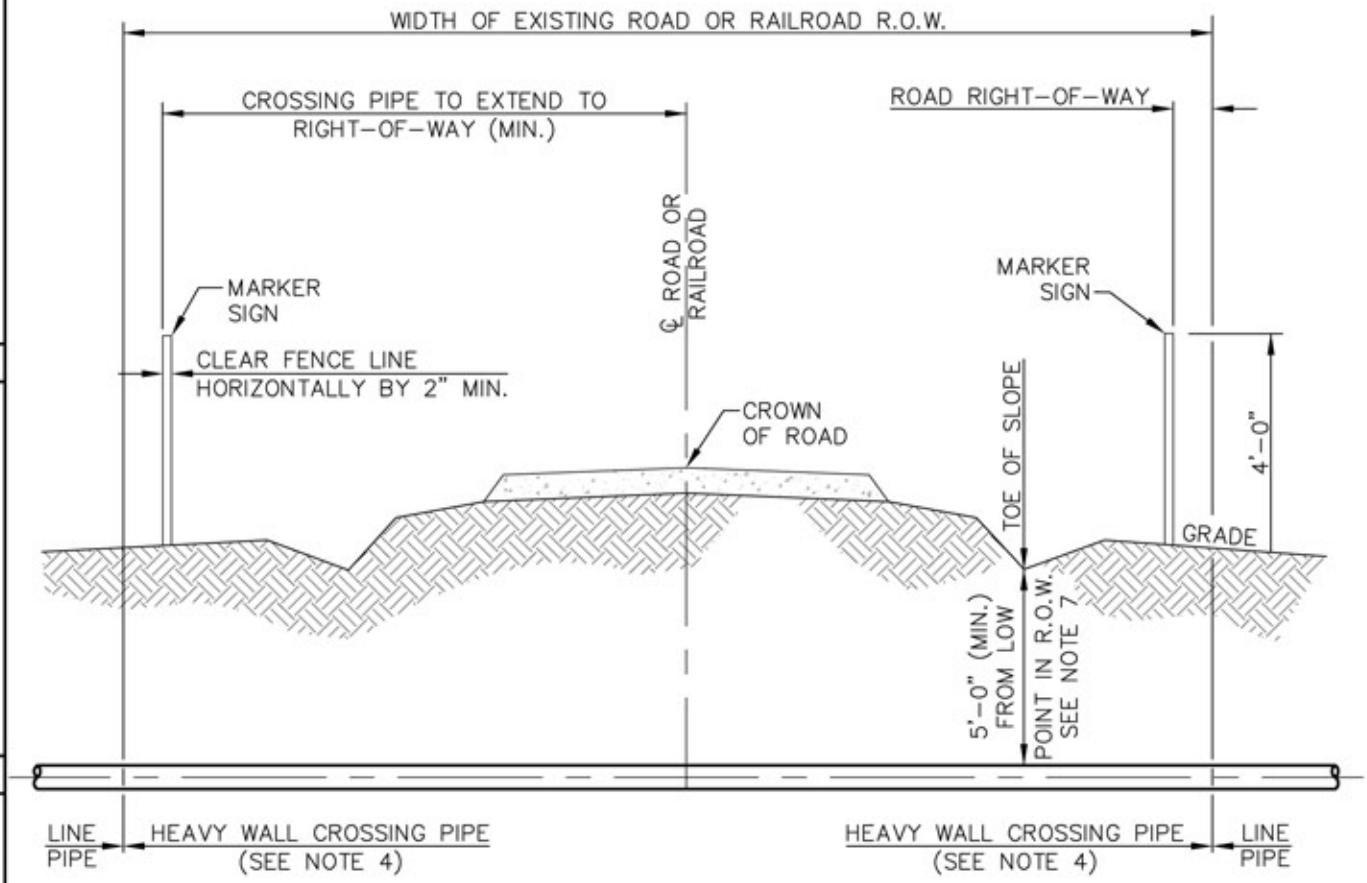

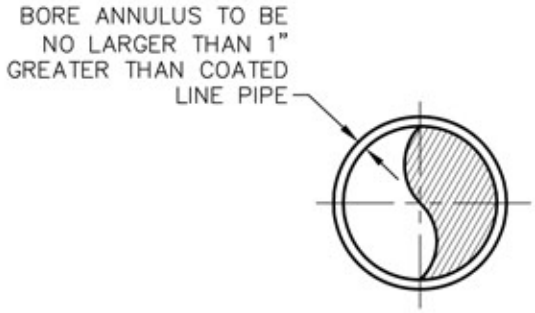

NOTES:

1. CROSSINGS SHALL BE IN ACCORDANCE WITH APPLICABLE PERMIT.
2. ROAD CROSSING PIPE SHALL EXTEND AT MINIMUM TO RIGHT-OF-WAY LINE UNLESS OTHERWISE SPECIFIED.
3. THE TYPE AND MINIMUM REQUIRED LENGTH OF PIPE FOR CROSSINGS OF ROADS SHALL BE AS SPECIFIED ON ALIGNMENT SHEETS.
4. PIPE FOR BORED CROSSINGS TO INCLUDE ABRASION-RESISTANT (ARB) COATING.
5. PIPELINE MARKER AND TEST STATIONS TO BE INSTALLED ON RIGHT-OF-WAY LINE NEXT TO FENCE IF POSSIBLE.
6. THE CROSSING PIPE SHALL BE STRAIGHT WITH NO VERTICAL OR HORIZONTAL BENDS WITHIN ROAD RIGHT-OF-WAY.
7. MINIMUM PIPELINE COVER IN DRAINAGE DITCHES AT PUBLIC ROADS IS 60 INCHES; 36 INCHES IN CONSOLIDATED ROCK.

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02 2010-10-11 REVISED TITLE BLOCK

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	TITLE: DETAIL 21 TYPICAL UNCASED ROAD/RAILROAD CROSSING BORE DETAIL		
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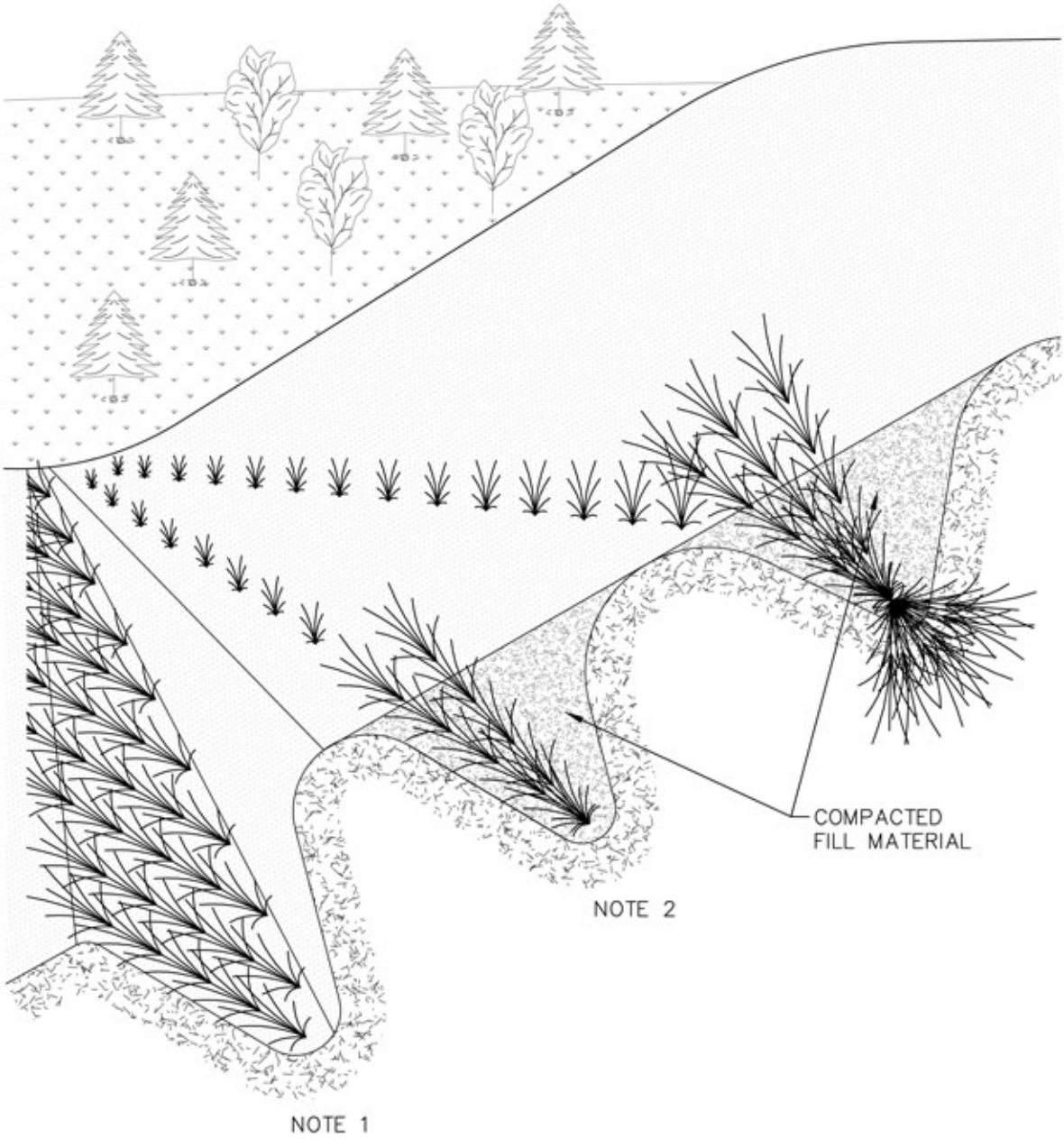

NOTES:

1. CUT TRENCH ACROSS SLOPE. FILL WITH DORMANT WOODY PLANT MATERIAL.
2. FILL IS PLACED ON TOP OF BRANCH LAYER AND COMPACTED.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT SITE CONDITIONS.

REVISIONS
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FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 22
STREAMBANK RECLAMATION –
BRUSH LAYER IN CROSS CUT SLOPE

SCALE N.T.S. | DWG No 4359-03-ML-05-710 | REV 02

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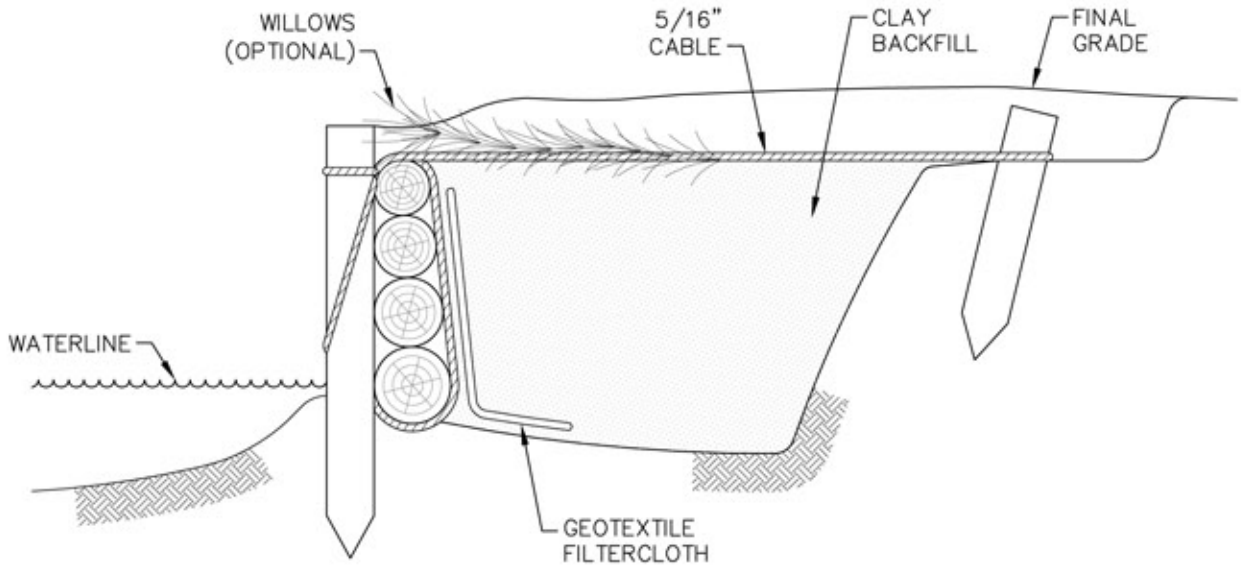

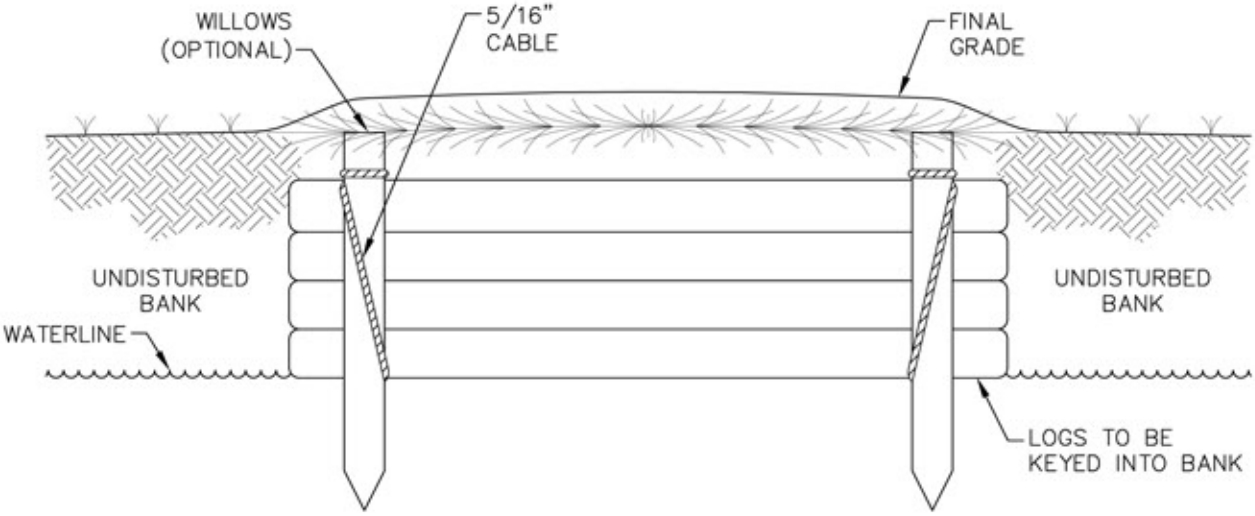

NOTES:

1. LOG WALLS TO BE CONSTRUCTED USING CONIFEROUS MATERIAL.
2. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED AS FILL MATERIAL.
3. ANCHOR PILINGS OR DEADMAN ANCHORS TO BE USED TO SECURE CABLE IN BANK.
4. NON-WOVEN FILTER CLOTH (NYLEX C34 OR EQUIVALENT) TO BE USED TO LINE LOG WALL.
5. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
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	TITLE: DETAIL 23 STREAMBANK RECLAMATION – LOGWALL		
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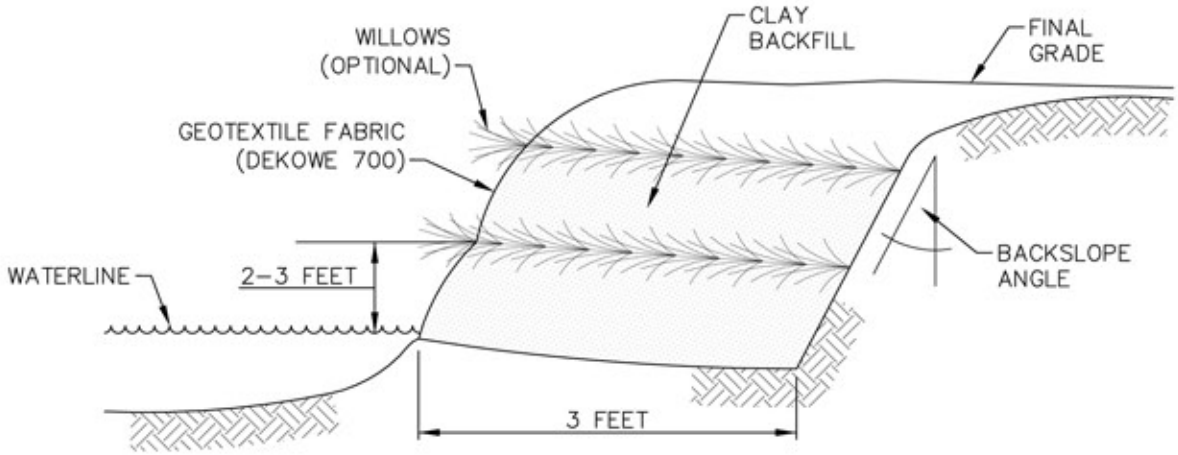

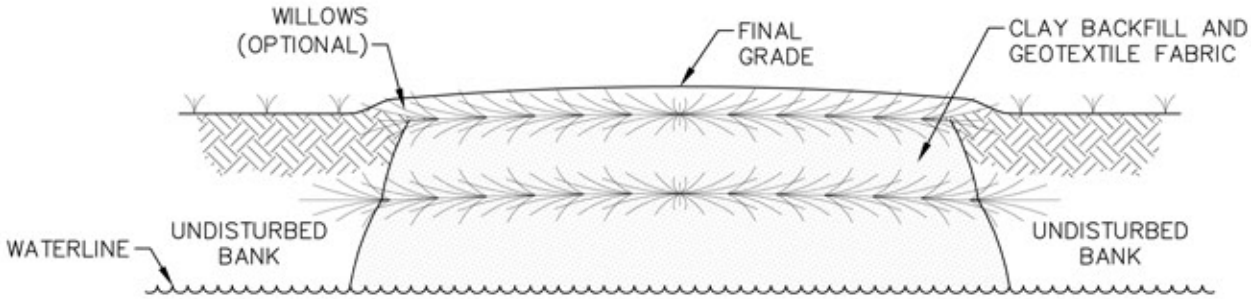

NOTES:

1. NATURE BACKFILL OR LOOSE GRADE MATERIAL SHOULD BE USED TO MINIMIZE AIR SPACES. THIS ALLOWS PROPER SOIL FABRIC CONTACT, WHICH MINIMIZES STEELING AND SCOURING DURING RUNOFF AND ENSURES SURVIVAL OF THE WILLOW CUTTINGS.
2. PLYWOOD FORMS (8'x2') MAY BE REQUIRED TO HELP RECONSTRUCT STEEP OR VERTICAL BANKS.
3. GRID LAYERS SHOULD NOT EXCEED 3 FEET IN HEIGHT WITH A MINIMUM OF 3 FEET SET IN BANK.
4. WILLOWS SHOULD BE HARVESTED AS CLOSE TO INSTALLATION AS POSSIBLE, PREFERABLY THE PREVIOUS DAY BUT NO MORE THAN 2 DAYS EARLY.
5. WILLOWS SHOULD BE 0.5 TO 1 INCH IN DIAMETER AND 2 TO 3 FEET LONG WITH NO MORE THAN 10 INCHES LEFT EXPOSED.
6. PLANTING RATE SHOULD BE APPROXIMATELY 1 STEM PER 6 INCHES.
7. INSTALLATION TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 2008-11-04 UPDATED DRAWING NOTES
02 2010-10-11 REVISED TITLE BLOCK

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		TITLE: DETAIL 24 STREAMBANK RECLAMATION – VEGETATED GEOTEXTILE INSTALLATION		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-712	REV 02

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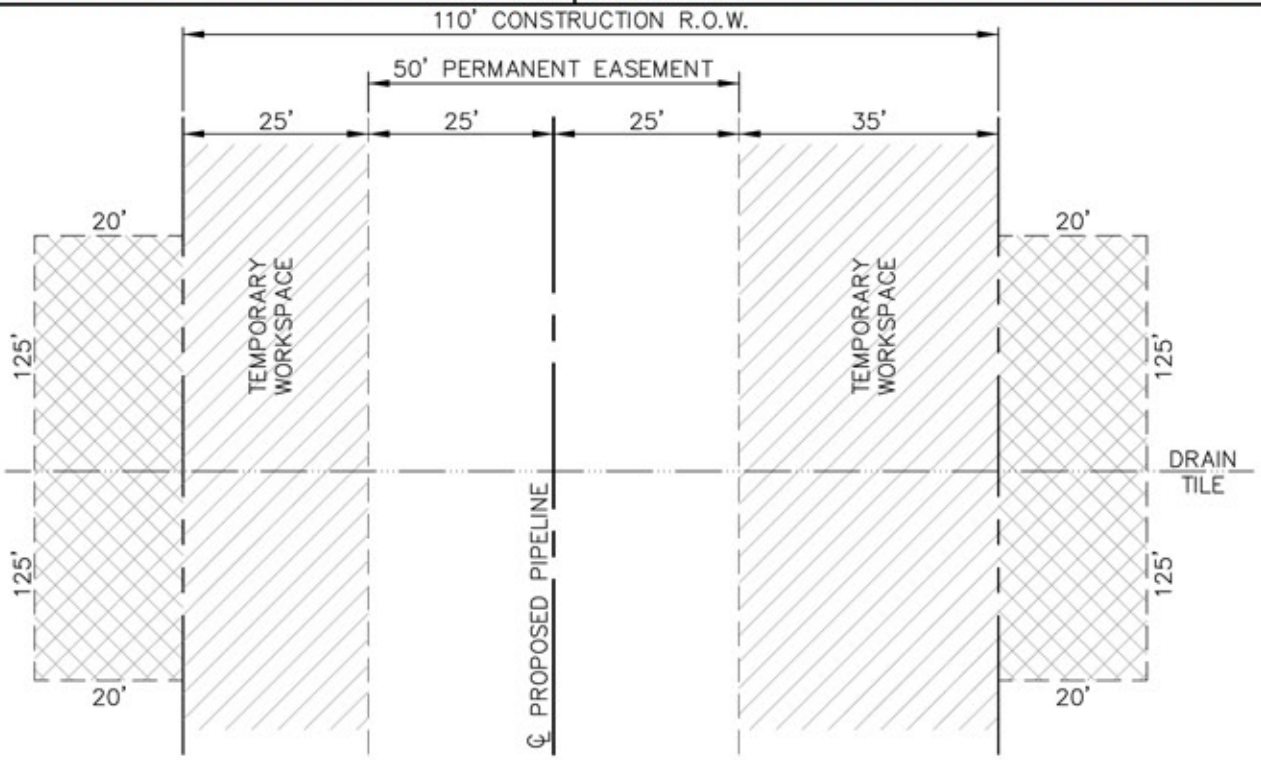
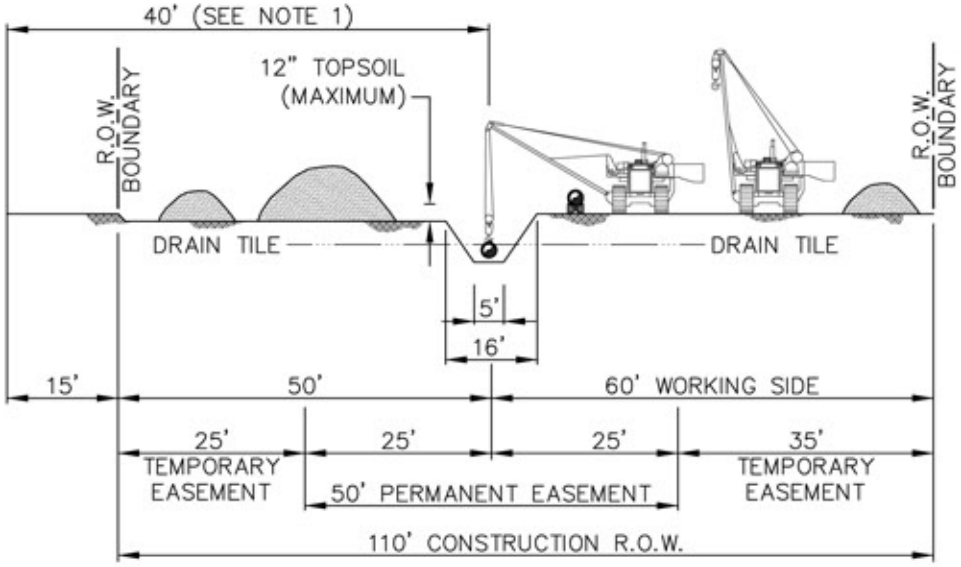


PLAN VIEW



ELEVATION

NOTES:

1. THE OFFSET FROM A FOREIGN PIPELINE, WHERE APPLICABLE, WILL BE 40' FOR MOST LOCATIONS, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.
2. THE MINIMUM CLEARANCE BETWEEN THE TOP OF PIPE AND THE BOTTOM OF DRAIN TILE WILL BE 12 INCHES.
3. INSTALLATION SPECIFICATIONS TO BE MODIFIED AS NECESSARY TO SUIT ACTUAL SITE CONDITIONS.

REVISIONS
01 REVISED NOTE 3; DELETED DIMENSION
02 2010-10-11 REVISED TITLE BLOCK

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 25 TYPICAL R.O.W. LAYOUT/SOIL HANDLING 110' CONSTRUCTION R.O.W. 50' EASEMENT DRAIN TILE CROSSING		
CHECKED BY: WSF / DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-718	REV 02

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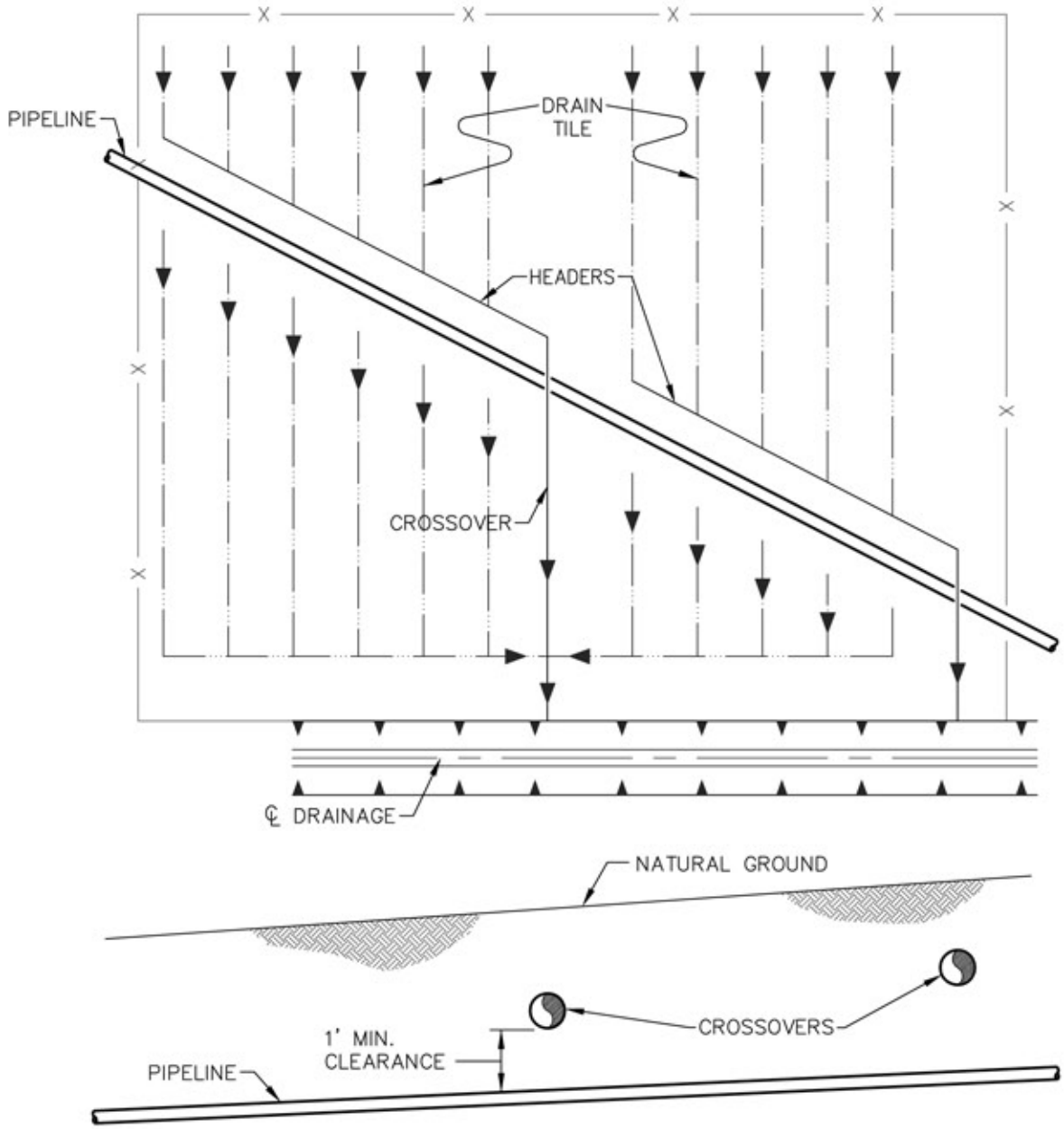

PROFILE

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02	2010-10-11	REVISED TITLE BLOCK
01		ADDED DIMENSION

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DESIGN CHECKER: RW P7100

KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 26
HEADER/MAIN CROSSOVERS OF PIPELINE

SCALE N.T.S. | DWG No 4359-03-ML-03-719 | REV 02

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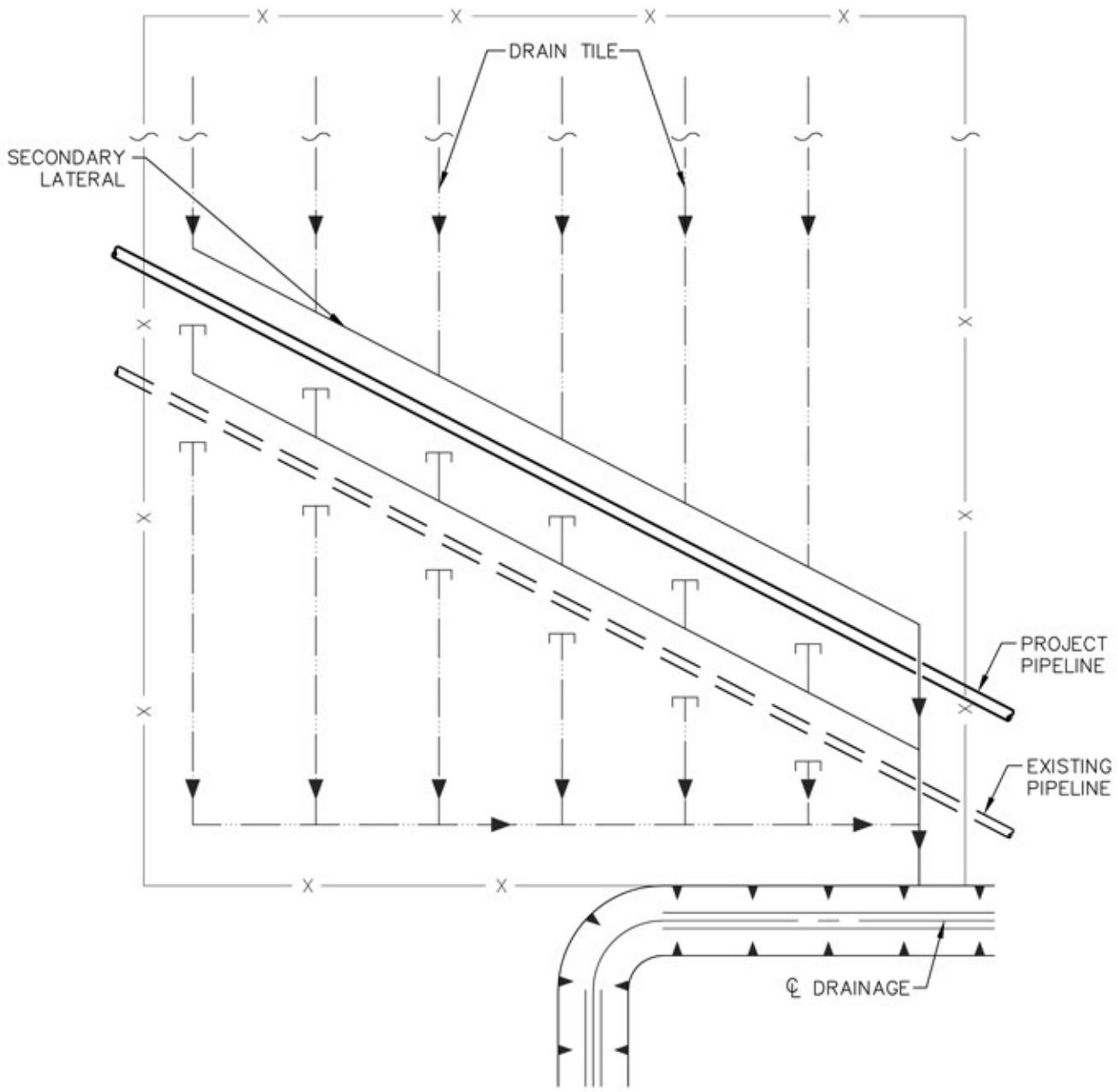
RELOCATE/REPLACE DRAINAGE HEADER/MAIN



REVISIONS
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DESIGNER: JMP (NAME) 2010-10-21 (DATE)	KEYSTONE XL PROJECT		
	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 27 HEADER/MAIN CROSSOVERS OF PIPELINE		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-03-720 REV 02

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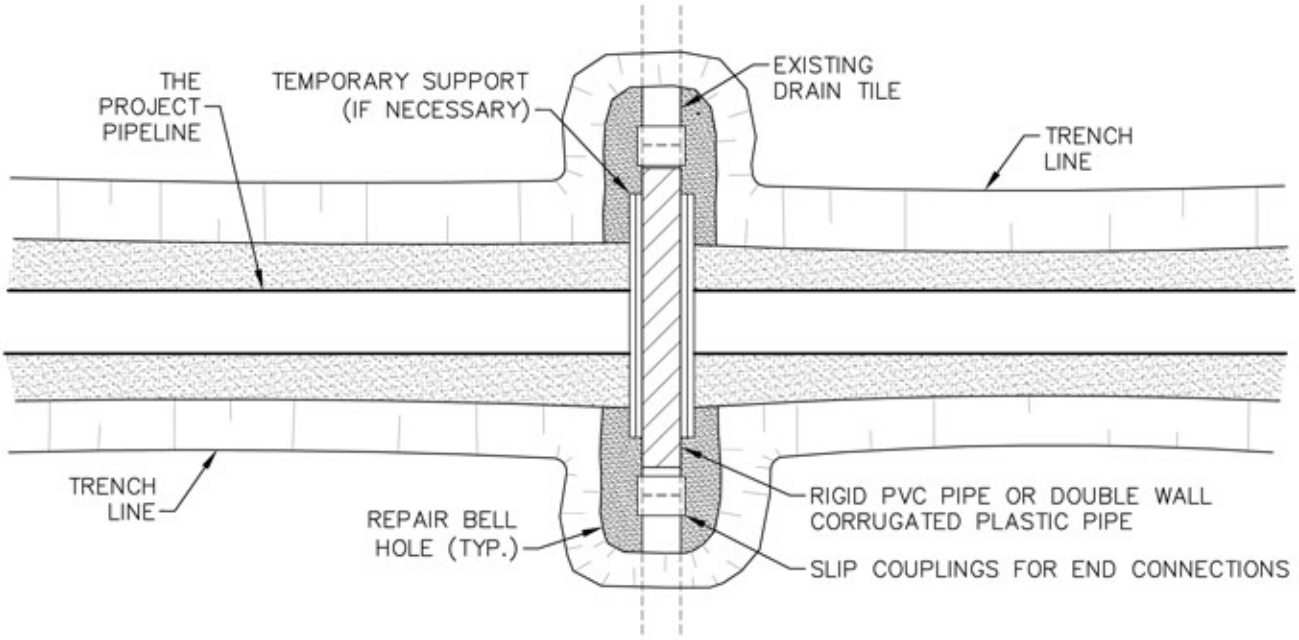

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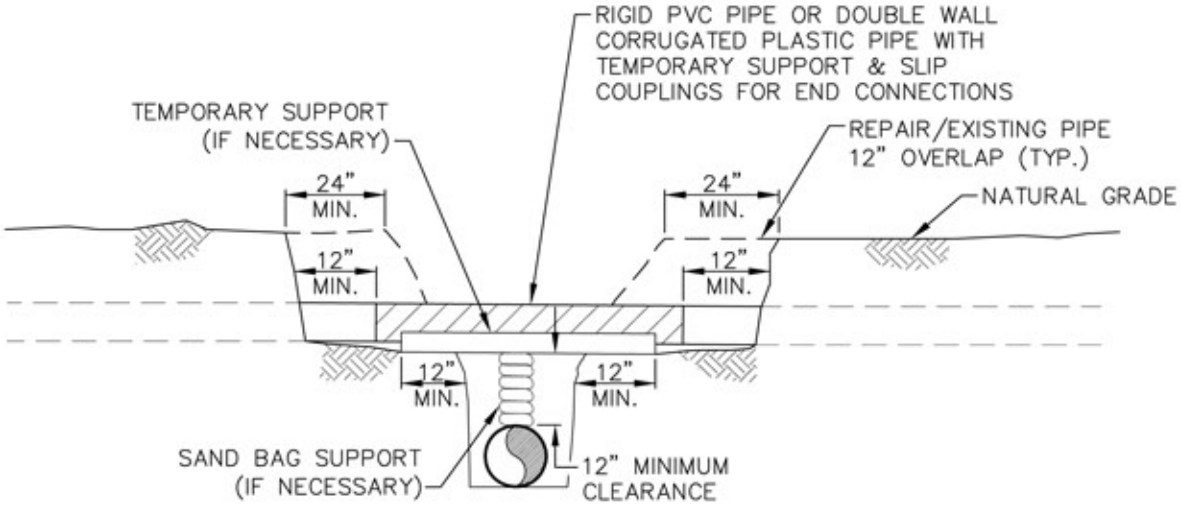

PROFILE

NOTES:

1. IMMEDIATELY REPAIR TILE IF WATER IS FLOWING THROUGH TILE AT TIME OF TRENCHING.
2. SCREEN ALL EXPOSED ENDS OF TILE LINES.

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE
DETAIL 28
DRAINAGE AND IRRIGATION
TEMPORARY DRAIN TILE REPAIR

SCALE N.T.S. | DWG No 4359-03-ML-03-721 | REV 02

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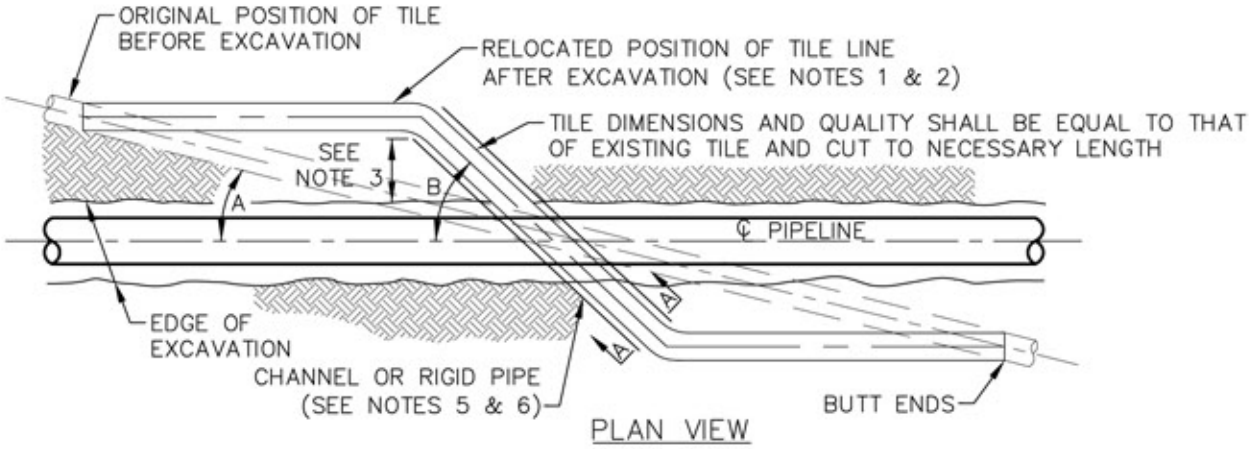
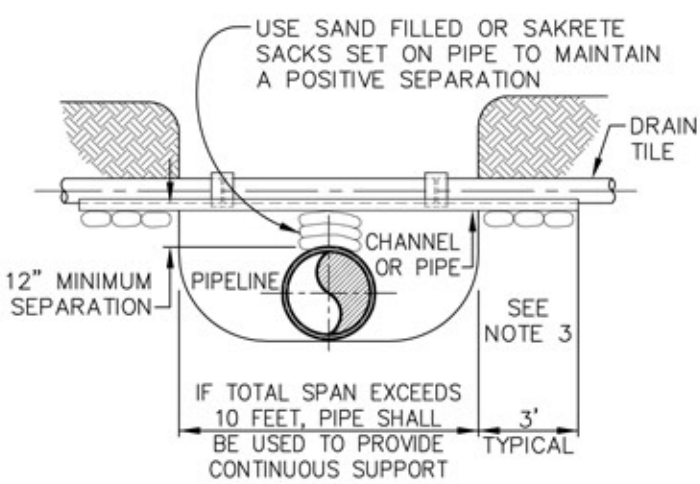
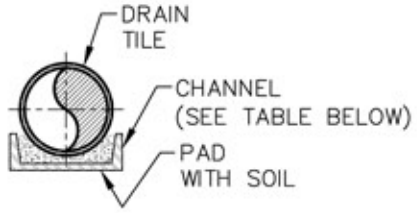
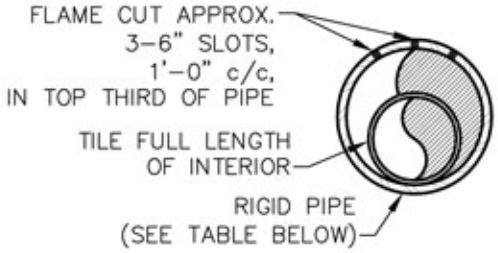


PLAN VIEW





SECTION "A–A" CHANNEL (SPANS < 10 FEET)



END VIEWS

SECTION "A–A" RIGID PIPE (SPANS > 10 FEET)

NOTES:

1. TILE REPAIR SHALL MAINTAIN ORIGINAL ALIGNMENT AND GRADIENT WHEN ANGLE "A", BETWEEN PIPELINE AND ORIGINAL TILE, IS MORE THAN 20 FEET UNLESS OTHERWISE DIRECTED BY THE PROJECT REPRESENTATIVE.
2. WHEN ANGLE "A" IS LESS THAN 20 FEET, UNLESS OTHERWISE DIRECTED BY COMPANY, ANGLE "B" SHALL BE 45° FOR USUAL WIDTHS OF TRENCH. FOR EXTRA WIDTHS, IT MAY BE GREATER AS DIRECTED BY THE PROJECT REPRESENTATIVE.
3. 3 FOOT MINIMUM LENGTH OF CHANNEL OR RIGID PIPE SHALL BE SUPPORTED BY UNDISTURBED SOIL, OR IF CROSSING IS NOT AT RIGHT ANGLES TO GAS PIPELINE, EQUIVALENT LENGTH PERPENDICULAR TO TRENCH. SHIM WITH SAKRETE, SAND BAGS OR CONCRETE BLOCKS TO UNDISTURBED SOIL FOR SUPPORT AND DRAINAGE GRADIENT MAINTENANCE (TYPICAL BOTH SIDES).
4. DRAINAGE TILE SHALL BE REPLACED SO THAT ITS FORMER GRADIENT AND ALIGNMENT ARE RESTORED.
5. DIAMETER OF RIGID PIPE SHALL BE OF ADEQUATE SIZE TO ALLOW FOR THE INSTALLATION OF THE TILE FOR THE FULL LENGTH OF THE RIGID PIPE.
6. OTHER METHODS OF SUPPORTING DRAIN TILE MAY BE USED IF THE ALTERNATE PROPOSED IS EQUIVALENT IN STRENGTH TO THE CHANNEL/PIPE SECTIONS SHOWN AND IF APPROVED BY THE PROJECT REPRESENTATIVE IN ADVANCE. SITE SPECIFIC ALTERNATE SUPPORT SYSTEM TO BE DEVELOPED BY THE PROJECT REPRESENTATIVE AND FURNISHED TO CONTRACTOR FOR SPANS IN EXCESS OF 20 FEET, TILE GREATER THAN 10 INCHES DIAMETER, AND FOR HEADER SYSTEMS.
7. ALL MATERIAL TO BE FURNISHED BY CONTRACTOR.
8. PRIOR TO REPAIRING TILE, CONTRACTOR SHALL PROBE INTO THE EXISTING TILE TO THE FULL WIDTH OF THE RIGHT–OF–WAY TO DETERMINE IF ADDITIONAL DAMAGE HAS OCCURRED. ALL DAMAGED/DISTURBED TILE SHALL BE REPAIRED AS NEAR AS PRACTICABLE TO ITS ORIGINAL OR BETTER CONDITION.
9. "NIGHT CAP" OPEN ENDS OF PIPE AND/OR DRAIN TILES IF REPAIRS ARE NOT COMPLETED BY END OF WORK DAY.

MINIMUM SUPPORT TABLE

TILE SIZE	CHANNEL SIZE	PIPE SIZE
3"	4" @ 5.4 #/FT.	4" STD. WT
4"–5"	5" @ 6.7 #/FT.	6" STD. WT
6"–9"	7" @ 9.8 #/FT.	8"–10" STD. WT
10"	10" @ 15.3 #/FT.	12" STD. WT

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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 29 DRAINAGE AND IRRIGATION PERMANENT DRAIN TILE REPAIR

SCALE: N.T.S. | DWG No 4359–03–ML–03–722 | REV 02

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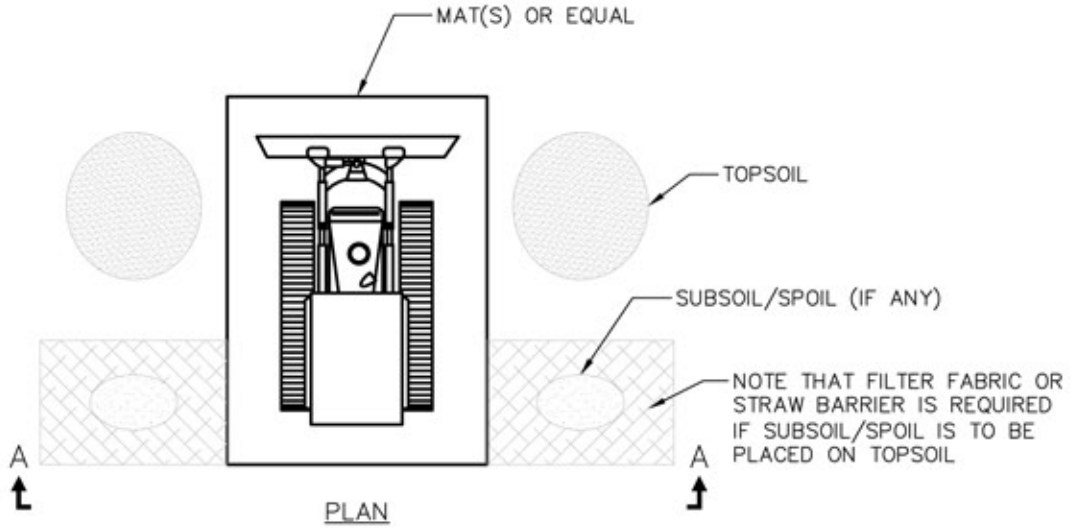
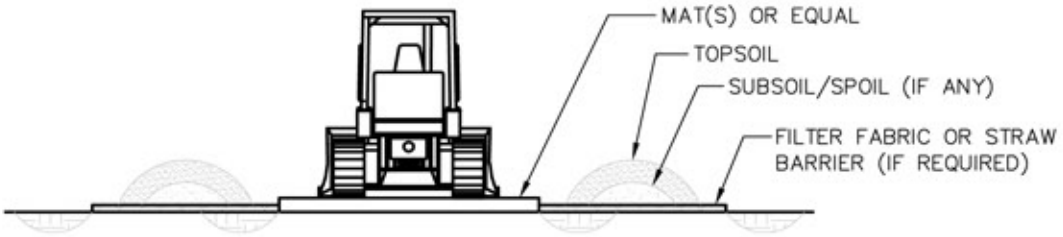


PLAN



SECTION A–A

CLEANING STATION NOTES:

1. ALL EQUIPMENT WILL BE REQUIRED TO BE CLEANED AT EQUIPMENT CLEANING STATIONS LOCATED AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. STOCKPILE TOPSOIL/SUBSOIL AS SHOWN OR IN ANY CONFIGURATION APPROVED BY THE ENVIRONMENTAL INSPECTOR.
3. SHOVELS OR OTHER HAND TOOLS AND/OR COMPRESSED AIR WILL BE USED TO REMOVE AS MUCH AS MUCH SOIL AS PRACTICAL FROM TRACKED EQUIPMENT. EFFORT WILL BE FOCUSED ON TRACKS AND BLADES.
4. IF CONDITIONS ARE MUDDY, WHEELED EQUIPMENT WILL ALSO BE CLEANED USING HAND TOOLS TO REMOVE EXCESS SOIL FROM TIRES AND WHEEL WELLS.
5. CLEANING WILL BE CONDUCTED ON CONSTRUCTION MATS OR OTHER RAISED SURFACE TO MINIMIZE REATTACHMENT OF SOIL THAT HAS BEEN PREVIOUSLY REMOVED.
6. MATS WILL BE CLEANED BETWEEN EACH PIECE OF EQUIPMENT.
7. SOIL COLLECTED DURING THE CLEANING PROCESS WILL BE STOCKPILED AT A CONVENIENT LOCATION NEAR THE CLEANING STATION AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. IF THE SOIL HAS A SIGNIFICANT COMPONENT OF SUBSOIL, IT WILL BE PLACED OVER THE BACKFILLED TRENCH OR IN THE ADJACENT SPOIL STORAGE AREA, AND SUBSEQUENTLY COVERED WITH TOPSOIL. IF THE LAND OWNER DIES NOT APPROVE OF ON–SITE DISPOSAL, THE SOIL WILL BE TAKEN TO AN APPROVED DISPOSAL SITE.
9. SOILS CONTAMINATED WITH OIL OR GREASE WILL BE REMOVED AND DISPOSED OF IN ACCORDANCE PROJECT SPCCC PLAN.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 30 EQUIPMENT CLEANING STATION DETAIL		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–05–713 REV 02

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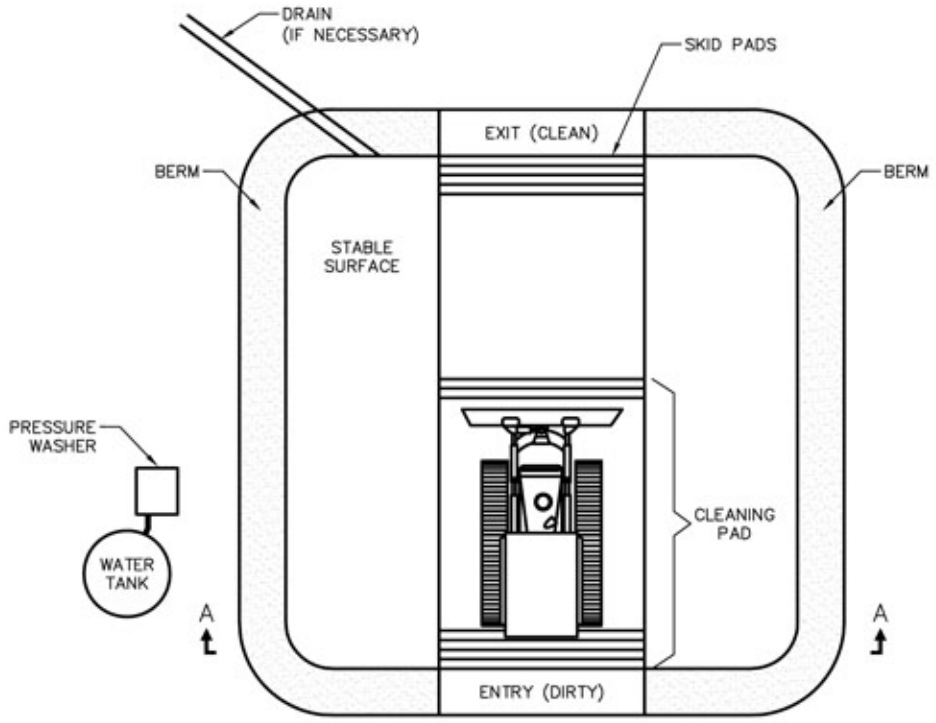

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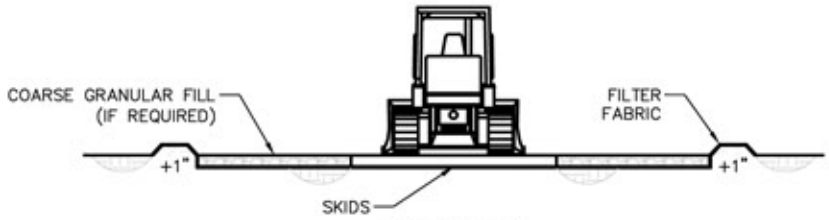

SECTION A–A

WASH STATION NOTES:

1. ALL EQUIPMENT AND VEHICLES ARE REQUIRED TO BE CLEANED AT WASH STATION LOCATIONS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR. WASH STATIONS WILL BE CONSTRUCTED BY THE CONTRACTOR. WASHINGS WILL BE CARRIED OUT UNDER THE SUPERVISION AND TO SATISFACTION OF THE ENVIRONMENTAL INSPECTOR.
2. WASH WATER USED FOR CLEANING WILL NOT BE ALLOWED TO ENTER ANY WATERBODY, WETLAND, OR IRRIGATION CANAL/DITCH. ANY SOILS CONTAMINATED BY PETROLEUM–BASED, OR OTHER UNDESIRABLE MATERIALS FROM WASH STATIONS WILL BE REMOVED.
3. THE SIZE OF STATION WILL BE ADEQUATE TO ACCOMMODATE THE MAXIMUM SIZE OF EQUIPMENT EXPECTED.
4. EQUIPMENT WILL CONSISTENTLY ENTER THE "DIRTY END" AND EXIT THE "CLEAN END."
5. STABLE DRAINAGE FROM THE SITE WILL BE PROVIDED (IF NECESSARY). NO DISCHARGE TO STREAMS OR WETLANDS WILL BE ALLOWED.
6. WASH STATIONS WILL BE EQUIPPED WITH SKID PADS OR WASH RACKS TO PREVENT SOIL FROM BEING CARRIED ON TRACKS OR TIRES AS EQUIPMENT AND VEHICLES EXIT THE WASH STATION. SKIDS ARE TO BE CLEANED EACH TIME A PIECE OF EQUIPMENT IS CLEANED.
7. GRAVEL FILL (IF REQUIRED) AND FILTER FABRIC WILL BE REMOVED AND DISPOSED OF IN AN ACCEPTABLE LAND FILL.
8. THE DEPRESSION WILL BE BACKFILLED WITH BERMED MATERIAL.
9. CLEANING SITES WILL BE MONITORED DURING THE POST CONSTRUCTION MONITORING PROGRAM AND WEEDS WILL BE CONTROLLED PER THE NOXIOUS WEED MANAGEMENT PLAN.

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	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
	TITLE: DETAIL 31 EQUIPMENT WASH STATION DETAIL		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359–03–ML–05–714 REV 02

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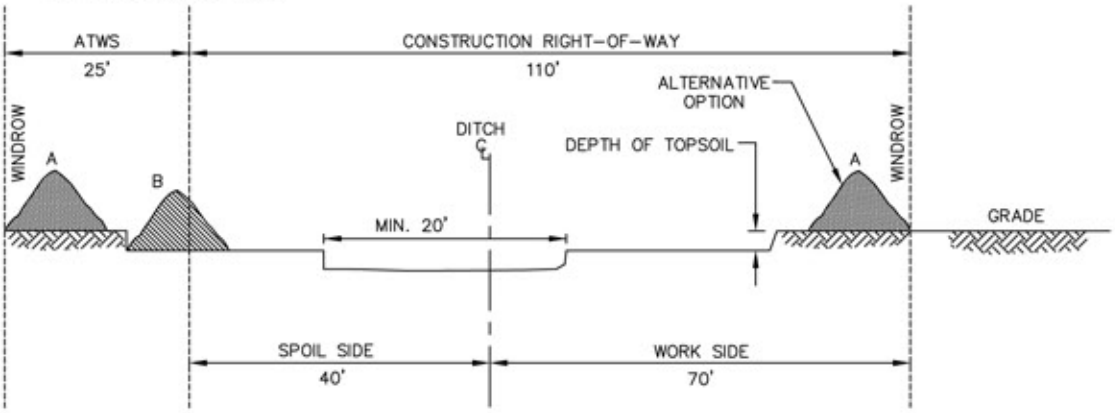
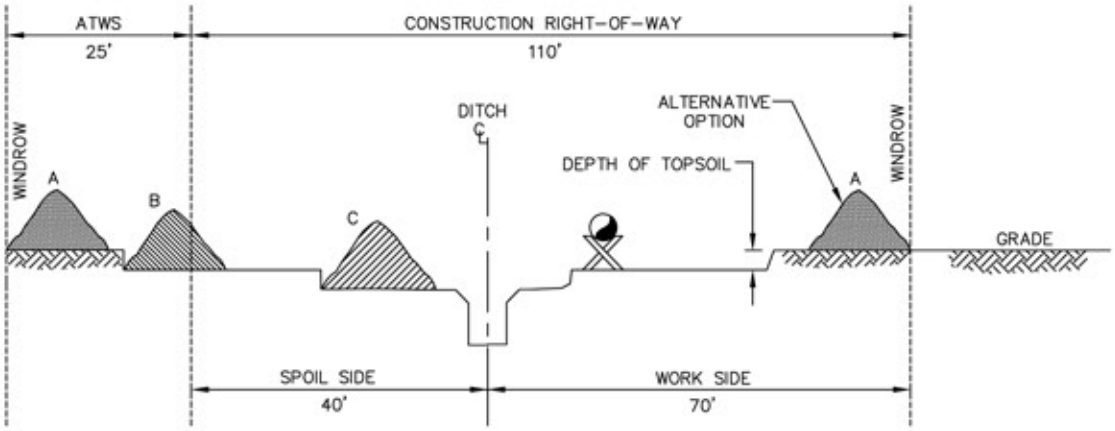
THESE ARE TYPICAL DRAWINGS; ACTUAL SITE CONDITIONS MAY VARY FROM THE SITE GRAPHICALLY REPRESENTED.

1. POTENTIAL LOCATIONS WHERE TRIPLE DITCH TOPSOIL CONSERVATION MAY BE COMPLETED ARE SHOWN ON THE ALIGNMENT SHEETS. KEYSTONE WILL DIRECT THE ACTUAL LOCATIONS WHERE TRIPLE DITCH WILL BE COMPLETED DURING, OR IMMEDIATELY PRIOR TO, TOPSOILING THE ROW. KEYSTONE MAY MODIFY TRIPLE DITCH PROCEDURES FROM THOSE DESCRIBED HERE TO ADDRESS SITE-SPECIFIC, OR SOIL-SPECIFIC, CONDITIONS.

2. STRIP TOPSOIL ("A" HORIZON) ACCORDING TO THE "A" HORIZON DEPTHS AND CONSTRUCTION DETAILS SHOWN ON CONSTRUCTION ALIGNMENT SHEETS. PLACE "A" HORIZON IN THE ADDITIONAL TEMPORARY WORKSPACE OR THE WINDROW WITHIN THE WORKING SIDE OF THE CONSTRUCTION RIGHT-OF-WAY. IN AREAS OF THICKER "A" HORIZON'S, "A" HORIZON MAY BE SPLIT TO BOTH SIDES OF THE RIGHT-OF-WAY.
REMOVE "B" HORIZON (2ND DITCH) TO DEPTHS SPECIFIED BY KEYSTONE AND STOCKPILE ON SPOIL SIDE. THE "B" HORIZON SHOULD BE REMOVED IN A STRIP AT LEAST 20 FEET WIDE OVER THE TRENCH TO ALLOW FOR STORAGE OF THE TRENCH SPOIL MATERIALS. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "A" HORIZON AND "B" HORIZON STOCKPILES.



3. EXCAVATE TRENCH. ENSURE THE DIFFERENT SOIL HORIZONS ("B" HORIZON AND "C" HORIZON) ARE IN SEPARATE STOCKPILES. THE VISUAL DISTINCTION OF EACH PILE MUST BE POSSIBLE AT ALL TIMES. THE STOCKPILING SHALL ALLOW FOR RE-PLACEMENT OF THE SOIL HORIZONS BACK TO THEIR ORIGINAL SEQUENCE WITHOUT LOSS OF SOIL. MAINTAIN A MINIMUM OF 2 FEET BETWEEN "B" HORIZON AND "C" HORIZON STOCKPILES.



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DESIGNER:		KEYSTONE XL PROJECT		
JMP (NAME)	2010-10-21 (DATE)	FIA # 4359	CHAINAGE:	DISCIPLINE # 03
		TITLE: DETAIL 67 TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH		
CHECKED BY: WSF	DESIGN CHECKER: RW P7100	SCALE N.T.S.	DWG No 4359-03-ML-05-724	REV 03

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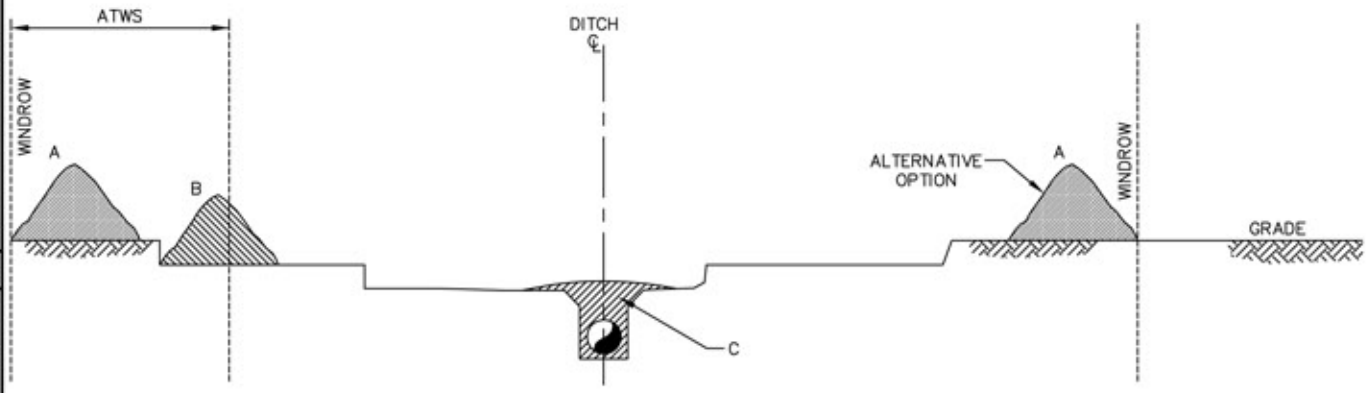
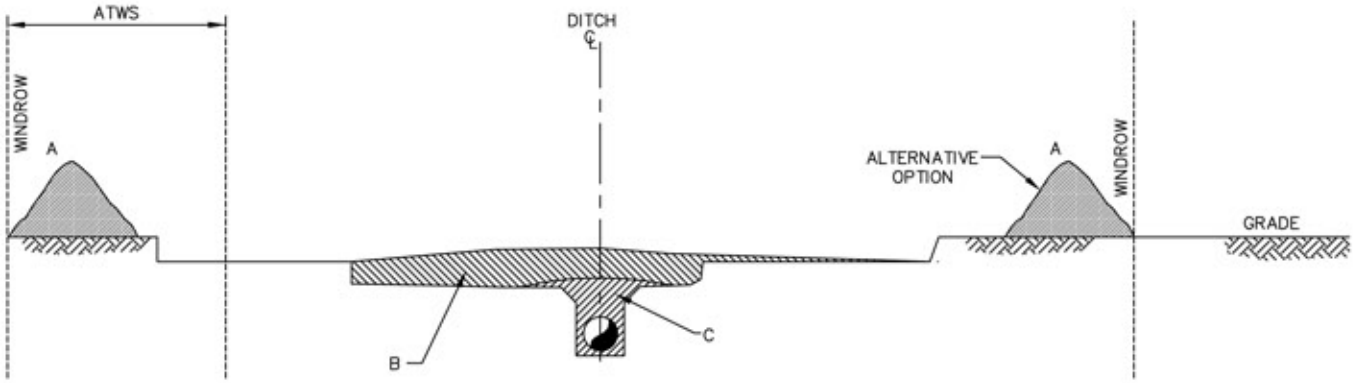
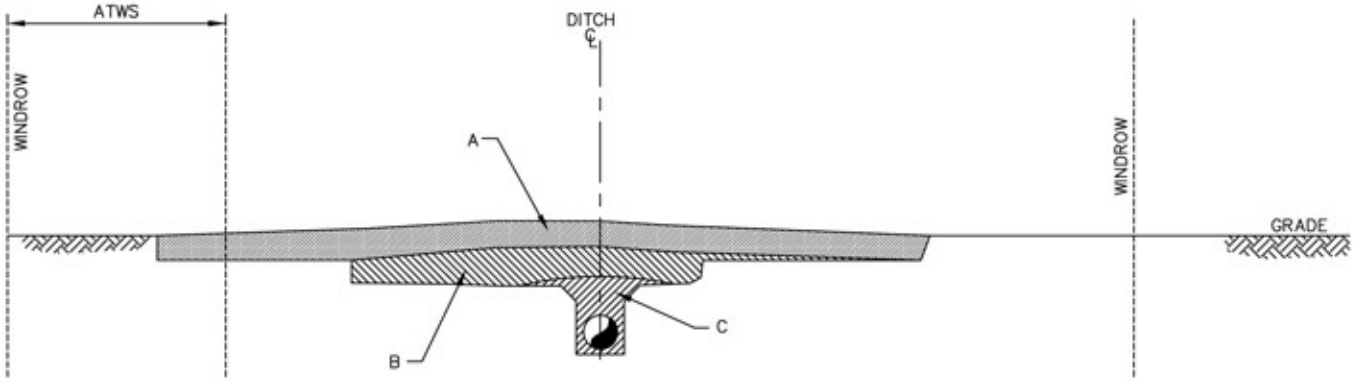
4. BACKFILL TRENCH AND COMPACT AS PER APPROVED PROCEDURE.. PLACE THE SOIL HORIZONS BACK IN THEIR ORIGINAL SEQUENCE IN THE TRENCH.



5. RELIEVE AREAS OF COMPACTION AND FEATHER (B) MATERIAL EVENLY OVER STRIPPED AREA.



6. REPLACE "A" HORIZON PILE EVENLY OVER STRIPPED AREA.



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KEYSTONE XL PROJECT

FIA # 4359 | CHAINAGE: | DISCIPLINE # 03

TITLE: DETAIL 67A
TOPSOIL CONSERVATION DITCH & SPOIL STRIPPING TRIPLE DITCH

SCALE: N.T.S. | DWG No: 4359-03-ML-05-725 | REV: 03

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Appendix D –
Agency Correspondence Letters

Appendix C

Agency Correspondence

Contents

1. Rufa Red Knot Concurrence (dated August 27, 2015)
2. DOS Concurrence Request (dated March 15, 2017)
3. USFWS Response to Concurrence Request (dated March 16, 2017)
4. DOS Request for Reinitation (dated January 31, 2018)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
9325 South Alda Road
Wood River, Nebraska 68883

August 27, 2015

FWS-NE: 2013-164

Ms. Mary D. Hassell
Office of Environmental Quality and
Transboundary Issues (EQT)
Bureau of Oceans and International
Environmental and Scientific Affairs (OES)
U.S. Department of State
Washington, D.C. 20520

RE: Request for Reinitiation of Section 7(a)(2) Consultation for the TransCanada Keystone XL Pipeline Project and Concurrence with Findings

Dear Ms. Hassell:

This is in response to your letter dated July 9, 2015, requesting reinitiation of section 7 consultation and concurrence that the proposed Keystone XL Pipeline Project (Project) may affect, but is not likely to adversely affect, the federally threatened Rufa Red Knot *(Calidris canutus rufa)*. After reviewing your July 9, 2015, letter and attached Biological Analysis of the effect of the Project on the species, the U.S. Fish and Wildlife Service (Service) has concluded that it concurs with the U.S. Department State's (Department) determination of effect.

This concludes section 7 consultation pursuant to the Endangered Species Act. Consultation should be reinitiated, however, if new information reveals impacts of the Project that may affect listed species, a new species is listed, new critical habitat is designated, or the Project is subsequently modified.

The Service appreciates the opportunity to work cooperatively with the Department in assuming a shared responsibility for protecting federal trust fish and wildlife resources along the proposed Project route in Montana, South Dakota, Nebraska, and Kansas.

If you have any questions or require technical assistance, please do not hesitate to contact Mr. Robert Harms at robert_harms@fws.gov; (308) 382-6468, extension 208.

Sincerely,

Eliza Hines
Nebraska Field Supervisor

Cc: USFWS, Denver CO (Attn: Clint Riley)
USFWS, Denver CO (Attn: Doug Laye)
USFWS, Helena, MT (Attn: Jeff Berglund)
USFWS, Pierre, SD (Attn: Charlene Bessken)
USFWS, Manhattan, KS (Attn: Dan Mulhern)
USDOI, Denver CO (Attn: Kate Williams-Shuck)
BLM, Reno, NV (Attn: Jim Stobaugh)

United States Department of State

Washington, D.C. 20520

March 15, 2017

FWS-NE: 2013-164

Ms. Eliza Hines
Nebraska Field Supervisor
U.S. Fish and Wildlife Service
Nebraska Ecological Services
9325 South Alda Road
Wood River, Nebraska 68883

Subject: Request for Reinitiation of Section 7(a)(2) Consultation for the TransCanada Keystone XL Pipeline Project and Concurrence with Findings

Dear Ms. Hines,

On January 26, 2017, TransCanada Keystone Pipeline, L.P., resubmitted an application to the U.S. State Department ("Department") for a Presidential Permit authorizing the construction, connection, operation, and maintenance of pipeline facilities for the importation of crude oil to be located at the international border between the United States and Canada at Phillips County, Montana. The Department is reviewing the application as well as the proposed plans for the construction of 20 power lines to serve 20 pumping stations along the proposed route ("Project") previously analyzed in the May 15, 2013 biological opinion ("BO"). After reviewing the relevant information, the Department is requesting reinitiation of consultation with the U.S. Fish and Wildlife Service (USFWS) Nebraska Field Office consistent with section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended. In particular, the Department is reinitiating section 7 consultation on the Project because of the listing of the northern long-eared bat (*Myotis septentrionalis*) as threatened and seeks concurrence of its findings that the Project may affect but is not likely to adversely affect the northern long-eared bat, as set forth in the attached effects analysis.

The northern long-eared bat was listed as a federally threatened species on April 2, 2015 and thus, was not a species that was considered in the BO.[1] Because the species is significantly affected by white-nose syndrome, the USFWS published an ESA Section 4(d) rule in the Federal Register on January 14, 2016, which specifically defines take prohibitions in order to protect maternity colonies and hibernaculum when a federal or non-federal action is located within the

[1] The rufa red knot was also listed as threatened after the issuance of the May 2013 BO. The Department reinitiated consultation for the rufa red knot which was completed in August 2015 with the USFWS concurring in a "may affect, but is not likely to adversely affect" determination.

white-nose syndrome zone. The northern long-eared bat's range is located within the regional action area of the proposed Project. In particular, a portion of the Project is located within the white-nose syndrome zone in Kansas and Nebraska where specific actions have been outlined by the USFWS to protect maternity colonies and hibernaculum for the species. Proposed Project segments in Montana and South Dakota occur outside of the currently delineated white-nose syndrome zone.

Technical assistance provided by the USFWS; a review of the 4(d) rule, information discussed during the Voluntary Conference Meeting between the Department and the USFWS[2] held on May 28, 2014, in Grand Island, Nebraska; and information received by the Department from USFWS in the past month helped to inform the Department's attached analysis of effects and determination. The Department commits, in coordination with the applicant, TransCanada Keystone Pipeline, L.P., that, should the Presidential Permit be granted, to abide by the requirements outlined in *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat,* ((50 CFR Part 17, Federal Register Notice, January 14, 2016 (81 Fed. Reg. 1900)) and summarized in the key for federal projects (https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/KeyFinal4dNLEB_FedAgencies17Feb2016.pdf).

- **Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula**
  TransCanada and the associated utilities responsible for the construction of power lines to pump stations, will not remove any trees within a 0.25-mile (0.4-km) buffer around known northern long-eared bat hibernacula (as determined by coordination with State Natural Heritage Inventory databases in Kansas and Nebraska, field surveys, and/or coordination with subject matter experts knowledgeable about the species).

- **Conservation Measure 2: Tree Removal Near Known Maternity Roost Trees**
  Known roosts (as determined by coordination with State Natural Heritage Inventory databases in Kansas and Nebraska, field surveys, and/or coordination with subject matter experts knowledgeable about the species) will be protected and TransCanada and the associated utilities responsible for the construction of power lines to pump stations, will avoid cutting or destroying of any other trees within a 150-foot (45-meter) radius from the known, occupied maternity roost trees during the pup season (June 1 through July 31).

Given these commitments, the Department is requesting written concurrence with our assessment that the Keystone XL project *may affect, but is not likely to adversely affect*, the northern long-eared bat.

The Department has evaluated the status of other species to determine whether further ESA consultation may be required. The Dakota Skipper *(Hesperia dacotae)* was listed as federally threatened on November 24, 2014. The species is found in mesic and upland native tall grass prairie habitat in the upper Midwest, including northeast South Dakota. The Project is located in

[2] Other attendees included U.S. Bureau of Land Management, Montana Fish, Wildlife & Parks, Nebraska Game and Parks Commission, ERM, Inc., and WESTECH Environmental Services, Inc.

southern and southwest South Dakota, approximately 150 miles southwest of the area where the Dakota Skipper is found in South Dakota. Additionally, suitable habitat is unavailable for the Dakota Skipper in the area of proposed Project. For these reasons, the Department has concluded that the Project would have no effect on the Dakota Skipper and has determined that reinitiation of Section 7 consultation with the USFWS for this species is unnecessary.

The 2013 BO reached a determination of *"no jeopardy"* for the endangered American burying beetle (*Nicrophorus americanus)* and concurred with our determinations that the Project *"may affect, but is not likely to adversely affect"* the endangered black-footed ferret (*Mustela nigripes)*, interior least tern (*Sternula antillarum athalassos)*, whooping crane (*Grus americana)*, and pallid sturgeon (*Scaphirhynchus albus)*; and the threatened piping plover (*Charadrius melodus)* and western prairie fringed orchid (*Platanthera praeclara)*. Additionally, in August 2015, we determined, and USFWS concurred, that the Project "*may affect, but is not likely to adversely affect"* the rufa red knot (*Calidris canutus rufa*). The Department has considered whether reinitiation of consultation might be required for any species previously addressed in the 2013 Biological Opinion, or in the 2015 consultation which resulted in a "not likely to adversely affect" determination for the rufa red knot (*Calidris canutus rufa*). The Department has reviewed the proposed route for the Project, including proposed plans for the construction of the power lines to serve pumping stations located along the 875-mile-long route. The Department has concluded that the proposed pipeline route, which follows the same 200-foot-wide corridor analyzed in the BO, and power lines have not been modified to the extent that the Project now may have an effect on federally listed species that were not previously considered in the BO and the 2015 consultation. The Department further concludes that there is no new information that reveals an effect of the proposed Project on the listed species or critical habitat in a manner not previously considered in the BO and 2015 consultation. Accordingly, the Department determines that reinitiation of consultation on these species is not required under 50 C.F.R. § 402.16.

Please also note the USFWS determined that the greater sage-grouse (*Centrocercus urophasianus*) was not warranted for listing in October 2015. In April 2016, the listing of the candidate species Sprague's pipit (*Anthus spragueii*) was determined to be not warranted. As such, we request confirmation from the USFWS that the conservation measures identified for these species in the BO are no longer in force. However, we recognize that the greater sage-grouse and possibly the Sprague's pipit require further coordination with the Bureau of Land Management and States of Montana (per the State of Montana's Sage-Grouse Executive Order 12-2015) and South Dakota.

The Department recognizes that the incidental take statement, which authorizes take of the American burying beetle as outlined in the BO, was issued to the Department. The Department will provide the appropriate oversight of the applicant to ensure implementation of reasonable and prudent measures and conservation measures for the American burying beetle as well as other conservation measures outlined in the BO for other federally listed species. The Department understands that the incidental take statement also covers any incidental take caused by TransCanada, provided it is in compliance with the terms and conditions of the incidental take statement.

If you have any questions, please contact me at: 202-736-7428 or HassellMD@state.gov. Thank you for your assistance.

Sincerely,

Mary D. Hassell

Mary D. Hassell, CEP
Bureau of Oceans and International
Environmental & Scientific Affairs (OES)
U.S. Department of State

Attachment (1)

1. Northern Long-Eared Bat Habitat Assessment on the Proposed Keystone XL Pipeline Project

Cc:

Mr. Robert R. Harms
U.S. Fish and Wildlife Service
9325 S Alda Rd.
Wood River, NE 68883

Mr. James Stobaugh
National Project Manager (WO350)
BLM Nevada State Office
1340 Financial Blvd.
Reno, NV 89502

Mr. Dennis Rankin
Rural Utilities Service
1400 Independence Avenue, SW
Room 2244, Stop 1571
Washington, DC 20250-1571

Ms. Shane Kimbrough
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

Mr. Jim White
TransCanada Corporation
450 1st Street SW
Calgary
Alberta, Canada T2P 5H1

Biological Analysis of Effect of the Proposed Keystone XL Pipeline Project on the Northern Long-Eared Bat (*Myotis septentrionalis*)

Life History

The northern long-eared bat is a medium-sized mammal, about 3 to 3.7 inches (7.6 to 9.4 centimeters) in length, and has a wingspan measuring between 9 and 10 inches (23 and 26 centimeters) (USFWS 2015a). The bat is identifiable from other *Myotis* species because of its long ears that extend beyond the tip of its nose when laid forward, a long, narrow, and sharp pointed tragus (part of external ear), and a calcar (cartilage spur at ankle) that lacks a keel. Females tend to be larger and heavier than males. It has medium to dark brown fur on its back and dark brown ears and wing membranes (Caceres and Barclay 2000).

The northern long-eared bat uses high-humidity caves and mines for hibernation, which can begin as early as August and continue through the winter months. During the summer, this species utilizes forested habitats for roosts and reproduction. The northern long-eared bat can be migratory, and travel up to 30 miles or more between winter hibernation sites and summer roost sites. The species primarily roosts under the bark of dead and dying trees or on tree species with peeling bark or bark containing many crevices. Forested areas, including riparian corridors provide habitat (e.g., decaying trees, loose bark, tree snags, and stumps) for roosting, feeding, and maternity colonies of northern long-eared bats (Menzel et al. 2002, Owen et al. 2002, Foster and Kurta 1999). The northern long-eared bat appears to be opportunistic in roost selection and will use a variety of tree species for roosts throughout its range as long as the tree forms suitable cavities or retains bark. In addition to natural habitats, the northern long-eared bat may occasionally roost in human structures (e.g., buildings). Northern long-eared bats are known to switch roosts often, typically using one site for 2 to 3 days. Beginning in late-summer to early-fall, males swarm near hibernacula to begin breeding. Females have delayed fertilization, and a gestation period ranging between 50 and 60 days. Females give birth to a single pup the following May to July, depending on where the colony is located within the species' range (USFWS 2015b).

The northern long-eared bat typically forages on the edge and understory of heavily forested areas and along hillsides, ridges, water, and clearings. These opportunistic insectivores forage 1 to 2 hours after dusk and before dawn (USFWS 2013b). The diet for the northern long-eared bat is diverse and varied according to season and geographical occurrence. However, the diet generally consists of moths, flies, leafhoppers, caddisflies, beetles, and spiders. These bats catch insects by hawking (i.e., catching in flight) and gleaning (i.e., emitting a high-frequency echolocation call to locate on vegetation) (Henderson and Broders 2008). The gleaning call of the northern long-eared bat is of a higher frequency than other *Myotis* bat species, and is higher than the hearing frequency of many moth species, thereby giving it a foraging advantage within its feeding habitat (Caceres and Barclay 2000).

Status and Distribution

The northern long-eared bat is distributed throughout portions of the proposed Project area. Of primary concern for this consultation is the portion of the Project located within the white-nose syndrome positive counties/districts in Kansas and Nebraska (https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf) Other counties of

interest include Keya Paha, Boyd, and Rock Counties in Nebraska as they have geologic formations (i.e. exposed bed rock, possibly cliff faces) suitable for use as hibernacula. These counties are located on the edge of the white nose syndrome zone and could be included within the zone should positive detection of the fungus that causes white nose syndrome be detected in additional Nebraska Counties in the future.

Nebraska

Northern long-eared bat concentrations occur in the northern tier of the state along the Niobrara River and its tributaries, and in deciduous forests in the eastern one-third of the state (USFWS 2014a). This species may also be found throughout the state in opportunistic roosts when traveling between hibernacula and summer use areas (USFWS 2014a). They are also known to summer in the northwestern parts of Nebraska, specifically the Pine Ridge in Sheridan County, where only males have been documented. Acoustic surveys and mist netting demonstrate that the species can be found in eastern-Nebraska (Robert Harms, personal communication, March 6, 2017). This species is often found in areas with exposed bedrock and limestone mines in Nebraska; these areas are used as hibernaculum in the winter (Robert Harms, personal communication, March 6, 2017).

Kansas

The northern long-eared bat has been documented in Ellis, Graham, Marshall, Osborne, Phillips, Rooks, Russell, Washington, and Leavenworth Counties, although habitat exists for this species in 58 counties (Michele McNulty, personal communication, May 28, 2014). Before this, the species was thought to only migrate through parts of the state (USFWS 2013b).

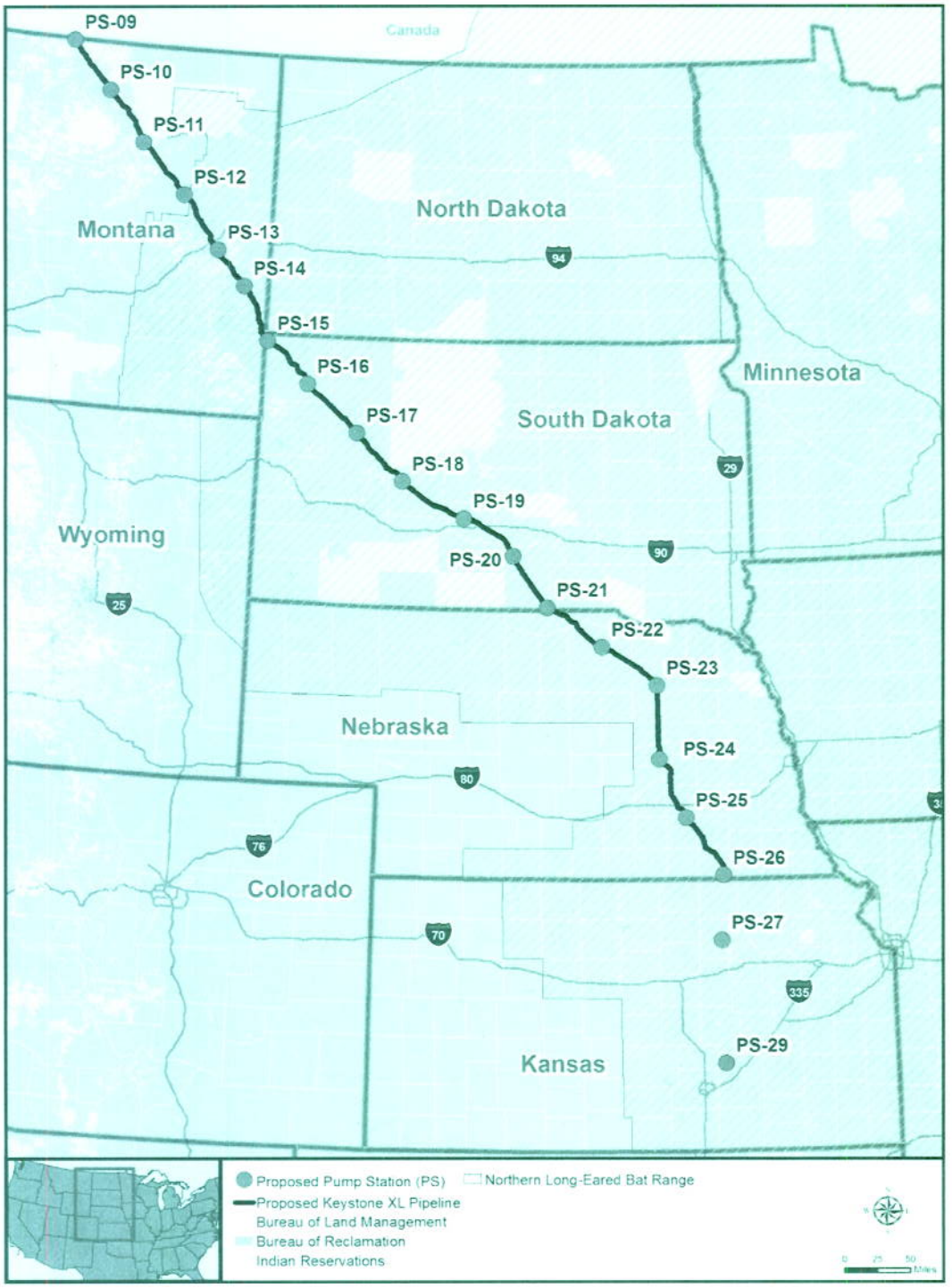
The 4(d) Rule and Conservation Measures

Within the boundaries of the white nose syndrome buffer zone, the 4(d) rule exempts take of the species due to forestry management activities, maintenance and limited expansion of transportation and utility rights-of-way, prairie habitat management, and limited tree removal projects, provided these activities include certain conservation measures. The majority of the proposed Project is outside of the white nose syndrome buffer zone, and so the 4(d) rule would exempt non-purposeful incidental take from all activities in these areas (USFWS 2015c). However, a portion of the proposed Project is located in Nebraska and Kansas and within the white nose syndrome buffer zone. The project could result in habitat loss and fragmentation that may impact maternity roosts and winter hibernacula. As such, the following conservation measures would be put in place consistent with the 4 (d) rule to avoid and minimize impact to the northern long-eared bat:

<u>Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula</u>
TransCanada and associated utilities responsible for the construction of power lines to pump stations will not remove any trees within a 0.25-mile (0.4-km) buffer around known northern long-eared bat hibernacula (as determined by coordination with State Natural Heritage Inventory databases in Kansas and Nebraska, field surveys, and/or coordination with subject matter experts knowledgeable about the species).

<u>Conservation Measure 2: Tree Removal Near Known Maternity Roost Trees</u>

Known roost will be protected and TransCanada and associated utilities responsible for the construction of power lines to pump stations will avoid cutting or destroying of any other trees within a 150-foot (45-meter) radius from the known, occupied maternity roost trees during the pup season (June 1 through July 31) (as determined by coordination with State Natural Heritage Inventory databases in Kansas and Nebraska, field surveys, and/or coordination with subject matter experts knowledgeable about the species) .



Determination

Effect on Critical Habitat

The proposed Project would not result in the destruction or adverse modification of federally designated or proposed critical habitat for the northern long-eared bat as none has yet been identified for the species. The USFWS has determined that critical habitat for the northern long-eared bat is not determinable at this time since information regarding the biological needs of the species is not sufficiently well known to permit identification of areas as critical habitat (USFWS 2015a).

Effect on the Species

The proposed Project *may affect, but is not likely to adversely affect,* the northern long-eared bat. This determination is based on Keystone's commitment to follow recommended conservation measures as identified by the USFWS in its 4(d) rule for pipeline construction, including ancillary project components (e.g., power lines to pump stations). As a result, no direct or indirect impacts are expected to result from the Project.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
9325 South Alda Road
Wood River, Nebraska 68883

IN REPLY REFER TO
FWS/R6/NEFO
DCN 065165

March 16, 2017

FWS-NE: 2013-164

Ms. Mary D. Hassell
Office of Environmental Quality and
Transboundary Issues (EQT)
Bureau of Oceans and International
Environmental and Scientific Affairs (OES)
U.S. Department of State
Washington, D.C. 20520

RE: Request for Reinitiation of Section 7(a)(2) Consultation for the TransCanada Keystone XL Pipeline Project

Dear Ms. Hassell:

This is in response to your letter dated March 15, 2017, requesting reinitiation of section 7 consultation and concurrence that the proposed Keystone XL Pipeline Project (Project) may affect, but is not likely to adversely affect, the federally threatened northern long-eared bat *(Myotis septentrionalis)*. The March 15, 2017, letter also evaluates the potential for Project effects on the federally threatened Dakota skipper *(Hesperia dacotae)* and reevaluates conclusions drawn for several species, including applicability as previously considered in section 7 consultation documents. Section 7 consultation documents include the Biological Opinion (Opinion) dated May 15, 2013, the U.S. Department of State's (Department) request to reinitiate section 7 consultation for the rufa red knot (*Calidris canutus rufa*), and the U.S. Fish and Wildlife Service's (Service) August 27, 2015, concurrence with a finding of not likely to adversely affect for that species. It should be noted that the Department's request to reinitiate section 7 consultation and our response represents the culmination of many productive discussions between our agencies; this collaboration began in 2015 when the rufa red knot was listed and resumed in February 2017 with discussion about the northern long-eared bat.

Northern Long-eared Bat

The Service has reviewed the Department's March 15, 2017, letter and attached analysis of Project effects on the northern long-eared bat. In that letter, the Department and its applicant TransCanada commit to ensuring implementation of two conservation measures designed to

protect maternity roost trees and hibernacula for the species consistent with *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat,* ((50 CFR Part 17, Federal Register Notice, January 14, 2016 (81 Fed. Reg. 1900)). Given the commitment to implement these conservation measures, the Service concurs with the Department's determination that the proposed Project may affect, but is not likely to adversely affect, the northern long-eared bat. Please note that the northern long-eared bat is state-listed as threatened in the States of Kansas, Nebraska, and Montana. We recommend coordination with the Nebraska Game and Parks Commission, Kansas Department of Wildlife and Parks, and Montana Fish, Wildlife, and Parks as other state requirements may apply.

Dakota Skipper

The Department completed an evaluation of the potential effects of the Project on the Dakota skipper and concluded there would be no effect on the species as there is no habitat available in the area of the Project. The Service has reviewed this evaluation as well as the best available information for the species including survey and habitat information for the Dakota skipper in South Dakota. Based on that review, we agree with the rationale utilized by the Department as it is based on a reasoned analysis of the best available information and we acknowledge the no effect determination.

Previously Considered Species

We acknowledge and appreciate the reevaluation of the species previously considered in the May 15, 2013, Opinion in addition to the rufa red knot, which was the subject of the Department's request to reinitiate section 7 consultation, dated June 9, 2015, following listing of this species as federally threatened. The Department's reevaluation was based on whether Project modifications or new information about the Project might indicate new effects to the previously considered species to the extent that reinitiation of section 7 consultation may be necessary. Based on the results of the reevaluation, the Department confirmed that the conclusions of the previous section 7 consultation documents regarding anticipated Project effects on listed species remain valid and that reinitiation of section 7 consultation is unnecessary. We agree with the Department's conclusions based on a review of the available information including Project maps and our knowledge of Project effects on these species. This is predicated on the completion of required pre-construction population surveys for the federally endangered American burying beetle *(Nicrophorus americanus)* to confirm that the amount of take authorized in the Incidental Take Statement (ITS) will not be exceeded for this species as annual populations are cyclic and dependent on weather conditions.

Greater Sage-grouse and Sprague's Pipit

The Service determined that the greater sage-grouse (*Centrocercus urophasianus*) and Sprague's pipit (*Anthus spragueii*) were not warranted for listing in October 2015 and April 2016, respectively. The May 15, 2013, Opinion identified several conservation measures for these species. Given the current status of these species, however, we confirm that these conservation measures are no longer in force. We appreciate the Department's commitment to coordinate with the Bureau of Land Management and the States of Montana and South Dakota as other requirements for these species may still apply.

The Service acknowledges the Department's recognition of its responsibilities as the recipient of the ITS as outlined in your letter and included in the May 15, 2013, Opinion. We appreciate the Department's commitment to provide the appropriate oversight of the applicant TransCanada to ensure implementation of reasonable and prudent measures, which continue to remain in force, and encourage implementation of conservation measures for the listed species. We confirm that the ITS covers incidental take caused by the applicant TransCanada provided that such take is in compliance with the ITS terms and conditions.

This concludes section 7 consultation pursuant to the Endangered Species Act. As provided in 50 C.F.R. § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control is authorized by law and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion. The Service views the Department's March 13, 2017, request for reinitiation and this response as supplements to the May 15, 2013, Opinion.

The Service appreciates the opportunity to work cooperatively with the Department in assuming a shared responsibility for protecting federal trust fish and wildlife resources along the proposed Project route in Montana, South Dakota, Nebraska, and Kansas. If you have any questions or require technical assistance, please do not hesitate to contact Mr. Robert Harms at robert_harms@fws.gov; (308)382-6468, extension 208.

Sincerely,

Eliza Hines
Nebraska Field Supervisor

Cc: TransCanada Corporation, Alberta, Canada (Attn: Jim White)
BLM, Reno, NV (Attn: Jim Stobaugh)

United States Department of State

Bureau of Oceans and International Environmental and Scientific Affairs

Washington, D.C. 20520

January 31, 2018

FWS-NE: 2018-139

Ms. Eliza Hines
Nebraska Field Supervisor
U.S. Fish and Wildlife Service
Nebraska Ecological Services
9325 South Alda Road
Wood River, Nebraska 68883

Subject: Request for Reinitiation of Section 7(a)(2) Consultation for the TransCanada Keystone XL Pipeline Project

Dear Ms. Hines,

On November 20, 2017, the Nebraska Public Service Commission approved the Mainline Alternative Route (MAR) in Nebraska for the TransCanada Keystone XL Pipeline. On January 18, 2018, TransCanada announced that it would be obtaining easements in advance of construction along the MAR.

The U.S. State Department is reviewing the MAR in light of TransCanada's announcement, and has decided to request reinitiation of consultation with the U.S. Fish and Wildlife Service (USFWS) Nebraska Field Office consistent with section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, and having regard to the May 15, 2013, FWS NE: 2013 164 Biological Opinion (BO), as supplemented on March 16, 2017. The attached map shows the route that was addressed in the Biological Opinion in green (identified as the "Preferred Route") and the MAR in yellow (identified as the "Keystone Mainline Alternative Route").

The State Department requests any new information on potentially affected species along the MAR. We also request that the Service consider that new information, or other relevant matters as appropriate, as it proceeds with this reinitiated consultation.

We request a meeting or conference call so we can discuss next steps in the consultation process.

If you have any questions, please contact me at: 202-647-9798 or ReillyJE@state.gov. Thank you for your assistance.

Sincerely,

Jill Reilly
Office of Environmental Quality
and Transboundary Issues (EQT)
Bureau of Oceans and International
Environmental & Scientific Affairs (OES)
U.S. Department of State

Enclosure

Cc:

Mr. Robert R. Harms
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
9325 S Alda Rd
Wood River, NE 68883

Appendix E –
Funding Assurances Letter

TC Energy
700 Louisiana Street
Houston, TX 7700
www.tcenergy.com

Angela Burgess
U.S Fish and Wildlife Service, Endangered Species Permit Office
Denver Federal Service
P.O. Box 25486
Denver, Colorado 80225-0489

March 22, 2020

Dear Ms. Burgess:

Assurance of HCP Implementation

TransCanada Keystone Pipeline, L.P. (Keystone) is submitting herewith to the U.S. Fish & Wildlife Service (Service) an application for an Incidental Take Permit (ITP) under section 10(a)(1)(B) of the Endangered Species Act (ESA) in connection with its proposed Keystone XL Pipeline project. In support of its application, Keystone is submitting a Habitat Conservation Plan (HCP). The HCP sets forth a suite of mitigation measures and commitments that Keystone will implement with respect to minimization and mitigation for takes of the American Burying Beetle (ABB).

This letter summarizes Keystone's financial assurances for carrying out certain of the mitigation measures set forth in the HCP. Specifically, Keystone makes the following funding commitments:

1. Keystone has retained the Conservation Fund, and Keystone will wire the acquisition cost to The Conservation Fund, who will purchase in fee lands or a conservation easement on lands with suitable ABB habitat, as approved by the Service. The acquisition of suitable lands will be completed and closed upon issuance of the ITP, prior to commencement of construction in ABB habitat.

   With respect to this commitment, Keystone is working with the Conservation Fund to complete identification of suitable ABB habitat lands. As a result of this on-going work, Keystone conservatively estimates that the cost of funding acquisition will be approximately $2.35 million. Keystone will directly pay The Conservation Fund the actual full cost of the land prior to closing of the acquisition(s).

2. Keystone will retain a qualified third party to monitor and manage the acquired lands for the duration of the ITP consistent with implementation of the measures set forth in the HCP. The third party will be selected subject to approval of the Service. The third-party will have the legal authority and practical ability to ensure that no activities are carried out on the subject lands that would be inconsistent with the HCP approved by the Service. The third party will be retained and in place prior to issuance of the ITP and commencement of construction in ABB habitat.

   With respect to this commitment, in consultation with The Conservation Fund, Keystone conservatively estimates that an $825,555 non-wasting stewardship endowment will need to be funded to cover the cost of third-party management of the habitat over the 50-year life of the ITP. To provide assurance with respect to this commitment, Keystone will fund an $825,555 non-wasting endowment with an independent non-profit that will be used by the approved third party to implement the HCP.

In addition to the commitments made herein, it should be noted that Keystone and its parent company have the financial resources to fully implement the mitigation measures in the HCP as well as any contingency funding that might conceivably be incurred. For the year ended December 31, 2019, TC Energy Corporation reported net income attributable to common shares of $4.0 billion and net cash provided by operations of $7.1 billion. TC Energy holds assets valued at over $100 billion.

Sincerely,

Gary Salsman

Director US Liquids Projects and KXL