AMENDED ARROW FIELD SERVICES, LLC'S APPLICATION FOR A CERTIFICATE OF SITE COMPATIBILITY CASE NO. PU-17-397

December 8, 2017

SUBMITTED TO

North Dakota Public Service Commission
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Department 408
Bismarck, North Dakota 58505-0480

SUBMITTED BY

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Arrow Field Services, LLC

Amended Application to the North Dakota Public Service Commission for a Certificate of Site Compatibility

Arrow Bear Den Gas Processing Plant II
McKenzie County, North Dakota

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North Dakota Public Service Commission Siting Application Checklist

Citation	Criteria	Section
North Dakota Century Code		
49-22.1-03	**Exclusion and avoidance areas - Criteria**.	4.3 and 4.4
49-22.1-06	**Application for a certificate - Notice of filing - Amendment - Designation of a site or corridor.**	
	1. A description of the size and type of facility.	1.1 and 1.2
	2. A summary of any studies that have been made of the environmental impact of the facility.	2.4 Appendix C
	3. A statement explaining the need for the facility.	3.1
	4. An identification of the location of the preferred site for any gas or liquid energy conversion facility.	3.1
	5. An identification of the location of the preferred corridor for any gas or liquid transmission facility.	N/A
	6. A description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reasons why the preferred location is best suited for the facility.	3.2
	7. A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility.	5.0
	8. An evaluation of the proposed site or corridor with regard to the applicable considerations set out in section 49-22.1-09 and the criteria established pursuant to section 49-22.1-03.	4.0
	9. Any other information as the applicant considers relevant or the commission may require.	N/A
49-22.1-09	**Factors to be considered in evaluating applications and designation of sites, corridors, and routes.**	
	1. Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	4.6.1
	2. The effects of new gas or liquid energy conversion and gas or liquid transmission technologies and systems designed to minimize adverse environmental effects.	4.6.1
	3. The potential for beneficial uses of waste energy from a proposed gas or liquid energy conversion facility.	N/A
	4. Adverse direct and indirect environmental effects that cannot be avoided should the proposed site or route be designated.	4.5.1.1
	5. Alternatives to the proposed site, corridor, or route that are developed during the hearing process and which minimize adverse effects.	3.2

Citation	Criteria	Section
North Dakota Century Code		
49-22.1-09	6. Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	4.5.1.3
	7. The direct and indirect economic impacts of the proposed facility.	4.5.1.3
	8. Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	4.5.2
	9. The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	4.4
	10. The effect of the proposed site or route on areas that are unique because of biological wealth or because the site or route is a habitat for rare and endangered species.	4.3
	11. Problems raised by federal agencies, other state agencies, and local entities.	2.3
North Dakota Administrative Code		
69-06-08-01	**Energy conversion facility siting criteria.**	
69-06-08-01(1)	**Exclusion areas.** Geographical areas that must be excluded in the consideration of a site for an energy conversion facility.	4.3 Table 4
69-06-08-01(3)	**Avoidance areas.** Geographical areas that may not be approved as a site for an energy conversion facility unless the applicant shows that under the circumstances there is no reasonable alternative.	4.4 Table 5
69-06-08-01(5)	**Selection criteria.** A site may be approved in an area only when it is demonstrated to the commission by the applicant that any significant adverse effects resulting from the location, construction, and operation of the facility in that area as they relate to the following, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum. The effects to be considered include:	4.5
	a) The impact upon agriculture (1) Agricultural production. (2) Family farms and ranches. (3) Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation. (4) Surface drainage patterns and ground water flow patterns. (5) The agricultural quality of the cropland.	4.5.1.1

Citation	Criteria	Section
North Dakota Administrative Code		
69-06-08-01(5)	b) The impact upon the availability and adequacy of: (1) Law enforcement. (2) School systems and education programs. (3) Governmental services and facilities. (4) General and mental health care facilities. (5) Recreational programs and facilities. (6) Transportation facilities and networks. (7) Retail service facilities. (8) Utility services.	4.5.1.2
	c. The impact upon: (1) Local institutions. (2) Noise-sensitive land uses. (3) Rural residences and businesses. (4) Aquifers. (5) Human health and safety. (6) Animal health and safety. (7) Plant life. (8) Temporary and permanent housing. (9) Temporary and permanent skilled and unskilled labor.	4.5.1.3
	d. The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development.	4.5.2

Citation	Criteria	Section
North Dakota Administrative Code		
69-06-08-01(6)	**Policy criteria.** The commission may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices, and in a proper case may require the adoption of such policies and practices. The commission may also give preference to an applicant that will maximize interstate benefits. The benefits to be considered include:	4.6
	a. Recycling of the conversion byproducts and effluents.	4.6.2
	b. Energy conservation through location, process, and design.	4.6.3
	c. Training and utilization of available labor in this state for the general and specialized skills required.	4.6.4
	d. Use of a primary energy source or raw material located within the state.	4.6.5
	e. Not relocating residents.	4.6.6
	f. The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management.	4.6.7
	g. Economies of construction and operation.	4.6.8
	h. Secondary uses of appropriate associated facilities for recreation and the enhancement of wildlife.	4.6.9
	i. Use of citizen coordinating committees.	4.6.10
	j. A commitment of a portion of the energy produced for use in this state.	4.6.11
	k. Labor relations.	4.6.12
	l. The coordination of facilities.	4.6.13
	m. Monitoring of impacts.	4.6.14

INTRODUCTION

Arrow Field Services, LLC ("Arrow") proposes to construct the Arrow Bear Den Gas Processing Plant II Project ("Project" or "Plant") that will remove natural gas liquids ("NGLs") from an influent natural gas stream, with subsequent transmission of the residue gas and NGLs through existing pipelines. The processing capacity of the Plant will be 120 million cubic feet per day ("MMscfd"), which exceeds the Commission's processing capacity criteria and thus, defines the Plant as a gas or liquid energy conversion facility under North Dakota Century Code ("N.D.C.C.") Section 49-22.1-01(6).

Arrow owns and operates natural gas, crude oil, and produced water gathering and processing facilities on the Fort Berthold Indian Reservation and in Dunn, McKenzie, and Williams Counties. Most of the wells connected to the gathering systems produce casinghead gas in association with crude oil from the Bakken Petroleum System. Casinghead gas from the Bakken Petroleum System generally has a high NGL content, which is separated from the natural gas at a processing plant to produce residue gas (i.e., natural gas with the NGLs removed) and NGLs that can be fractionated into individual components and sold. Arrow's facilities interconnect with third-party interstate natural gas, crude oil, and NGL pipelines that serve markets in the Rocky Mountain states and the Midwest.

The Project will be located approximately 7.5 miles southeast of Watford City, in the W/2NE/4 of Section 21, Township 149 North, Range 98 West, McKenzie County, North Dakota, as shown in Figure 1 (hereinafter referred to as the "Site"). The Project study area is a 0.5-mile buffer around the Project Site that encompasses Sections 15, 16, 21, and 22, Township 149 North, Range 98 West (hereinafter referred to as the "Study Area"). *See* Figure 2.

Arrow submits this amended application to the Commission and requests a Certificate of Site Compatibility for construction of the Project. The Arrow Bear Den Gas Processing Plant II is located on the same land parcel as the Arrow Bear Den Gas Processing Plant I, which is a 30 MMscfd gas processing plant that receives influent gas from the newly constructed Arrow Bear Den West Gathering System Pipeline. The two plants will operate independently of one another and Arrow is only requesting site designation for the Plant II. This application provides the necessary information as required by N.D.C.C. Chapter 49-22.1, Energy Conversion and Transmission Facilities, and by the North Dakota Administrative Code ("N.D.A.C.") Section 69-06-08-01, Energy Conversion Facility Siting Criteria.

The information presented in this application is organized into the following four main categories.

- Section 1: Facility Description
- Section 2: Studies
- Section 3: Need for Facility
- Section 4: Energy Conversion Facility Siting Criteria

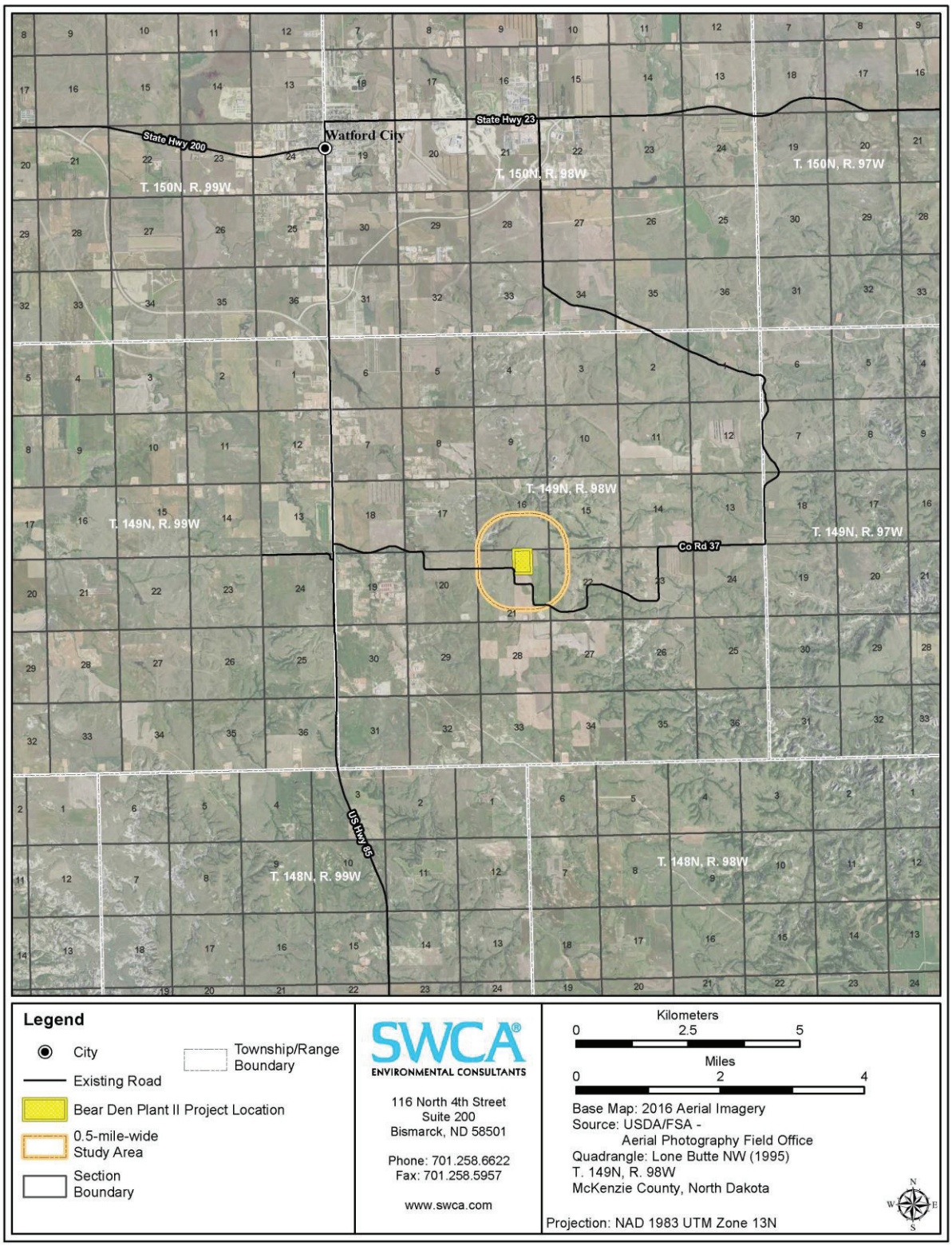

Figure 1. Project Location Map.

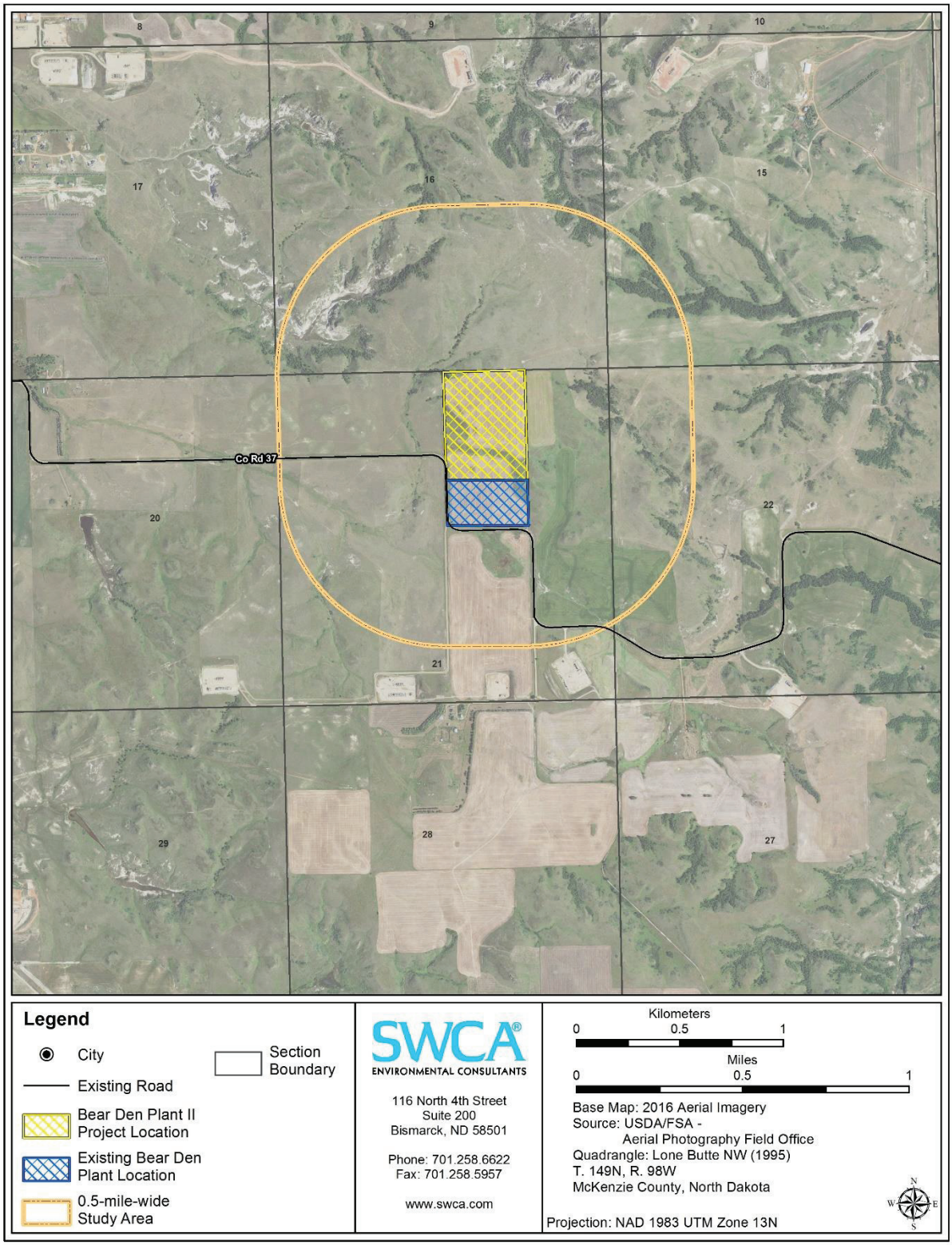

Figure 2. Project Study Area.

SECTION 1: FACILITY DESCRIPTION

1.1 TYPE OF ENERGY CONVERSION FACILITY

The Plant will consist of one cryogenic turbo-expander processing unit with a design capacity of 120 MMscfd that will process well-head natural gas purchased from local crude oil production facilities. The natural gas will be transported to the Plant for processing via Arrow's newly constructed Bear Den West Gathering Pipeline. The residue gas will be transported from the Plant via the NB Residue Gas Pipeline and WBI connections that will be expanded to facilitate 100% of the volume from the plant. NGLs will be transported from the Plant via truck and Oneok's Bakken NGL Pipeline via Arrow's Bakken NGL pipeline, which has a maximum design flow rate or 40,000 barrels per day.. Arrow anticipates that the first year processing capacity of the plant will be 90,000 MMscfd, with production of approximately 11,250 barrels of NGLs per day. Processing capacity in the second year of operation is anticipated to be 120 MMscfd, with production of approximately 15,000 barrels of NGLs per day.

The Plant will produce NGLs such as propane, butane, and natural gasoline, as well as pipeline-grade natural gas, which is a mixture of methane, ethane, and carbon dioxide.

Construction of the Plant will include installation of underground piping, above ground piping, and above ground gas processing equipment and systems. The major processing systems and their locations are illustrated in the overall site plot plan included in Appendix A. Starting at the head of the Plant, these process systems include the following.

- Inlet gas slug catchers
- Inlet gas condensate pumping, filtration, and stabilization
- Mole sieve dehydration
- NGL extraction (including refrigeration)
- High-pressure residue gas compression
- NGL product storage and pipeline pumps
- Flare system
- Drain system
- Plant control systems
- Utility systems (electrical, instrument air, and heat medium)

1.2 SIZE AND DESIGN

1.2.1 Gross Design Capacity

The Plant is composed of one process train with a nameplate capacity of 200 MMscfd. Appendix A includes a Design Data Report, which discusses the nameplate capacity in more detail.

1.2.2 Net Design Capacity

The net design capacity of the proposed Plant using the Bear Den West Pipeline influent stream is 120 MMscfd, less 3.4 MMscfd for utility natural gas.

1.3 ESTIMATED THERMAL EFFICIENCY OF THE ENERGY CONVERSION PROCESS AND THE ASSUMPTIONS ON WHICH THE ESTIMATE IS BASED

This is not applicable to the process.

1.4 TIME SCHEDULE

1.4.1 Certificate of Site Compatibility

Arrow seeks a Certificate of Site Compatibility on or before March 1, 2018.

1.4.2 Land Acquisition

Arrow owns the parcel on which the Plant is to be constructed.

1.4.3 Construction Start Date

Arrow will begin construction of the Plant upon receipt of the necessary authorizations. Arrow anticipates that Plant construction will start in March 2018 upon receipt of all applicable permits, authorizations, and appropriate weather conditions. Site preparation activities, including grading and excavation, are more efficient when soils are not frozen and Arrow would prefer to commence activities under these conditions.

1.4.4 Construction Completion Date

Arrow anticipates that Plant commissioning activities will begin in the third quarter of 2019, and will be fully in service by August 2019.

1.4.5 Test Operations

Arrow anticipates that testing of the Plant will be completed before commissioning activities.

1.4.6 Commencing Commercial Production

Arrow anticipates commercial production will begin by July 31, 2019.

1.4.7 Beginning Any Expansions or Additions

No further expansions or additions are planned at this time.

1.5 COMMERCIAL PRODUCTION DATA FOR ARROW GAS PLANT II

Product	Production
Inlet Gas Rate	120 MMscfd
Mole Percent Ethane+	21%
Residue Gas Production	100 MMscfd
NGL Production	15,000 barrels/day
100 Percent Capacity Factor	Not applicable to this process

1.6 ESTIMATED COST OF CONSTRUCTION

Arrow estimates that the total cost of construction of the proposed Project will be approximately $136 million.

SECTION 2: STUDIES

2.1 STUDY AREA

The Study Area is defined as the 51.48-acre Site and the approximately 0.5-mile-wide buffer area around the perimeter of the Site, as illustrated in Figure 2. The environmental analysis was conducted for the entire Study Area.

2.2 SITE

The Project comprises 51.48 acres of a 72.88-acre parcel, 20 acres of which were recently developed as Arrow's Bear Den Gas Plant I (Figure 2, Appendix B). A natural resources desktop analysis was conducted for the entire Study Area and included wetland and waterbody delineation, habitat and threatened and endangered species assessment, and tree/shrub inventory. Natural resources field surveys of the Site were conducted to delineate wetlands and waterbodies, identify threatened and endangered species habitats, observe and record noxious weeds, and enumerate trees and shrubs on the Site that may be impacted by Plant construction. The findings of the desktop analysis and field surveys are summarized in Section 2.4, and the complete report is included as Appendix C.

A Class I cultural resource inventory was conducted to identify any previously recorded cultural resources within the Study Area. A Class III inventory, consisting of a pedestrian survey with a maximum 15-meter survey line separation distance, was conducted for the Site. The results of the Class I inventory and the Class III field survey are summarized in Section 2.5, and the complete report is included as Appendix D.

2.3 FEDERAL, STATE, AND LOCAL AGENCY CONSULTATIONS

Arrow provided Project notification to federal, state, and local governmental agencies listed in N.D.A.C. § 69-06-01-05 on July 27, 2017, to solicit comments and environmental resource assessments. Agency comments received as of the date of this application are summarized in the following sections as well as any respective consultations, and copies of all agency correspondence are included in Appendix E.

2.3.1 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers ("USACE") response letter was received August 3, 2017, but was dated January 5, 2017, and is the same response submitted in connection to the NB Residue Gas Pipeline and the Bakken NGL Pipeline (Certificate of Corridor Compatibility No. 199 and Route Permit 210). *See* Case No. PU-17-48.

2.3.2 U.S. Fish and Wildlife Service

Email and letter response from the U.S. Fish and Wildlife Service ("USFWS"), dated August 23, 2017, indicated that the Project is not expected to have significant impacts on fish and wildlife resources.

2.3.3 North Dakota Game and Fish Department

No response has been received to date. Additional attempts were made to obtain a response from the agency on October 17, 2017. Any comments received will be filed with the Commission.

2.3.4 North Dakota Parks and Recreation Department

No response has been received to date. Additional attempts were made to obtain a response from the agency on October 17, 2017. Any comments received will be filed with the Commission.

2.3.5 North Dakota State Historic Preservation Office

The North Dakota State Historic Preservation Office ("SHPO") letter response, dated August 1, 2017, indicated that a Class III inventory of the Site should be conducted. Arrow completed the respective surveys and submitted an inventory report to the SHPO on October 17, 2017. In a letter dated October 30, 2017, SHPO concurred with the "No Significant Site Affected" determination included in the Class I and Class III inventory report (Appendix D).

2.3.6 North Dakota Department of Trust Lands, Minerals Management Division and Surface Management Division

An e-mail response dated July 31, 2017, concurred that the Site location was accurately portrayed in proximity to the mineral interests managed by the North Dakota Department of Trust Lands ("NDDTL").

2.3.7 North Dakota Department of Health

The North Dakota Department of Health letter response, dated August 14, 2017, indicated that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. The letter provided guidance regarding construction near state waters, specified the need for a permit to discharge stormwater for projects disturbing 1 or more acres, advised that the Project does not overlie a defined glacial drift aquifer, indicated that an Air Pollution Control Permit to Construct/Operate would be required for the Project, and advised that projects involving construction of pipelines should select routes or locations that minimize the potential for adverse effects to human health or the environment.

2.3.8 North Dakota Department of Transportation

The North Dakota Department of Transportation letter response, dated August 24, 2017, stated that the Project should have no adverse effect on state highways.

2.3.9 North Dakota State Water Commission

The North Dakota State Water Commission letter response, dated August 24, 2017, stated that no National Flood Insurance Program permits would be required and that if surface water or groundwater were to be diverted for construction or operation of the Plant, appropriate water permits would be required.

2.3.10 McKenzie County Weed Control Office

An e-mail response dated August 3, 2017, advised that a weed management plan for the Project would be required as part of the county's Conditional Use Permit.

2.3.11 McKenzie County Planning and Zoning and Board of Commissioners

Arrow has met or has plans to meet both formally and informally with the following local agencies.

- McKenzie County Commission; and
- McKenzie County Planning and Zoning Office

Arrow has engaged with the McKenzie County Planning and Zoning Office to seek a Conditional Use Permit ("CUP") for the Project. An application for a CUP was filed with McKenzie County Planning and Zoning on September 1, 2017. Arrow's CUP application is anticipated to be on the November agenda for recommended approval. Arrow anticipates the McKenzie County Board of County Commissioners will approve the CUP by the end of November 2017.

2.4 ENVIRONMENTAL ANALYSIS

2.4.1 Natural Resources Inventory

Arrow retained SWCA Environmental Consultants ("SWCA") to conduct a natural resources inventory of the Site. This inventory was conducted to study the presence or absence of protected species and critical habitat. Field studies included a wetland and waterbody delineation and a tree/shrub inventory. The inventory and field studies were completed on February 21, 2017. A copy of the report is provided in Appendix C. The Site is characterized as agricultural.

2.4.1.1 Vegetation

Two general types of vegetative communities are present within the Study Area and are classified as herbaceous upland/rangeland and cropland. The herbaceous upland community is dominated by non-woody vegetation such as grasses and forbs, including Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and crested wheatgrass (*Agropyron cristatum*). The cropland in the Study Area included common wheat (*Triticum aestivum*), durum wheat (*Triticum durum*), canola (*Brassica napus*), oats (*Avena sativa*), and barley (*Hordeum vulgare*) (U.S. Department of Agriculture 2006).

2.4.1.2 Hydrology, Wetlands, and Waterbodies

No primary or secondary indicators of wetland hydrology, as defined by the *Corps of Engineers Wetlands Delineation Manual* ("Manual") (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual* ("Supplement") (USACE 2010), were observed during surveys of the Site. No wetlands were identified within the Site nor were any National Wetlands Inventory-mapped wetlands located within the Site. No non-wetland waterbodies (streams, rivers, lakes, etc.) were identified within the Site. Field studies of the Site were commissioned to record the actual resources on the property.

2.4.1.3 Soils

Based on Natural Resources Conservation Service ("NRCS") mapping (NRCS 2016), six soil map units are present on the Site, as listed in Table 1.

Table 1. Soil Map Units Present within the Site.

Soil Map Units	MUSYM	% Slope	Area within 51.48-acre Site (acres)	% of Total Area
Cabba-Chama-Sen silt loams	E2741D	9 to 15	22.44	43.59
Chama-Cabba-Sen silt loams	E2737C	6 to 9	6.86	13.33
Amor-Cabba loams	E2601C	6 to 9	17.17	33.35
Chama-Sen-Cabba silt loams	E2913B	3 to 6	2.84	5.51
Cabba-Chama-Shambo loams	E2617F	9 to 50	2.17	4.22
Total			**51.48**	**100.00**

MUSYM: Map Unit Symbol
Source: NRCS 2016

The soil series that are most prevalent within the Site are described below (NRCS 2016).

Caba

The Cabba soil series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2% and 70%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43 degrees Fahrenheit (°F). The most common vegetation species found on this soil type are little bluestem (*Schizachyrium scoparium*), green needlegrass (*Nasella viridula*), and other various herbs, forbs, and shrub species (NRCS 2016).

Chama

The Chama soil series consists of well-drained soils found in materials weathered from soft siltstone, mudstone, and shale on uplands. These soils are reasonably deep to soft siltstone, mudstone, or shale. These soils are moderately or moderately slowly permeable. The slope ranges from 0% to 45%. The mean annual precipitation found throughout the spatial extent of this soil type is 15 inches and the mean annual air temperature is 42°F. Soils are cropped to small grains, which are mostly wheat, where a significant acreage is in rangeland. The native vegetation is principally western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), and blue grama (*Bouteloua gracilis*) (NRCS 2016).

Sen

The Sen series consists of well-drained, moderately permeable soils that formed in calcareous siltstone or shale. They are moderately deep to soft bedrock. These soils are on upland plains and have slopes of 0% to 25%. The mean annual precipitation found throughout the spatial extent of this soil type is 15 inches and the mean annual air temperature is 42°F. Soils are cropped to small grains in a crop-summer fallow rotation. Native vegetation is middle and short prairie grasses such as green needlegrass, needle and thread, western wheatgrass, blue grama, and a variety of forbs (NRCS 2016).

Amor

The Amor series consists of moderately deep, well-drained, moderately permeable soils found on sandstone bedrock uplands with slopes ranging from approximately 0% to 25%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation of small grains, flax (*Linum usitatissimum*), and corn (*Zea mays*). Native vegetation species common to this soil type include needle and thread, western wheatgrass, and blue grama (NRCS 2016).

2.4.1.4 Tree, Sapling, and Shrub Count

SWCA conducted field surveys of the Site on October 17, 2017 to confirm the presence or absence of woody vegetation. The Commission requires 2:1 mitigation for all shrubs and all trees that are 1 inch diameter at breast height or greater that will be impacted during the construction of the Project. Four areas of woody vegetation were identified during the field surveys at the upper northwest corner of the Site. These areas were found to contain a combined 339 plants that met the 1-inch diameter at breast height or greater mitigation requirement. However, no tree, sapling, or shrub individuals will be impacted by construction activities because the Project does not utilize that portion of the survey area and property parcel for the Arrow Bear Den Gas Processing Plant II. Refer to Appendix C, Natural Resources Report, for additional information on these features and mapped locations.

2.4.1.5 Noxious Weeds

There are no occurrences of state-listed or county-listed noxious weeds within the Study Area. Surveys were conducted outside of the growing season, but residual plant matter would have likely been observed if noxious weed communities were present. Arrow will monitor and control noxious weeds within the Site before and after construction.

2.4.1.6 Wildlife Inventory

SWCA conducted a threatened and endangered species suitable habitat survey concurrently with the wetland determinations.

During the field survey, SWCA observed various wildlife species within the Study Area (Table 2). Common wildlife species may be affected both directly via death or injury from construction activities or indirectly through the minor fragmentation of habitat as a result of construction activities and disturbance which may disrupt normal activities such as breeding, feeding, and sheltering. Similar habitats exist adjacent to the Site and throughout the region and displaced wildlife is expected to inhabit these areas.

Table 2. Wildlife Observed during Field Surveys of the Proposed Project.

Common Name	Scientific Name
Ring-necked pheasant	*Phasianus colchicus*
Mourning dove	*Zenaida macroura*
Mule deer	*Odocoileus hemionus*
Hungarian partridge	*Perdix perdix*
Sharp-tailed grouse	*Tympanuchus phasianellus*

2.4.2 U.S. Fish and Wildlife Service

The USFWS administers several natural resource programs designed to identify and protect various plant and animal species of special status including habitats deemed critical. The USFWS responded in a letter dated August 23, 2017, and indicated that the Project is not expected to have significant impacts on fish and wildlife resources (Appendix E).

2.4.2.1 Threatened and Endangered Species Review

As discussed in the Natural Resources and Wetland Delineation Report for the Arrow Natural Gas Processing Plant, McKenzie County, North Dakota (Appendix C), nine wildlife species listed as threatened or endangered under the Endangered Species Act have the potential to occur in McKenzie County (USFWS 2015). The listed endangered species include the gray wolf (*Canis lupus*), black-footed ferret (*Mustela nigripes*), whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*). The listed threatened species include the piping plover (*Charadrius melodus*) and its designated critical habitat, Dakota skipper (*Hesperia dacotae*) and its designated critical habitat, rufa red knot (*Calidris canutus rufa*), and northern long-eared bat (*Myotis septentrionalis*).

SWCA did not observe any primary (i.e., actual sighting) or secondary (i.e., tracks, scat, feather, or fur) indication of the presence of threatened or endangered species. While the lack of discovery of threatened or endangered species does not signify their absence within the area, based on the habitat present and absence of indicators, it the applicant's position that the Project will have no effect or is not likely to adversely affect any of the protected species. No critical habitat will be affected by the Project. Details on how these determinations were made are in the report provided as Appendix C. On August 23, 2017, the USFWS responded to the Applicant's letter soliciting comments that the Project is not expected to have any significant impacts on fish and wildlife resources.

2.4.2.2 Migratory Bird Treaty Act Review

Marginally suitable habitat for migratory birds exists in the Study Area. Specifically, ground-nesting birds have the potential to occur, feed, and nest in the Study Area, especially during the migratory bird breeding season, which generally occurs between February 1 and July 15. Take of migratory birds, their parts, or their active nests, including eggs and young, would be avoided to the extent practical for compliance with the Migratory Bird Treaty Act.

Bald Eagle
Federal Status: Delisted in 2007; protected under the MBTA and the Bald and Golden Eagle Protection Act ("BGEPA")

The bald eagle (*Haliaeetus leucocephalus*) feeds on fish and carrion and typically roosts in large trees near a water source. Bald eagles in North Dakota are usually observed along the Missouri River (North Dakota Game and Fish Department 2015a) and Yellowstone River. Bald eagles frequently migrate through the grassland habitats. No bald eagles or nests were observed during the field surveys and the nearest known bald eagle nest is approximately 10.46 miles east of the Study Area (North Dakota Game and Fish Department 2015b). The USFWS generally recommends a buffer of 0.5 mile from any eagle nest. If any active nests are

discovered within 0.5 mile of the Project location, the USFWS should be contacted for further direction. Impacts to bald eagles are not anticipated.

Golden Eagle
Federal Status: Unlisted; protected under the MBTA and the BGEPA

The golden eagle (*Aquila chrysaetos*) prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. Golden eagles may occur within or near the Study Area, however, no golden eagles or nests were observed during the field surveys. The nearest documented golden eagle's nest is located approximately 19 miles to the east of the Site. The USFWS generally recommends a buffer of 0.5 mile from any eagle nest. If any active nests are discovered within 0.5 mile of the Site, the USFWS should be contacted for further direction. Golden eagles are not expected to be impacted by the proposed Project.

2.5 CULTURAL RESOURCES INVENTORY

Class I and Class III cultural resource inventories were conducted for the proposed Project.

The Class I inventory was conducted on October 5, 2016, with an updated search conducted on October 26, 2016. The Class III inventory was conducted on March 22 and 23, 2017. Approximately 20% of the Site has been previously inventoried (Burns 2008; Kulevsky 2012). For the current inventory, 63.57 non-overlapping acres were surveyed of the 72.88-acre Arrow-owned parcel. The inventoried area is located in Section 21 of Township 149 North, Range 98 West, McKenzie County, North Dakota.

During the inventory, SWCA personnel did not identify any newly or previously recorded cultural resources within the Site, although three field-clearing piles were noted, but not formally recorded. The report was submitted to the SHPO on October 17, 2017. In a letter dated October 30, 2017, SHPO concurred with the "No Significant Site Affected" determination included in the Class I and Class III inventory report (Appendix D).

SECTION 3: NEED FOR FACILITY

3.1 ANALYSIS OF NEED BASED ON PRESENT AND PROJECTED DEMAND, INCLUDING SYSTEM STUDIES

Hydrocarbon production from the Bakken Petroleum System of the Williston Basin witnessed extraordinary growth between 2010 and 2014, and although there was a slowdown in oil and gas production in 2015 and 2016, steady growth has continued, but not at its earlier pace. In January 2010, oil production was approximately 235,925 barrels per day ("bbls/day") and natural gas production amounted to 254,686 MMscfd from 4,628 wells. In May 2017, oil production was 1,040,995 bbls/day (all-time high was December 2014 at 1,227,483 bbls/day) and gas production amounted to 1,853,528 MMscfd (new all-time high) from 13,885 wells. These increases represent over a 340% growth in oil production, almost a 680% growth in gas production, and approximately a 200% increase in the number of producing wells over the last seven years. Approximately 85% of the wells are unconventional Bakken Petroleum System wells.

The earlier phenomenal growth in production can be attributed to the demands for rapid exploration in a young and relatively unknown resource. At the time, the increase in gas production from Bakken Petroleum System wells exceeded the existing processing capacity available in the region, and construction of additional processing capacity was required to meet the demand of area producers. As the level of activity has shifted from exploration to development of a mature resource, the number of wells will continue to increase as infilling occurs to maximize resource recovery. Advances in drilling and completion technologies have resulted in increased production and lower costs and as the number of wells is expected to increase over the next 20 to 30 years, the demand for increased gas processing capacity will continue to rise as well.

The flaring policy adopted by the North Dakota Industrial Commission ("NDIC") in July of 2014 was designed to reduce flaring by promoting gas capture at the wellhead, with the goal of reducing the average number of wells flaring from 30% to 5% by 2020. To be in compliance, producers have to develop a gas capture plan that identifies the anticipated gas production volume and the infrastructure that will be used to process that gas. The proposed Plant and associated gathering system pipeline will help minimize future releases as more wells are completed and tied into the gathering system pipeline. In addition, the consumer-quality residue gas that will be produced by the Plant will be transported to an existing natural gas transmission pipeline and sent to consumers in North Dakota and adjoining states. The removed NGLs are valuable products that will be collected and transported to a third-party NGL facility for subsequent use in a variety of manufacturing and commercial enterprises. Thus, the Project will employ environmentally sound capture techniques while stimulating economic development and maximizing the utilization of the oil and gas resources in North Dakota.

3.2 DESCRIPTION OF FEASIBLE ALTERNATIVE METHODS OF SERVING THE NEED

A thorough analysis of all reasonable alternatives was conducted. Various factors were considered by Arrow, including engineering, economic, and environmental factors in a multidisciplinary and iterative approach, as outlined below.

No Action Alternative: Overall regional production would continue to be constrained by gas processing capacity, resulting in increased flaring at wellheads and loss of natural resources. This alternative is not desirable.

Alternative Plant Location: Alternative locations were not desirable, as land was available on the 72.88-acre Arrow-owned parcel containing the existing Arrow Bear Den Gas Plant location, which has access to residue gas and NGLs through Arrow's PSC-permitted pipelines.

3.3 10-YEAR PLAN

Arrow's most recent 10-year plan was filed on January 20, 2017 (PU-17-036). Based on modifications made to the Siting Act during the 65th Legislative Session, Ten Year Plans are no longer required for gas or liquid energy conversion facilities or gas or liquid transmission facilities sited under Chapter 49-22.1. Accordingly, no further Ten Year Plan or statement explaining any deviation is required under N.D.C.C. 49-22.1.

3.4 REQUIRED PERMITS

To ensure that construction and operation of the Project is compliant with environmental regulations, Arrow has or will obtain the requisite permits, as summarized below in Table 3.

Table 3. Required Permits.

Agency	Permit/Approval	Status
State		
ND PSC	Certificate of Site Compatibility	Application pending
ND Dept. of Health	Construction Stormwater Permit	Anticipate filing the Notice of Intent in February 2018 and 30 days prior to commencing ground disturbing activities. Permit coverage is effective 7 days after submittal unless otherwise notified.
ND Dept. of Health	Permit to Construct	Application to be submitted December 20, 2017. Receipt anticipated March 2018.

ND State Historic Preservation Office	Cultural and historic resources consultation and review	Class III Cultural Resources Inventory submitted and concurrence received.
Local		
McKenzie County	Permanent Road Approach Permit	Application submitted September 2017. Receipt anticipated December 2017.
McKenzie County	Conditional Use Permit	CUP 0001-17 issued in April 2017 is for 80 acres, which includes the Gas Plant II location; New application submitted September 2017 at the request of the county; receipt anticipated by February 2018.

SECTION 4: ENERGY CONVERSION FACILITY SITING CRITERIA

The information presented in this section demonstrates conformance with the Commission's siting criteria for Energy Conversion Facilities, as promulgated in N.D.A.C. § 69-06-08-01.

4.1 STUDY AREA

Arrow's Study Area included a 0.5-mile-wide area surrounding the 51.48-acre Site, as shown in Appendix B. Arrow initiated agency correspondence, geographic information system ("GIS") mapping, internet-based research, and a desktop analysis when conducting the resource inventory of the Study Area. These efforts were augmented with biological and cultural resource surveys of the Site.

4.2 IDENTIFY AND MAP CRITERIA

Arrow has conducted a thorough inventory of the Study Area and evaluated the resources that occur within the Site and Study Area to assess the compatibility of the Plant with the state's siting criteria. The following sections identify and discuss the presence or absence of siting criteria within the Site or Study Area.

4.3 EXCLUSION AREA INVENTORY AND ANALYSIS

Exclusion areas are geographic areas that should be excluded from consideration when siting an Energy Conversion Facility, as specified in N.D.A.C. § 69-06-08-01(1). Table 4 and the following sections identify and discuss exclusion areas within the Study Area or Site.

Table 4. Exclusion Areas.

Exclusion Area	Project Site	Within Study Area
Federal		
National Parks or Memorial Parks	No	No
Historic Sites, Districts, or Landmarks	No	No
Natural Landmarks or Monuments	No	No
Wilderness Areas or Wildlife Areas	No	No
Wild, Scenic, or Recreational Rivers	No	No
Wildlife Refuges or Grasslands	No	No
State		
Parks, Forests, or Forest Management Lands	No	No
Historic Sites, Monuments, or Historical Markers	No	No
Archaeological Sites	No	No
Grasslands	No	No
Wild, Scenic, or Recreational Rivers	No	No
Game Refuges or Game Management Areas	No	No
Management Areas	No	No
Nature Preserves	No	No

Exclusion Area	Project Site	Within Study Area
County		
Parks	No	No
Recreation Areas	No	No
Municipal Parks	No	No
Other		
Parks or Public Lands Held by Other Government Entities	No	No
Prime Farmland	No	No
Irrigated Farmland	No	No
Critical Habitat for Protected Species	No	No
Areas within 1,200 Feet of ICBM Facilities	No	No

4.3.1 Federal Exclusion Areas

Based on a review of publicly available information, Arrow has concluded that no national parks, memorial parks, historic sites and landmarks, monuments, or wilderness areas are within the Site or Study Area. Arrow provided Project notification to the appropriate federal agencies to offer the opportunity to review and confirm this conclusion, as discussed in Section 2.3.

4.3.2 State Exclusion Areas

Based on a review of field surveys, publicly available information, and agency correspondence, Arrow has concluded that no state parks, historic sites, monuments, historical markers, archaeological sites, or nature preserves are within the Site.

The NDDTL-Surface Management Division responded to Arrow's Project notification on July 31, 2017, and confirmed the absence of surface interests in the Site, although State Trust Lands are present in Section 16, Township 149 North, Range 98 West, which is located within the Study Area immediately north of the proposed Project, as discussed in Section 2.3.

4.3.3 County Exclusion Areas

Based on a review of publicly available information, Arrow has concluded that no McKenzie County parks, recreation areas, municipal parks, or parks owned by other governmental bodies are within the Site or Study Area. Arrow provided Project notification to various agencies to offer the opportunity to review and confirm this conclusion, as discussed in Section 2.3.

4.3.4 Prime Farmland

Arrow conducted a review of published data to assess both the Site and Study Area for the presence of Prime Farmland. Arrow confirmed that no Prime Farmland is present on the Site.

This analysis also evaluated Farmland of Statewide Importance. Generally, Farmland of Statewide Importance includes areas considered nearly Prime Farmland and has the potential to produce economically high yields of crops when treated and managed according to acceptable farming methods. This analysis concluded that approximately 16.83% (13.46 acres) of the Site is comprised of Farmland of Statewide Importance.

North Dakota has an estimated 9,761,025 acres of Prime Farmland and an estimated 10,063,663 acres of Farmland of Statewide Importance. As such, the acreages within the Project Site represent approximately 0.0% and 0.00013% of the total Prime Farmland and Farmland of Statewide Importance in North Dakota, respectively. McKenzie County, North Dakota, has an estimated 1,756.91 acres of Prime Farmland and an estimated 304,218.90 acres of Farmland of Statewide Importance. The acreages within the Project Site represent approximately 0.0% and 0.009% of the total Prime Farmland and Farmland of Statewide Importance in McKenzie County, respectively. Thus, the proposed development of the Site will have a negligible impact on Prime Farmland or Farmland of Statewide Importance when assessed on a state-wide or county-wide basis.

4.3.5 Irrigated Farmland

Arrow's investigation found no evidence of irrigation within the Site or Study Area.

4.3.6 Protected Species Resource Review

Based on field surveys of the Site by qualified biologists and review of published information, no areas critical to the life stages of threatened or endangered animal or plant species are within the Site or Study Area. In addition to field studies, Arrow has provided Project notification to federal and state agencies to offer the opportunity to review and confirm this conclusion. See Section 2.3 for a comprehensive discussion of Arrow's efforts.

4.3.7 Critical Habitat for Protected Species

Arrow has confirmed the absence of critical habitat within the Site or Study Area. See Section 2.3 for a comprehensive discussion of Arrow's efforts.

4.3.8 Areas in Proximity to ICBM Facilities

Arrow used information compiled by the University of Wyoming regarding current and historic missile site locations for each Minot Air Force Base Minuteman Intercontinental Ballistic Missile ("ICBM") site to confirm that no ICBM facilities are located within 1,200 feet of the Site.

4.4 AVOIDANCE AREAS INVENTORY AND ANALYSIS

Avoidance areas are geographic areas that may not be approved as a site for an energy conversion facility unless the applicant shows that under the circumstances there is no reasonable alternative, as specified in N.D.A.C. § 69-06-08-01(3). Table 5 and the following sections identify and discuss avoidance areas within the Study Area or Site.

Table 5. Avoidance Areas.

Avoidance Area	Project Site	Within Study Area
Other Historical Resources Not Meeting Exclusion Area Criteria	No	No
Areas within City Limits or Military Installation Boundaries	No	No
Areas within Known 100-year Floodplains	No	No
Areas of Known Geologic Instability	No	No
Woodlands and Wetlands	No	Yes
Areas of Recreational Significance Not Categorized as Exclusion Areas	No	No

4.4.1 Other Historical Resources Not Meeting Exclusion Area Criteria

Arrow commissioned a Class I study of the Site and Study Area, and a Class III cultural resource survey of the Site. These studies did not identify any newly or previously recorded cultural resources within the Site or Study Area, although three field-clearing piles were noted, but not formally recorded. The report was submitted to SHPO on October 17, 2017. In a letter dated October 30, 2017, SHPO concurred with the "No Significant Site Affected" determination included in the Class I and Class III inventory report (Appendix D).

4.4.2 Areas Within City Limits or Military Installation Boundaries

Arrow has confirmed, based on publicly available information, that the Site and Study Area are not located within city limits or within the boundaries of military installations.

4.4.3 Areas Within Known 100-Year Floodplains

Flood hazards are benchmarked with Federal Emergency Management Administration's ("FEMA") 100-year floodplain analysis. Preliminary floodplain mapping has been completed by FEMA in McKenzie County. Analysis of the Site and Study Area determined that this area is not located within the 100-year or 500-year floodplain.

4.4.4 Areas of Known Geologic Instability

No known areas of geologic instability are within the Site or Study Area. North Dakota has not experienced an earthquake of sufficient magnitude to damage welded steel piping or structural steel in recorded history. Sinkholes are known to occur in North Dakota but are more closely related to mining activities and no evidence of mining or sinkholes was identified. A desktop analysis indicated that no landslide deposits are located in the Site or Study Area (Carlson 1985).

4.4.5 Woodlands and Wetlands

Natural resource studies of the Study Area and Site used GIS analytical capabilities. Field studies of the Site were also used to enhance assessment of the physical characteristics of the Site. This analysis relied on field verification to confirm the presence or absence of natural resources found within the Site.

A comprehensive field survey of the entire Site was completed on February 21, 2017, to assess the presence or absence of these features within the boundaries of the Site. Site conditions were suitable for surveys as there was no snow present and the ground was not frozen solid. The Site was evaluated for the presence of trees, saplings, or shrubs. No woody vegetation was identified on the Site, and woody vegetation in the surrounding Study Area is sparse and limited to woody draws and ravines associated with drainage ways.

Field surveys did not record any wetlands or waterbodies on the Site, although intermittent tributaries to Elkhorn Creek and Cherry Creek were noted in the Study Area on the east side and northwest and west sides of the Site, respectively. One wetland was identified on the south side of County Route 37, south of the Site in the Study Area.

4.4.6 Areas of Recreational Significance Not Categorized as Exclusion Areas

No areas of recreational significance occur within the Site or Study Area (U.S. Geological Survey 2014).

4.5 FACTORS TO BE CONSIDERED IN EVALUATING APPLICATIONS AND DESIGNATION OF SITES, CORRIDORS, AND ROUTES (N.D.C.C. § 49-22.1-09)

4.5.1 Selection Criteria (N.D.A.C. § 69-06-08-01(5))

The selection criteria require a study of environmental impacts and changes in land use that may result from the siting of the proposed facility. A site may be approved in an area only when it is demonstrated to the Commission by the applicant that any significant adverse effects resulting from the location, construction, and operation of the facility in that area as they relate to the following, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum. Arrow proposes that it has successfully avoided or minimized these effects to the maximum extent practicable. The results of this effort are presented below.

4.5.1.1 Agricultural Impact Assessment

Agricultural Production: Land for the Plant will be permanently removed from agricultural production. No other impact to agricultural lands is anticipated.

Family Farms and Ranches: The property was acquired through a purchase agreement negotiated by Arrow and the landowner. The Site will be converted from agricultural/rangeland to industrial use. No other impacts to family farms or ranches are anticipated.

Lands Suitable for Irrigation: Construction activity will not impact irrigated lands. Land that is most efficient for irrigation is relatively level and has soils that are well drained and highly permeable. The combination of topographic relief and soil characteristics at the Site indicate that the Site is not suitable for irrigation. No above-ground irrigation systems have been identified on the Site or in the Study Area.

Surface Drainage: The Site is within the Upper Clear Creek watershed. U.S. Geological Survey National Hydrography Dataset mapping and aerial photography indicate the presence

of a water flowage originating at the center of the Site and draining to the northwest corner of the Site into an unnamed tributary off site. This waterbody flows northwest to its confluence with Clear Creek which continues northwest to Tobacco Garden Creek and ultimately Lake Sakakawea, approximately 14.5 miles northwest of the Site.

Ground Water Flow: The Site is located within the McKenzie County Water Resource District and Western Area Water Supply. Arrow does not anticipate installation of a well or use of the groundwater for construction or operation of the Project.

Water demands during and after construction are anticipated to be minimal and purchased commercially.

Agricultural Quality of the Cropland: Land acquired for the Plant will be permanently removed from agricultural production. No other impact to agricultural lands is anticipated.

4.5.1.2 Impact on the Availability and Adequacy of Local Public Services

The potential impacts to local public services including law enforcement, fire department, health care, public schools, and recreational facilities are anticipated to be temporary in duration and minimal in their overall effect to existing programs and systems. Construction activities are anticipated to occur over an 18- to 24-month period. During this period, there will be an influx of employees ranging from laborers, skilled tradespeople, technicians, and engineering and environmental professionals. The work force will typically engage 250 individuals, with periods of peak activity where the work force will increase to levels of up to 300 individuals for a period of up to 6 months.

Area resources may experience increased demand on services with the addition of construction workers temporarily residing in the area. Provided timely receipt of authorizations to construct, the peak demands will likely occur in 2018. The most noticeable impact may be due to an increase in vehicle traffic associated with the Plant construction activities.

Prior to construction, Arrow will coordinate with local health care providers and emergency responders to discuss emergency response coordination.

4.5.1.3 Potential Impacts

Local Institutions: Due to its proximity to the Site, Watford City, North Dakota, may see the greatest impact from the Project. These impacts from facility construction will be temporary, as construction will occur over a period of 18 to 24 months. To operate the Plant, Arrow will hire 11 new full-time employees. Plant operations will engage local businesses and contractors to support the facility. Generally, the impacts will be beneficial to the local economy due to the addition of revenues from outside of the community being spent on goods and services locally. The beneficial impacts of the additional workforce associated with permanent workforce required to operate the facility will have long-term benefits on the economy that are anticipated to be greater than the demands placed on the institutions.

Noise-Sensitive and Light-Sensitive Land Uses: No noise-sensitive or light-sensitive resources, including residences, schools, hospitals, or care facilities are located within 500 feet

of the Site. The Project has been sited approximately 7.5 miles southeast of Watford City in a rural setting, effectively isolating the Project from the majority of sensitive receptors. Local residents may experience additional motor vehicle volumes on area roadways, but the noise associated with vehicles will be similar to existing background levels and will occur largely during normal business hours.

Rural Residences and Businesses: The Project is located approximately 7.5 miles from Watford City. The nearest rural residence is approximately 0.69 miles south of the Site and the nearest business (oil and gas production facility) is 0.66 mile south of the Site. Residents may experience additional traffic and an increase in commerce in response to the influx of temporary workers purchasing goods and services. The Plant will likely benefit the local economy for both the near and long term.

Aquifers: The aquifers that underlay North Dakota are typically associated with two types of geologic formations: bedrock and glacial drift. Bedrock aquifers in the area are known to occur from approximately 120 to 2,120 feet below the surface, while glacial drift aquifers are known to occur at depths from a few feet to up to 150 feet below the surface. Groundwater suitable for domestic and livestock supplies in McKenzie County is available from three aquifer systems in semi-consolidated rocks of Late Cretaceous and Tertiary age. The Fox Hills and basal Hell Creek aquifer system is used as a source for livestock and domestic supplies. This aquifer system generally is 1,100 to 1,800 feet below land surface. Tertiary-age aquifers are limited in use due to chlorides and dissolved solids. Groundwater is also available from aquifers in unconsolidated sand and gravel deposits of Quaternary age that is suitable for domestic, livestock, municipal, industrial, and irrigation uses. These unconsolidated sand and gravel aquifers consist of the Bennie Peer, Charbonneau, Cherry Creek, Little Missouri River, Tobacco Garden, and Yellowstone-Missouri aquifers. The proposed Project is not located within any of these groundwater resource areas. The nearest surficial aquifer is the Spring Creek Branch of the Tobacco Garden Aquifer located approximately 2.93 miles west/northwest of the Site (North Dakota State Water Commission 2015).

Human Health and Safety: Arrow promotes a safe and healthy workplace during construction and operations of all its assets. A corporate policy that meets or exceeds federal and state laws, rules, and regulations is enforced and adhered to by all employees and contractors. Arrow governs operations and construction activities with safe work procedures designed to protect property, persons, and the environment while maintaining regulatory compliance. Safety inspectors will be onsite throughout active construction and an Arrow employee will oversee safety upon operation of the Project.

Animal Health and Safety: The wildlife currently inhabiting the Site are common and are generally mobile. The local wildlife inhabitants will be displaced by the Project without a measurable impact to the viability of these populations. No species of special concern are anticipated to be impacted due to construction or operation of the Plant.

Plant Life: The Project will result in the loss of a negligible amount of pasture and crop land, when measured on a county- or state-wide basis. No species of special concern will be impacted

by the Project. A landscaping plan is under development and will be coordinated with the county in accordance with a conditional use permit, if applicable.

Temporary and Permanent Housing: The region has experienced increased demand for permanent and temporary housing as the result of the continued expansion of resource production. The area has witnessed this increased activity since the early 2000s and as a result has steadily increased lodging resources in response. The temporary workforce often mobilizes with trailers and fifth wheels in addition to some requiring rental properties and hotel/motel lodging. The contractor to be selected will be well aware of the situation and willing to accept non-traditional lodging opportunities if necessary.

Temporary and Permanent Skilled and Unskilled Labor: Construction of the Plant will require an average work force of approximately 250 with a maximum expected of 300 temporary employees. The construction employees will be comprised of both skilled and unskilled personnel. Skilled labor will include craft workers such as operating engineers, iron workers, welders, electricians, carpenters, and boilermakers. The unskilled workforce will be comprised of common laborers who work closely with the skilled trades.

Once the Plant is operational, it will require approximately 11 full-time employees. These personnel will be responsible for day-to-day operations, maintenance, and support of local gathering assets that supply the Plant.

4.5.2 Cumulative Effects of the Location of the Facility in Relation to Existing and Planned Facilities and Other Industrial Development

Arrow is not aware of any new planned facilities or industrial developments within the Study Area. The introduction of additional gas processing capacity may expose existing demand that may result in development of additional gathering capacity. Also, due to development of new processing capacity, there may be development of additional take-away capacity to bring the product to market, such as Arrow's future proposed NGL pipeline.

4.6 POLICY CRITERIA

The Commission may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices, and in some cases may require the adoption of such policies and practices. The Commission may also give preference to an applicant that will maximize interstate benefits (N.D.A.C. § 69-06-08-01[6]).

4.6.1 Policies and Commitments to Limit Environmental Impact

Arrow is committed to conducting its business in compliance with all applicable environmental laws and regulations. These laws and regulations are designed to safeguard the environment, human health, wildlife, and natural resources. Arrow's commitment to observe them faithfully is an integral part of the company's business and values.

Arrow will make compliance with environmental considerations contained in the permits and authorizations received for this Project a priority. Arrow will conduct its activities with the

objectives of providing a healthful and safe workplace for all employees, preventing accidents and environmental incidents, and controlling emissions and wastes to below harmful levels.

All persons and firms providing service to Arrow are required to conduct their work in compliance with environmental conditions, permit authorizations, and regulations, and will be held accountable for their actions in that regard.

4.6.2 Recycling of the Conversion Byproducts and Effluents

Not applicable to this type of Project.

4.6.3 Energy Conservation Through Location, Process, and Design

The siting of the Plant in close proximity to wellhead and gathering systems reduces emissions associated with shipping raw feed gas over greater distances. Waste energy is generated in the expansion of cooled inlet gas to the cryo-thermal gas plant. The gas is first chilled to condense liquids. After separation, the temperature of the gas is then lowered further via the process of throttling expansion in the expander section of the turbo-expander. The expander is tied to a compressor by an integral shaft to compress gases from the stabilizer overhead prior to the residue compressors. The mechanical efficiencies of the turbo-expanders can achieve 90%.

4.6.4 Training and Utilization of Available Labor in this State for the General and Specialized Skills Required

Gas plant and fractionator construction is a specialized niche construction market and the labor force needed to build the Plant will be primarily comprised of a non-local workforce. The primary contractor has not been selected and will be awarded upon completion of an in-depth bid process. Arrow will strongly encourage the use of the local skilled and unskilled labor force.

4.6.5 Use of a Primary Energy Source or Raw Material Located within the State

The raw feed gas supplying the proposed Plant will be produced from within North Dakota and is currently a by-product of crude production. Products from the Plant will be distributed for further processing, transmission, and/or consumption by various inter- and intra-state parties.

4.6.6 Non-Relocation of Residents

No residences shall be displaced or require relocation due to the Project.

4.6.7 The Dedication of an Area Adjacent to the Facility to Land Uses such as Recreation, Agriculture, or Wildlife Management

Arrow does not own property adjacent to the proposed Project suitable for recreation, agricultural, or wildlife management purposes. The current land use of properties adjacent to the Project is active agricultural/range land (see Appendix B).

4.6.8 Economies of Construction and Operation

Arrow has sited the proposed facility to be near its Bear Den Gas Plant I facility and NGL and residue gas pipelines. The location will also take advantage of close proximity to existing infrastructure including public roads, electrical power, and supply pipelines.

The expander is tied to a compressor by an integral shaft to compress gases from the stabilizer overhead prior to the residue compressors. The mechanical efficiencies of the turbo-expanders can achieve 90%. Collocation of the fractionator with the gas processing plant(s) eliminates the need for potentially lengthy pipelines that would be needed to connect to an offsite fractionator to obtain the desirable end products. The location and design of the Plant are clear examples of creating an economy of scale project concept, achieving additional production capacity in the most minimally intrusive and most efficient way possible, in terms of new infrastructure development.

4.6.9 Secondary Uses of Appropriate Associated Facilities for Recreation and the Enhancement of Wildlife

There are no appropriate associated facilities suitable for recreation or enhancement of wildlife.

4.6.10 Use of Citizen Coordinating Committees

Arrow has established and maintained a good relationship with the local residents through its existing gathering and processing systems in the area and development of the existing gas plant at the same location. Through these relationships, Arrow has maintained several grass roots communication channels to inform local residents regarding the developments associated with the Plant.

4.6.11 A Commitment of a Portion of the Energy Produced for Use in this State

The raw feed gas supplying the proposed Plant will be produced from within North Dakota. Products from the Plant will be distributed for further processing, transmission, or consumption by various inter- and intra-state parties.

4.6.12 Labor Relations

Arrow does not anticipate encountering any adverse labor relations on this Project. The labor market in the Study Area is supportive of the oil and gas industry.

4.6.13 Coordination of Facilities

Arrow is actively engaged in the operation of regional crude oil, produced water, and natural gas gathering infrastructure that is integrated into its processing facilities. The integrated approach allows for the most efficient utilization of existing infrastructure while fully capitalizing on the available processing capacity.

4.6.14 Monitoring of Impacts

Arrow will retain inspection oversight either directly or through a third party to ensure compliance with all applicable rules, regulations, and permit/certificate conditions. Inspection

services will be retained throughout the Project construction and ultimately transition to operation staff, inclusive of environmental responsibilities.

4.6.15 Problems Raised by Federal Agencies, Other State Agencies, and Local Entities

Arrow has solicited engagement with all applicable stakeholders including federal, state, and local authorities who have various forms of oversight authority. To date, responses have been received from 8 of 38 agencies contacted, indicating that there are no anticipated significant impacts associated with the proposed Project (*see* Section 2.3).

Arrow will remain responsive to agency input throughout construction, restoration, and operation of the Project.

SECTION 5: MITIGATIVE MEASURES

Arrow's commitment to minimize environmental impacts is a key mitigation element. As described previously, Arrow's design took into consideration various elements to maximize efficiencies while minimizing impacts to the environment. This combination of actions effectively mitigates the impacts of the Plant.

SECTION 6: LIST OF PREPARERS

Mr. Asim Siddiqui
Senior Project Manager
Crestwood Midstream Partners, L.P., 700 Louisiana Suite 2060, Houston, Texas 77002

Mr. Siddiqui is the Director of Bakken projects for Crestwood Midstream Partners and the Project Manager for the Bear Den Gas Plant II. He also provides oversight for the Project Managers, Project Engineers, and Construction Managers who execute the various projects constructed in the region, including gathering systems, pipelines, pump/compressor stations, truck stations, central delivery point stations, and processing plants.

Ms. Monica Howard
Environmental Projects Director
Crestwood Midstream Partners, L.P., 700 Louisiana Suite 2060, Houston, Texas 77002

Ms. Howard is the Environmental Projects Director for Crestwood Midstream Partners and provides management and oversight on all company projects, including gathering systems, pipelines, pump/compressor stations, truck stations, central delivery point stations, and processing plants.

Mr. Jim Dawson
Senior Project Manager
SWCA Environmental Consultants, 116 North 4th Street, Bismarck, North Dakota 58501

Mr. Dawson is a Professional Geologist and Certified Hazardous Materials Manager who provides regulatory compliance consulting services for oil and gas operations, including environmental site assessments and due diligence activities; stormwater permitting and inspections; preparation of Spill Prevention, Contingency and Countermeasure Plans, Facility Response Plans, and Pipeline Spill Response Plans; spill investigation, assessment, and cleanup services; and investigation and cleanup/remediation of reserve pits and legacy contamination sites.

Ms. Sarah Baer
Senior Project Manager
SWCA Environmental Consultants, 116 North 4th Street, Bismarck, North Dakota 58501

Ms. Baer is the Office Director for SWCA's Bismarck, North Dakota, office and provides oversight of all aspects of large energy development projects (i.e., archaeology, wildlife, leasing, operations, survey, GIS, and environmental permitting; stormwater pollution prevention plans (SWPPPs); spill prevention, control and countermeasure (SPCC) plans; and National Pollutant Discharge Elimination System permitting). Ms. Baer has been involved in numerous projects in the Bakken oil and gas development area and has completed projects comprising over 1,000 miles of pipeline and hundreds of well sites. Ms. Baer is experienced in strategically planning and developing energy projects involving multidisciplinary staff, understanding the regulatory environment for generation and oil and gas projects, and completing discipline and permitting for projects.

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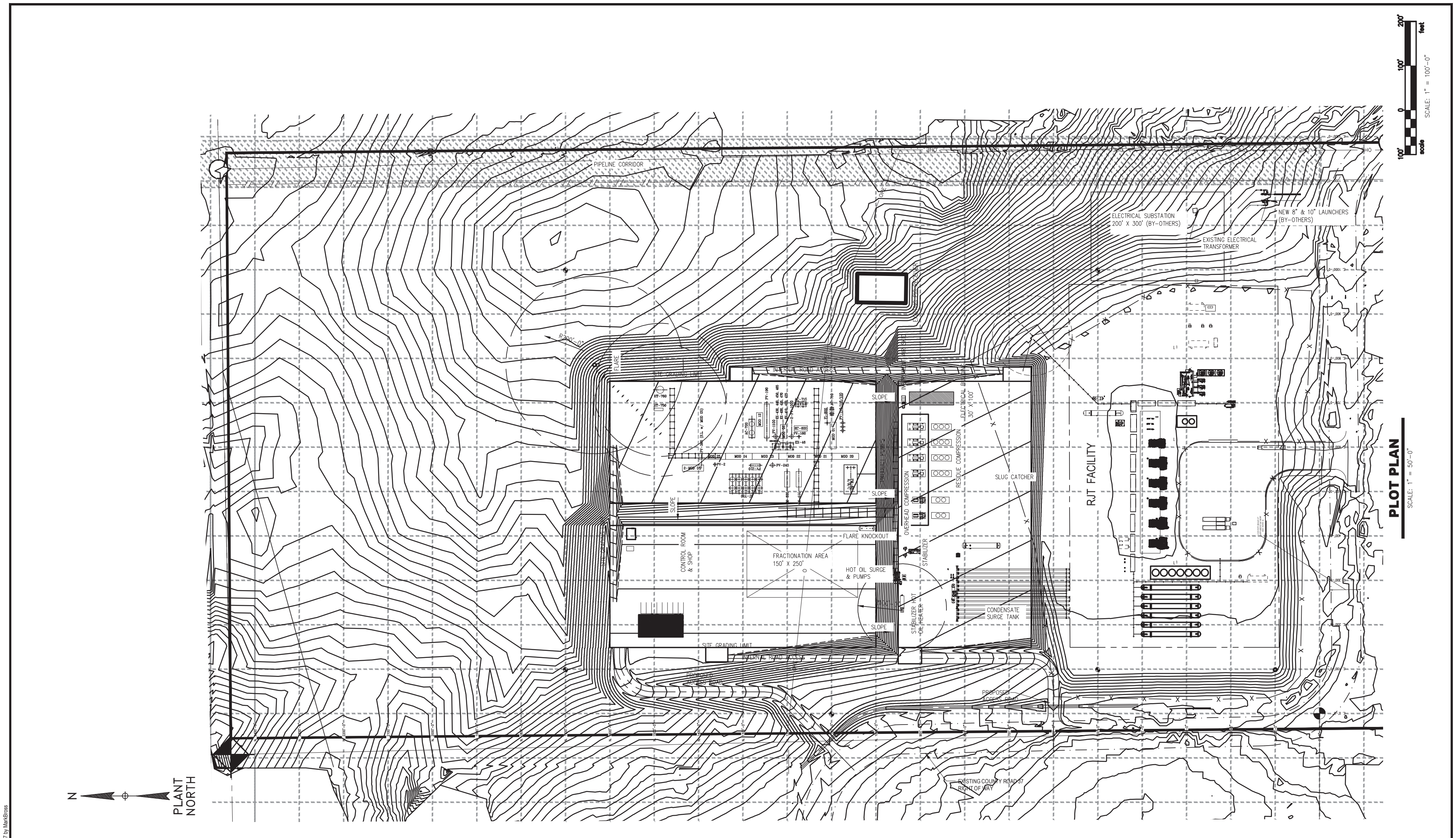
APPENDIX A
Engineering Documents



R#?	REV?	BY?	CHK?	DATE?
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
C	ISSUED FOR PRELIMINARY REVIEW	MB	TG	10/25/17
B	ISSUED FOR PRELIMINARY REVIEW	MB	TG	10/20/17
A	ISSUED FOR PRELIMINARY REVIEW	MB	TG	10/10/17
NO.	REVISION	BY	CHK	DATE

Crestwood

DRAWN BY	MBROSS	DATE	10/04/17
CHK. BY	TGRIMES	SCALE	1" = 100'-0"
DESIGNED BY	KAHUNA	APPR. BY	

GENERAL ARRANGEMENT
OVERALL SITE
PLOT PLAN - BOTH PLANTS
BEAR DEN GAS PLANT

A.F.E. NO.	4083.0480.00	DWG. DESC:	200 MMCFD CRYO PLANT
PRINT ISSUED	10/25/17	DWG. NO.	BDP-PP-2001D

BDP-SK-2001-E1.dwg Plotted on: Nov 16, 2017 by MarkBross

Client:	Crestwood Midstream Partners LP
Project:	Bear Den Gas Plant
Date:	12/6/2017

Details - Cryo Facility 120MMSCFD [1]			**Fuel Use**
Equipment	**Size Estimate**	**Heat Duty (MMBTU/hr)**	**Residue (MMSCFD)**
			Gross Ideal Gas Heating Value (BTU/ft3)
			1145.00
Inlet System			
High Pressure Slug Catcher	Harp Style; 4900bbl		
Condensate Filter			
Inlet Separator			
Pre-Heat Exchanger			
Condensate Stabilizer / OH Compression Systems	15,000 BBL		
3 Phase Condensate Surge Tank	1 x 60,000 Gal		
HP Condensate Exchanger (Hot Oil)			
HP Separator			
Condensate Product/OH Exchanger			
Stripper Feed / Bottoms Exchanger			
Stripper			
Stripper Reboiler			
Stabilizer			
Stabilizer Reboiler			
Condensate Product Cooler			
Condensate Storage	Existing		
Stabilizer NGL Overhead Condenser			
Overhead Compressors	2 x 2250 BHP		
Overhead Compressor Cooler			
Stabilizer Overhead Accumulator			
Stabilizer NGL Tank			
Stabilizer NGL Metering Skid			
Stabilizer NGL Booster Pumps			
Stabilizer NGL Product Pipeline Pumps	Existing		
Cryo System			
Preheat Exchanger			
Cryo Inlet Separator			
Inlet Gas Filter Separator			
Mol Sieve Dust Filter			
Regen Gas Compressor			
Mol Sieve Dehydrators			
Gas/Gas Exchanger			
Reflux Exchanger			
Feed/Gas Exchanger			
Chiller			
Expander/Compressor Aftercooler			
Cold Separator			
Methanol Injection Pump			
Expander / Compressor			
Expander Lube Oil Makeup Pump			
Gas / Product Exchanger			
Demethanizer Bottoms Reboiler			
Demethanizer Side Heater			
Demethanizer Trim Reboiler			
Heat Medium Heater [2]	Dependant on package	27	0.57
Light Ends Fractionation Column			

Client:	Crestwood Midstream Partners LP
Project:	Bear Den Gas Plant
Date:	12/6/2017

Details - Cryo Facility 120MMSCFD [1]			**Fuel Use**
Equipment	**Size Estimate**	**Heat Duty (MMBTU/hr)**	**Residue (MMSCFD)**
Heavy Ends Fractionation Column			
LEFC Bottoms pumps			
HEFC Bottoms Pumps			
NGL Surge Tank			
NGL Booster Pumps			
NGL Pipeline Pumps			
NGL Cooler			
NGL Metering Skid			
Refrigerant System			
Refrigerant Economizer			
Refrigerant Reclaimer	Dependant on package		
Refrigerant Suction Scrubber			
Refrigerant Compressors	2 x 2250 BHP		
Lube Oil Coolers			
Propane Condenser			
Refrigerant Accumulator			
Refrigerant Disengaging Vessels			
Hot Oil System			
Hot Oil Expansion Tank			
Heat Medium Solids Filter			
Hot Oil Pumps			
Hot Oil Heater [2] (includes heat for stabilizer & stabilizer pre-heat)		50	1.05
Residue Compression			
Residue Compressor	5 x 4500 BHP		
Residue Compressor Cooler			
Residue Coalescing Filter			
Residue Gas Discharge Cooler			
Regen Compression			
Regen Compressor			
Regen Coalescing Filter			
Regen Gas Cooler			
Regen Gas Scrubber			
Regen Gas Heater [2]		7	0.15
Utilities / Misc.			
Fuel Gas Scrubber			
Instrument Air Compressor Skid			
Instrument Air Volume Bottle			
Flare Knockout (x2)			
Cryo Flare [2]		TBD	
Truck Loading Flare [2]	Existing	3.73 TON/yr	
GC's			
Compressor Lube Oil / Engine Coolant Pnuematic Pumps			
Produced Water Storage	Existing		
Skid Drain Storage / Slop Tank			
Compressor Frame/Engine Oil Tank			

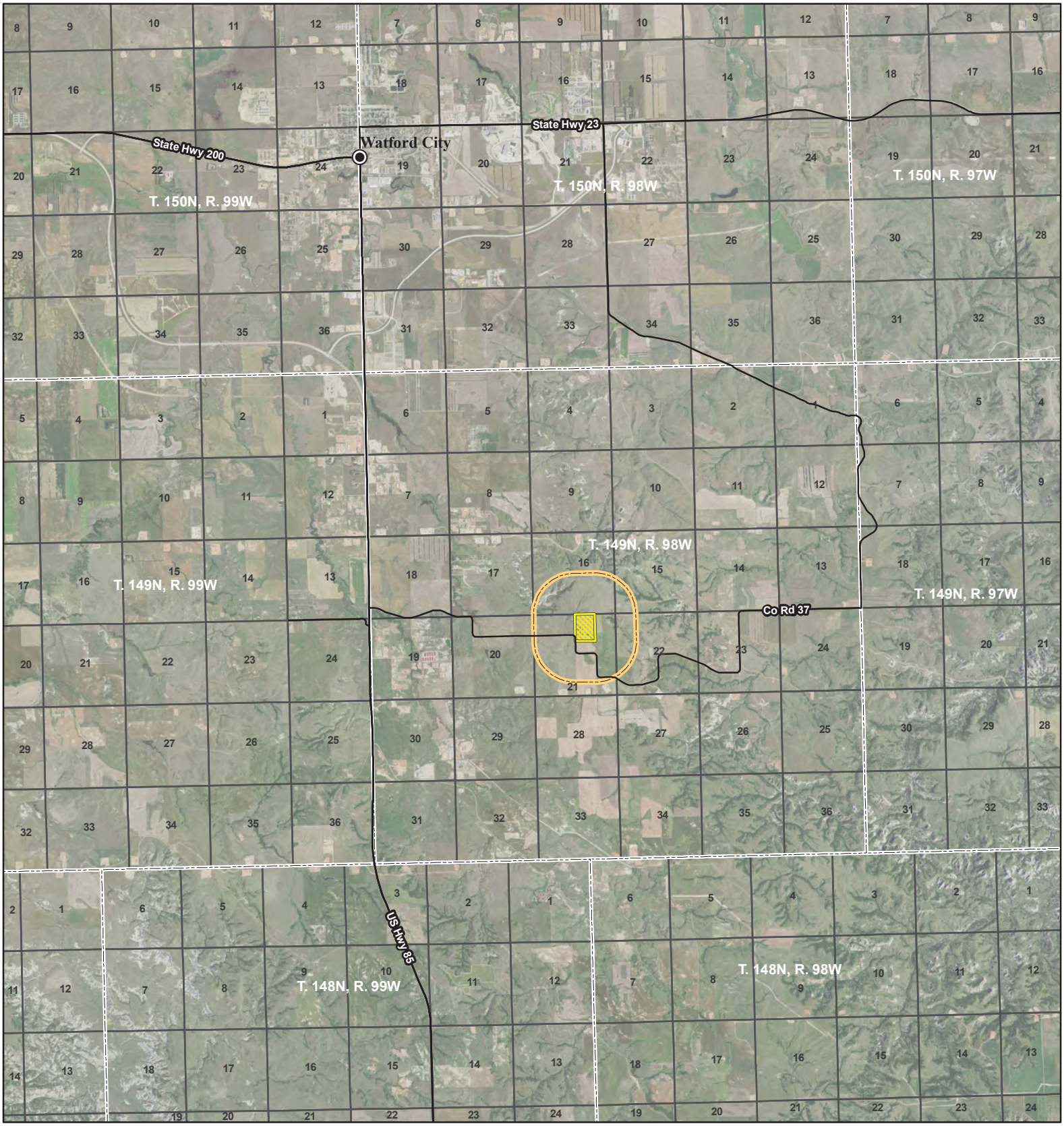
Client:	Crestwood Midstream Partners LP
Project:	Bear Den Gas Plant
Date:	12/6/2017

Details - Cryo Facility 120MMSCFD [1]			**Fuel Use**
Equipment	**Size Estimate**	**Heat Duty (MMBTU/hr)**	**Residue (MMSCFD)**
Compressor Cylinder Oil Tank			
Inlet Meter System			
Residue Meter System			
FG Meter System			

NOTES:
1. All equipment sizes are approximate. Detailed engineering will need to be complete in order to determine exact sizing for all equipment.
2. Equipment has burner emissions.

Total Fuel Usage (MMSCFD)
1.76

APPENDIX B
Project Maps



Legend

- City
- Existing Road
- Bear Den Plant II Project Location
- 0.5-mile-wide Study Area
- Section Boundary
- Township/Range Boundary

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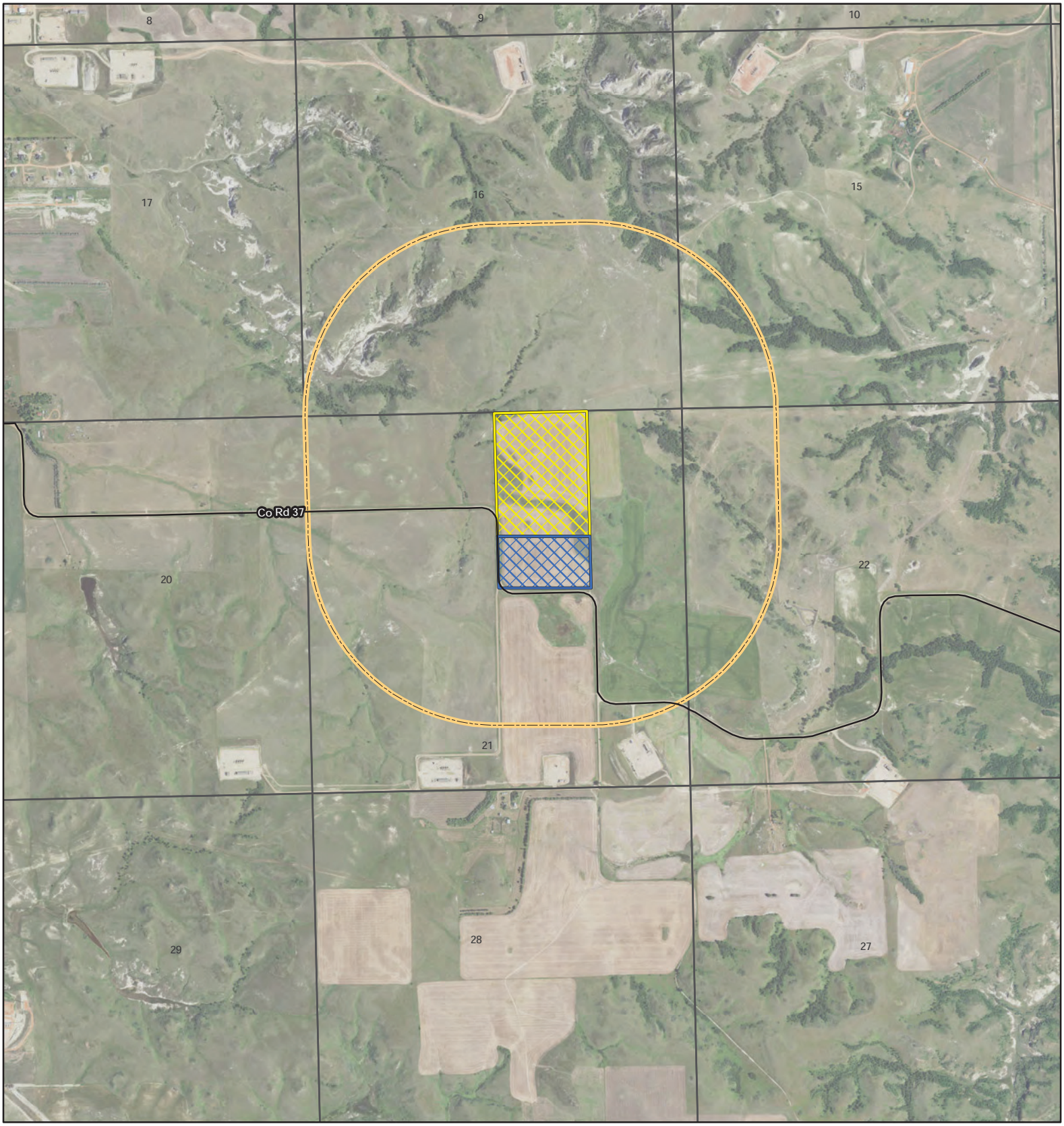
Kilometers
0 2.5 5

Miles
0 2 4

Base Map: 2016 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Lone Butte NW (1995)
T. 149N, R. 98W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S



Legend

- City
- Existing Road
- Bear Den Plant II Project Location
- Bear Den Plant I Project Location
- 0.5-mile-wide Study Area
- Section Boundary

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Kilometers
0 0.5 1

Miles
0 0.5 1

Base Map: 2016 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Lone Butte NW (1995)
T. 149N, R. 98W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N
W E
S

Legend

- Proposed Residue Gas and NGL Pipelines
- Existing Road
- Proposed 80-acre Gas Plant Location
- Soil Unit Boundary
- Pipeline Corridor
- Section Boundary

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Meters
0 100 200

Feet
0 400 800

Base Map: 2016 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Lone Butte NW (1995)

Township/Range: T. 149N, R. 98W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N
W E
S

SOIL MAP KEY

Soil Map Units	MUSYM	% Slope	Area within 80-acre Project Area (acres)	% of Total Area
Cabba-Chama-Sen silt loams	E2741D	9 to 15	23.80	29.75
Chama-Cabba-Sen silt loams	E2737C	6 to 9	20.67	25.83
Amor-Cabba loams	E2601C	6 to 9	17.93	22.41
Chama-Sen-Cabba silt loams	E2913B	3 to 6	10.27	12.84
Cabba-Chama-Shambo loams	E2617F	9 to 50	4.14	5.18
Golva silt loam	E2213B	2 to 6	3.19	3.99
Total			**80.00**	**100.00**

APPENDIX C
Natural Resources and Wetland/Waterbody Determination Report

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

Natural Resources and Wetland Delineation Report for the Arrow Bear Den Gas Processing Plant II, McKenzie County, North Dakota

Prepared for

Arrow Field Services, LLC

Prepared by

SWCA Environmental Consultants

October 2017

Natural Resources and Wetland Delineation Report for the Arrow Bear Den Gas Processing Plant II, McKenzie County, North Dakota

Prepared for

Arrow Field Services, LLC

Prepared by

Jason Bivens, B.S., Wildlife Biologist

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SWCA Project No. 40238.02

October 17, 2017

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1.0 INTRODUCTION

1.1 BACKGROUND

Arrow Field Services, LLC (Arrow) is proposing to construct and operate the Arrow Bear Den Gas Processing Plant II Project (Project) on privately owned lands in McKenzie County, North Dakota (the project). SWCA Environmental Consultants (SWCA) conducted natural resources field surveys to identify exclusion and avoidance areas as specified in North Dakota Administrative Code 69-06-08-02 for the proposed project.

On November 15 and 16, 2016, SWCA completed a field survey of a 200-foot-wide corridor for the proposed Bear Den West gathering pipeline through the eastern end of the gas plant parcel; however, 100% coverage of the gas plant parcel was not completed at that time because plans for the facility were not yet finalized. SWCA completed additional cultural and natural resource surveys on February 21, 2017 and on October 17, 2017 after gas plant plans were finalized.

SWCA completed field surveys to determine the potential presence and extent of wetlands and waterbodies, including those that are likely jurisdictional waters of the U.S. according to the U.S. Army Corps of Engineers (USACE) regulatory program. Concurrently with the wetland determinations, SWCA conducted a cursory threatened and endangered species survey and habitat assessment; a tree, sapling, and shrub enumeration survey; and a noxious weed survey. Site layout maps of the survey area and natural resource features identified during the field surveys are provided in Appendix A.

This report describes the methodology used by SWCA to complete each of the aforementioned surveys. Additionally, this report presents the results of the completed field surveys and provides regulatory recommendations to comply with the Clean Water Act of 1972 (33 United States Code [USC] 1251–1387). Lastly, this report ensures observance of and offers mitigation measures for resources protected by the Endangered Species Act of 1973 (ESA) (16 USC 1531-1544), Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703712), and Bald and Golden Eagle Protection Act of 1940 (BGEPA) (16 USC 668).

1.2 SURVEY AREA

Overall, northwest North Dakota is characterized by a moderate to cool climate, with cold, dry winters and mild to warm summers. Mean annual precipitation for the area is 14 to 16 inches. The project is located in the Northwestern Great Plains (Level III ecoregion) which is a semiarid rolling plain of shale and sandstone-derived soils punctuated by occasional buttes and badlands (U.S. Geological Survey [USGS] 2014).

The surveyed area for the project discussed herein (Figure 1) is situated on the Lone Butte NW (1995), North Dakota, 7.5-minute USGS quadrangle. The proposed gas plant is located on an 80-acre tract in the SW¼ NE¼ Section 27, Township 149 North, Range 98 West; McKenzie County, North Dakota. The gas plant parcel is bounded by a north-south-running section line

on the eastern boundary, County Road 37 on the west and south boundaries, and an overhead power line on the north boundary.

Figure 1. General topography within project area.

1.3 REGULATORY BACKGROUND

1.3.1 Clean Water Act, Section 404

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

1.3.2 USACE Nationwide Permit 12

Nationwide Permit (NWP) 12 authorizes the construction of utility line projects in non-tidal waters of the U.S., provided the activity does not result in the permanent loss of greater than 0.5 acre of waters of the U.S., including wetlands. In conjunction with NWP 12, Clean Water Act Section 401 certification is required for all Section 404 permits (i.e., NWP 12).

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

- The activity involves mechanized land clearing in a forested wetland.
- The utility line exceeds 500 feet in length through any single crossing of a water of the U.S.
- The utility line is placed within a jurisdictional area (i.e., water of the U.S.) and it runs parallel to a streambed that is within that jurisdictional area.
- Discharges result in the permanent loss of greater than 0.1 acre of waters of the U.S.

- Permanent access roads are constructed above grade in waters of the U.S. for a distance of more than 500 feet.
- Permanent access roads are constructed in waters of the U.S. with impervious materials.

1.3.3 USACE Regional Conditions

The USACE has published several regional conditions for projects operating under NWPs in North Dakota (USACE 2012). The regional conditions apply to wetlands classified as "fens," waters adjacent to natural springs, the Missouri River, historic properties, and fish-spawning areas.

1.3.4 Endangered Species Act

In the absence of a federal nexus (i.e., any action carried out, funded, or permitted by a federal agency), the ESA protects endangered and threatened species and their habitats by prohibiting the "take" of a listed animal, except as authorized by the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 10 of the ESA. The use of a Section 404 NWP will mean the project must meet NWP General Condition 18 on endangered species.

The lack of discovery of threatened or endangered species does not signify their non-existence within any particular area, but only that no primary or secondary indications of these species were recorded.

1.3.5 Migratory Bird Treaty Act

The MBTA provides that it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. Oil and gas developments are advised to consider this federal act when considering seasonal timing, best management practices, and pre-construction survey requirements.

1.3.6 Bald and Golden Eagle Protection Act

The BGEPA prohibits anyone, without a take permit issued by the Secretary of the Interior, from "take" of an eagle. This may include causing 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 sheltering behavior. Oil and gas developments in North Dakota are subject to compliance with the BGEPA, and should consider this federal act when planning spatial and temporal aspects of construction or other disruptive activities, best management practices, and pre-construction survey requirements.

2.0 METHODS

2.1 PRE-FIELD REVIEW

Prior to conducting field surveys, SWCA reviewed applicable National Wetlands Inventory (NWI) data (USFWS 2012a), National Hydrography Dataset (NHD) flowline data (USGS 2011), the threatened and endangered species list for McKenzie County (USFWS 2015a), as well as preliminary National Weather Service climatic data.

2.2 WETLANDS

NWI mapping for the region indicates there are no documented wetlands within the project area (USFWS 2012a). SWCA biologists conducted wetland delineations within the survey area based on the principles and guidelines provided in the *Corps of Engineers Wetlands Determination Manual* (Manual) (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Determination Manual: Great Plains Region Version 2.0* (Supplement) (USACE 2010). According to the Manual, an area is a wetland if three specific wetland indicators—hydrophytic vegetation, wetland hydrology, and hydric soils—are present, with certain exceptions. All wetlands and waterbodies geographically referenced within the survey area during field survey are depicted on the site layout maps in Appendix A.

2.3 WATERBODIES

The lateral extent of jurisdictional waterbodies (i.e., ponds, creeks, streams, lakes) was identified by the presence of an ordinary high water mark (OHWM), if present. Common identifiable indicators of an OHWM include physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas. The OHWM typically represents the potential limits of USACE jurisdiction, unless there is a wetland adjacent to the waterbody (USACE 2008). Please note that the USACE has full discretion in determining the jurisdictional status of referenced wetlands and waterbodies.

The NHD is a digital vector dataset referred to by SWCA biologists in the field to confirm or disprove the existence of features such as lakes, ponds, streams, rivers, canals, dams, and stream gages (USGS 2011). NHD flowlines are features that contain flow direction and form a network (USGS 2011). In the field, SWCA can confirm or disprove NHD flowlines based on the presence of streams, OHWMs, hydrophytic vegetation, wetland hydrology, and hydric soils. A desktop analysis is then performed to determine if the confirmed waterbodies show significant nexus to waters as described in Definition of Waters of the United States (Title 33 Code of Federal Regulations [CFR] Part 328.3 [a] [1]–[3]).

SWCA classified streams as perennial, intermittent, or ephemeral based on field observations. During a typical year, a perennial stream contains flowing water year-round and the water table is located above the streambed. Groundwater is the primary water source for stream flow while

precipitation runoff is supplemental. Additionally, the USGS topographic maps were used as reference.

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

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

2.4 TREE, SAPLING, AND SHRUB COUNT

SWCA ecologists determined the total number of trees, saplings, and shrubs present within the survey area by employing several different techniques depending on the type of woody vegetation habitat (i.e., forested upland, shrubland, or shelterbelt) encountered and the overall extent of each habitat within the project right-of-way (ROW). The boundaries of all forested upland, shrubland, and shelterbelt habitat were mapped using a Trimble GeoXT global positioning system (GPS) unit (Section 2.7). In forested upland and shrubland habitat, SWCA counted the number of all woody-stemmed vegetation with a diameter at breast height (DBH) of ≥1 inch. In shelterbelt areas, all woody-stemmed vegetation, regardless of DBH, was inventoried via direct count. Biologists taxonomically identified all recorded individuals to the species level within each habitat type.

2.5 NOXIOUS WEED SURVEYS

"Noxious weed" is a plant species designated at the state or county level. They generally are not native to a given area, spread rapidly, and have adverse ecological and economic impacts. Noxious weed species may have high reproduction rates and are usually adapted to occupy a diverse range of habitats otherwise occupied by native species. These species may subsequently out-compete native plant species for resources, causing a reduction in native plant populations. Noxious weed communities (both alive and residual) were identified and mapped during field surveys by visual inspection of the survey corridor.

2.6 WILDLIFE INCLUDING THREATENED AND ENDANGERED SPECIES

Prior to conducting field surveys, SWCA reviewed information obtained from the USFWS list of threatened and endangered species by North Dakota county (USFWS 2015a) regarding the presence of threatened or endangered species that may occur within the survey area. This document does not represent a comprehensive survey, but rather acknowledges the potential presence of listed species. Wildlife sightings can involve primary observations (i.e., actual sighting of an animal) or secondary observations (i.e., observation of scat, tracks, feathers, or fur deposits). SWCA completed surveys for suitable habitats that would have the potential to support any listed species. No occupancy or species-specific surveys were conducted.

A 0.5-mile line-of-sight binocular survey for raptor nests was conducted. SWCA noted all wildlife observed during the field survey.

2.7 MAPPING

The boundaries of each wetland, waterbody, and woody vegetation habitat were geographically recorded using a Trimble GeoXT GPS unit. The GPS unit is capable of recording geographic data with submeter accuracy. SWCA used Universal Transverse Mercator Zone 13 North as the projected coordinate system and North American Datum 1983 as the datum. ArcGIS v10.3 (ESRI Redlands, California) was used to analyze recorded features, calculate areas, and generate the maps provided in Appendix A. Please note that all data recorded using the GPS unit and displayed on the attached maps are for review purposes only and do not represent a professional civil survey.

3.0 RESULTS

3.1 VEGETATION

During the field survey, SWCA ecologists identified two general types of vegetative communities within the survey area. These vegetative communities were classified as herbaceous upland and cropland. Photographs of the survey area are provided in Appendix B.

3.1.1 Herbaceous Upland

The herbaceous upland community identified in the survey area was dominated by non-woody vegetation such as grasses and forbs. The dominant herbaceous community within the proposed pipeline survey area includes native and non-native grasses and forbs such as Kentucky bluegrass (*Poa pratensis*), smooth brome (*Bromus inermis*), and crested wheatgrass (*Agropyron cristatum*).

3.1.2 Cropland

The cropland identified in the survey area was planted with small grains. Common crops in the area include common wheat (*Triticum aestivum*), durum wheat (*Triticum durum*), canola (*Brassica napus*), oats (*Avena sativa*), and barley (*Hordeum vulgare*) (U.S. Department of Agriculture 2006).

3.2 HYDROLOGY

There were no primary or secondary indicators of wetland hydrology, as defined by the Manual and Supplement, observed during surveys of the gas plant.

3.3 WETLANDS

SWCA did not identify any wetlands within the project area. Further, there are no NWI-mapped wetlands located within the project area.

3.4 WATERBODIES

SWCA did not identify any non-wetland waterbodies (streams, rivers, lakes, etc.) in the survey area. Additionally, there are no NHD flowlines present within the project area.

3.5 SOILS

Based on Natural Resources Conservation Service (NRCS) mapping (NRCS 2016), 18 soil map units are present in the project corridor. The project area analyzed for soils covers the 200-foot-wide survey corridor. All soil map units within the survey area are listed in Table 1.

Table 1. Soil Map Units Present within the Survey Area

Soil Map Units	MUSYM	% Slope	Area within 80-acre Project Area (acres)	% of Total Area
Cabba-Chama-Sen silt loams	E2741D	9 to 15	23.80	29.75
Chama-Cabba-Sen silt loams	E2737C	6 to 9	20.67	25.83
Amor-Cabba loams	E2601C	6 to 9	17.93	22.41
Chama-Sen-Cabba silt loams	E2913B	3 to 6	10.27	12.84
Cabba-Chama-Shambo loams	E2617F	9 to 50	4.14	5.18
Golva silt loam	E2213B	2 to 6	3.19	3.99
Total			**80.00**	**100.00**

MUSYM: Map Unit Symbol
Source: NRCS 2016

The soil series that are most prevalent within the survey area are described in Sections 3.5.1 through 3.5.5 (NRCS 2016).

3.5.1 Caba

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2% and 70%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem (*Schizachyrium scoparium*), green needlegrass (*Nasella viridula*), and other various herbs, forbs, and shrub species (NRCS 2016).

3.5.2 Chama

The Chama soil series consists of well-drained soils found in materials weathered from soft siltstone, mudstone, and shale on uplands. These soils are reasonably deep to soft siltstone, mudstone, or shale. These soils are moderately or moderately slowly permeable. The slope ranges from 0% to 45%. The mean annual precipitation found throughout the spatial extent of this soil type is 15 inches and the mean annual air temperature is 42°F. Soils are cropped to small grains, which are mostly wheat, where a significant acreage is in rangeland. The native vegetation is principally western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), and blue grama (*Bouteloua gracilis*) (NRCS 2016).

3.5.3 Sen

The Sen series consists of well-drained, moderately permeable soils that formed in calcareous siltstone or shale. They are moderately deep to soft bedrock. These soils are on upland plains and have slopes of 0% to 25%. The mean annual precipitation found throughout the spatial extent of this soil type is 15 inches and the mean annual air temperature is 42°F**.** Soils are cropped to small grains in a crop-summer fallow rotation. Native vegetation is middle and short prairie grasses such as green needlegrass, needle and thread, western wheatgrass, blue grama, and a variety of forbs (NRCS 2016).

3.5.4 Amor

The Amor series consists of moderately deep, well-drained, moderately permeable soils found on sandstone bedrock uplands with slopes ranging from approximately 0% to 25%. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil type is largely used for cultivation of small grains, flax, and corn. Native vegetation species common to this soil type include needle and thread, western wheatgrass, and blue grama (NRCS 2016).

3.6 TREE, SAPLING, AND SHRUB COUNT

During SWCA's field survey, four tree and shrubland areas were geographically referenced within the survey area. All four sample points (WV1 – WV4) are located on the northwestern periphery of the survey area. Species, type (planted or natural), and counts are summarized in Table 2 (see sample points locations on Appendix A figures). In the event trees are removed during construction, the NDPSC requires a 2:1 post- to pre-construction mitigation for all trees, saplings, and shrubs impacted. SWCA estimates zero trees will be impacted during construction; therefore, no mitigation will be required.

Table 2. Tree, Sapling, and Shrub Count

Woody Vegetation (WV) ID	Species	Type	Number of Trees		Estimated Mitigation Commitment
			Survey Area	Gas Plant Construction ROW	
WV1	Green ash (*Fraxinus pennsylvanica*)	Natural	4	0	0
WV2	Silver buffalo berry (*Shepherdia argentia*)	Natural	2	0	0
WV2	Green ash	Natural	263	0	
WV3	Green ash	Natural	10	0	0
WV4	Chokecherry (*Prunus virginiana)*	Natural	60	0	0
Total			**339**	**0**	**0**

3.7 NOXIOUS WEEDS

SWCA did not identify any occurrences of state-listed or county-listed noxious weeds within the project area. Surveys were conducted outside of the growing season, however residual plant matter would have likely been observed if noxious weed communities were present. Arrow will monitor and control noxious weeds within their ROW prior to and subsequent to construction.

3.8 WILDLIFE

Nine wildlife species listed as threatened or endangered under the ESA have potential to occur in McKenzie County (USFWS 2015a), The listed endangered species include the gray wolf (*Canis lupus*), black-footed ferret (*Mustela nigripes*), whooping crane (*Grus americana*), interior least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*). The listed threatened species include the piping plover (*Charadrius melodus*) and its designated critical habitat, Dakota skipper (*Hesperia dacotae*) and its designated critical habitat, rufa red knot (*Calidris canutus rufa*), and northern long-eared bat (*Myotis septentrionalis*).

SWCA conducted a threatened and endangered species suitable habitat survey concurrently with the wetland determinations. SWCA did not observe any primary (i.e., actual sighting) or secondary (i.e., tracks, scat, feather, or fur) indication of the presence of threatened or endangered species. However, the lack of discovery of threatened or endangered species does not signify their non-existence within the area, but only that no primary or secondary indications of these species were recorded.

3.8.1 Gray Wolf

Federal Status: Endangered

The gray wolf, listed as endangered in the United States in 1978, was believed extirpated from North Dakota in the 1920s and 1930s, with only sporadic reports from the 1930s to the present (Licht and Huffman 1996; USFWS 1978). The presence of wolves in most of North Dakota consists of occasional dispersing animals from Minnesota and Manitoba (Licht and Fritts 1994; Licht and Huffman 1996). Most documented gray wolf sightings within western North Dakota are believed to be young males seeking to establish territory (Hagen et al. 2005). The Turtle Mountain region of north-central North Dakota provides marginal habitat that may be able to support a very small population of wolves. The closest known pack of wolves is the Minnesota population located approximately 17 miles from the northeast corner of North Dakota.

The gray wolf uses a variety of habitats that support a large prey base, including montane and low-elevation forests, grasslands, and desert scrub (USFWS 2013a). Due to a lack of forested habitat and the distance from Minnesota and Manitoba populations, as well as the troubled relationship between humans and wolves and their vulnerability to being shot in open habitats (Licht and Huffman 1996), the re-establishment of gray wolf populations in North Dakota is unlikely. Additionally, habitat fragmentation may further act as a barrier against wolf recolonization in western North Dakota. The gray wolf is not expected to be impacted by the proposed project.

3.8.2 Black-footed Ferret

Federal Status: Endangered

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the USFWS as endangered since 1967, and have been the object of extensive reintroduction programs (USFWS 2013b). Ferrets inhabit extensive prairie dog complexes of the Great Plains, typically composed of several smaller colonies in proximity to one another that provide a sustainable prey base. The *Black-footed Ferret Survey Guidelines for Compliance with the Endangered Species Act* (USFWS 1989) states that ferrets require black-tailed prairie dog (*Cynomys ludovicianus*) towns or complexes greater than 80 acres in size, and towns of this dimension may be important for ferret recovery efforts (USFWS 1988a). Prairie dog towns of this size were not observed during the field survey. Therefore, the black-footed ferret is not expected to be impacted by the proposed project.

3.8.3 Whooping Crane

Federal Status: Endangered

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

The winter 2015–2016 total wild population of the Wood Buffalo-Aransas population was estimated at 329 birds (USFWS 2016a). There is only one self-sustaining wild population, the Aransas-Wood Buffalo National Park population, which nests in Wood Buffalo National Park and adjacent areas in Canada, where approximately 83% of the wild nesting sites occur (Canadian Wildlife Service and USFWS 2007; USFWS 2013c). McKenzie County, including the project area, is within the primary migratory flyway of whooping cranes.

Whooping cranes probe the soil subsurface with their bills for foods on the soil or vegetation substrate (Canadian Wildlife Service and USFWS 2007). Whooping cranes are omnivores and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. The largest amount of time during migration is spent feeding in harvested grain fields (Canadian Wildlife Service and USFWS 2007). Studies indicate that whooping cranes use a variety of habitats during migration, in addition to cultivated croplands, and generally roost in small palustrine (marshy) wetlands within 0.62 mile of suitable feeding areas (Howe 1987, 1989). Whooping cranes have been recorded in riverine habitats during their migration, with eight sightings along the Missouri River in North Dakota (Canadian Wildlife Service and USFWS 2007:18). In these cases, they roost on submerged sandbars in wide, unobstructed channels that are isolated from human disturbance (Armbruster 1990).

It is well-documented that migrating whooping cranes use habitats in the vicinity of the project for roosting and feeding. The project area is located within the migratory corridor for the

whooping crane, with the nearest sighting being approximately 13.31 miles west from the pipeline corridor (M. Tacha, USFWS, unpublished data). Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed within the survey area; however, high levels of disturbance near the project area from existing roads, agriculture production, oil and gas activity, etc., minimize the likelihood of cranes using the area within or near the project corridor. The whooping crane is not expected to be impacted by the proposed project.

3.8.4 Interior Least Tern

Federal Status: Endangered

The interior population of the least tern is listed as endangered by the USFWS (1985a). This bird is the smallest member of the gull and tern family, measuring approximately 9 inches in length. Terns remain near flowing water, where they feed by hovering over and diving into standing or flowing water to catch small fish (USFWS 2013d).

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, and Red River and Rio Grande systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and in bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults continue to care for chicks after they hatch. Least terns in North Dakota often will be found sharing sandbars with the piping plover, a threatened species (USFWS 2013d).

Census data indicate over 8,000 least terns are in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea (USFWS 1990a, 2013d). Approximately 100 pairs breed in North Dakota (USFWS 2013d). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2013d).

Loss of suitable breeding and nesting habitat for terns has resulted from dam construction and river channelization on major rivers throughout the Mississippi, Missouri, and Rio Grande river systems. River and reservoir changes have led to reduced sandbar formation and other shoreline habitats for breeding, resulting in population declines. In addition, other human shoreline disturbances affect the species (USFWS 1990a). Critical habitat has not been designated for the species (USFWS 2013d). Current conservation strategies include identification and avoidance of known nesting areas, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 2013d).

Given the distance to suitable habitat, the likelihood of observing a tern in the project area is relatively low. The interior least tern is not expected to be impacted by the proposed project.

3.8.5 Pallid Sturgeon

Federal Status: Endangered

The pallid sturgeon was listed as endangered in 1990 in the United States by the USFWS (1990b). The primary factor leading to the decline of this species is the alteration of habitat

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

Pallid sturgeon populations occur in the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up to the confluence of the Tongue River in Montana (USFWS 2007). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007). Hatchery-reared sturgeon also have been stocked since 1998. The pallid sturgeon has been found to use the 15.5 miles of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996, as cited in USFWS 2007). Larval pallid sturgeons also have been found to drift into Lake Sakakawea. Although the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, the North Dakota Game and Fish Department has caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook areas. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, USFWS, to SWCA, September 3, 2010).

Desktop analysis concluded that suitable habitat is not present in the project ROW corridor. Activities associated with the project area are not anticipated to adversely affect water quality and thus the pallid sturgeon. The pallid sturgeon is not expected to be impacted by the proposed project.

3.8.6 Piping Plover

Federal Status: Threatened

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

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2012b). The shorelines of lakes of the Missouri River constitute significant nesting areas for the bird. Piping plovers nest on the ground, making shallow scrapes in the sand, which they line with small pebbles or rocks (USFWS 1988b). Anthropogenic alterations of the landscape along rivers and lakes where piping plover nest have increased the number and type of predators, subsequently decreasing nest success and chick survival (USFWS 2002, 2012b). The birds fly south by mid to late August to areas along the Texas coast and Mexico (USFWS 2002). The Northern Great Plains population has continued to decline despite federal listing, with population estimates of 1,500 breeding pairs in 1985 reduced to fewer than 1,100 in 1990. Low survival of adult birds has been identified as a factor (Root et

al. 1992). Current conservation strategies include identification and preservation of known nesting sites, public education, and limiting or preventing shoreline disturbances near nests and hatched chicks (USFWS 1988b, 2012b).

The lack of alkali wetlands and distance to critical habitat mean the likelihood of a piping plover occurring is relatively low. The piping plover is not expected to be impacted by the proposed project.

3.8.7 Designated Critical Habitat of Piping Plover

The USFWS has designated critical habitat for the Great Lakes and Northern Great Plains populations of piping plover (USFWS 2002). Designated critical habitat for the piping plover includes 183,422 acres and 1,207.5 river miles of habitat including 354.6 river miles of the Missouri River (ND Unit 11) that flows from the Montana–North Dakota border to the North Dakota–South Dakota border (USFWS 2002). Additionally, North Dakota contains 10 units (ND Units 1–10) of designated critical habitat, which consist primarily of alkaline lakes and wetlands located north and northeast of ND Unit 11 (USFWS 2002).

Desktop analysis concluded that designated critical habitat for the threatened piping plover is not present in the project ROW. The nearest designated critical habitat for piping plovers is approximately 21.27 miles northwest of the proposed project. The proposed project would not modify, alter, disturb, or affect the shoreline within ND Unit 11 or the alkaline lakes and wetlands within ND Units 1 through 10. Designated critical habitat of the piping plover is not expected to be impacted by the proposed project.

3.8.8 Dakota Skipper

Federal Status: Threatened

The Dakota skipper is a small butterfly with a 1-inch wingspan. The male wing ranges from a tawny-orange to brown and the female wing is darker brown with tawny-orange spots and faint white spots (USFWS 2011). On October 24, 2014, the USFWS determined a threatened species status for the Dakota skipper, and the final rule became effective November 24, 2014 (USFWS 2014). Two units of designated critical habitat—Unit 11 (McKenzie Pasture 11 East) and Unit 12 (McKenzie Pasture 12 West)—are located on the Little Missouri National Grassland, in McKenzie County.

The primary cause for the decline of this species is the loss of high-quality native prairie habitat due to overgrazing, conversion to agriculture, and disruption of natural prairie fire cycles (USFWS 2011). “Type A” habitat is low wet-mesic prairie with little topographic relief occurring in near-shore glacial lake deposits (Royer and Marrone 1992). Three plants species dominate “Type A” habitat: wood lily (*Lilium philadelphicum*), bluebell bellflower (*Campanula rotundifolia*), and mountain deathcamas (*Zigadenus elegans*) (McCabe 1981). “Type B” habitat of the Dakota skipper occurs on rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem (*Andropogon gerardii*), little bluestem, and needlegrasses (*Stipa* spp.), and may include bluebell bellflower and wood lily (USFWS 2015d). Additionally, “Type B” habitat supports extensive stands of purple coneflower (*Echinacea*

angustifolia), upright prairie coneflower (*Ratibida columnifera*), and common gaillardia (*Gaillardia artistata*) (USFWS 2015b).

During the surveys, non-native grasslands and cropland were dominant in the project area. Dominant species recorded during surveys included Kentucky bluegrass, smooth brome, and crested wheatgrass.

Dakota skippers are not known to occur in the project area. Adult Dakota skipper dispersal is limited due to a short adult life span of 3 weeks (Dana 1991) and one annual flight per year (USFWS 2015b). The Dakota skipper may disperse an average of 0.62 mile to an area that contains sufficient vegetative diversity and emigrants (Cochrane and Delphey 2002). Unless a site is within about 0.62 mile of an area that generates a sufficient number of emigrants, the species' extirpation from the site is likely permanent.

Larval Dakota skipper habitat within dry-mesic habitat is associated with more gravelly glacial landscapes of relatively higher relief, more variable soil moisture, and somewhat higher soil temperatures (Royer et al. 2008). Soils in these habitats are classified predominantly as sandy loams, and occasionally as loamy sands (Royer et al. 2008). Soil compaction and vegetation removal substantially alter soil water movement and evaporation, thereby altering near-surface humidity (Royer et al. 2008). Livestock grazing has been shown to increase bulk density and soil compaction, which are correlated with decreased soil water content and hydraulic conductivity (Royer et al. 2008). Dakota skippers will tolerate little to no grazing in mixed-grass prairie (Cochrane and Delphey 2002; McCabe 1981).

The Eagle Nest Butte site is the nearest known occupied site and is 23.16 miles east of the project area, and the nearest designated critical habitat unit, Unit 12, is located 28.11 miles north of the project area. Because of the lack of suitable habitat and the distance to the nearest known population, the Dakota skipper is not expected to be impacted by the proposed project.

3.8.9 Designated Critical Habitat of Dakota Skipper

The USFWS has designated critical habitat for the Dakota skipper and Poweshiek skipperling (*Oarisma poweshiek*) (USFWS 2016b). Designated critical habitat for the Dakota skipper includes 19,900 acres in 38 units in Minnesota, North Dakota, and South Dakota, including Units 11 and 12 which are located in McKenzie County approximately 30.55 miles and 28.11 miles north of the project area, respectively.

The proposed project would not modify, alter, disturb, or affect critical habitat Units 11 or 12. Therefore, designated critical habitat of the Dakota skipper is not expected to be impacted by the proposed project.

3.8.10 Rufa Red Knot

Federal Status: Threatened

The rufa red knot is a medium-sized shorebird approximately 9 to 11 inches in height with breeding plumage consisting of red around the face and a prominent stripe above the eye, breast, and upper belly, and non-breeding plumage a dusky gray and white (USFWS 2013e). The

USFWS published a proposal to list the rufa red knot as threatened under the ESA in the *Federal Register* in September 2013 (USFWS 2013f). On December 11, 2014, the USFWS determined a threatened species status for the rufa red knot, and the final rule became effective January 12, 2015 (79 *Federal Register* 73705).

The primary reason for the decline of this species is reduced food supplies in Delaware Bay due to commercial harvest of horseshoe crabs, but secondary reasons include areas of range loss due to rising sea levels, shorelines projects, and development (USFWS 2013e). The rufa red knot breeds in the Canadian Arctic and migrates 19,000 miles to winter on the U.S. Gulf Coast and in South America. The species generally occurs along the ocean coasts during migration, but a small number have been reported across the interior United States.

Suitable habitat along Lake Sakakawea is approximately 21.27 miles northwest of the project area. The likelihood of the rufa red knot occurring in the proposed project ROW is very low due to the distance to Lake Sakakawea. The rufa red knot is not expected to be impacted by the proposed project.

3.8.11 Northern Long-eared Bat

Federal Status: Threatened
On May 4, 2015, the USFWS listed the northern-long eared bat as threatened under the ESA (USFWS 2015c). The USFWS also issued an interim rule pursuant to Section 4(d) of the ESA in conjunction with the final rule (50 CFR Part 17). For areas within the species' range that are not affected by white-nose syndrome (i.e., areas outside the 150-mile white-nose syndrome buffer zone), including all of North Dakota, the interim 4(d) rule exempts incidental take from certain activities.

This medium-sized bat ranges across the eastern and north-central United States and all of the Canadian provinces (USFWS 2015d). Throughout most of this species' range, populations are patchily distributed. They emerge at dusk to fly through the understory of forested hillsides and ridges, feeding on moths, flies, leafhoppers, caddisflies, and beetles.

Most records of northern long-eared bats are from winter hibernacula surveys, with more than 780 hibernacula identified within the United States. No known hibernacula are located in North Dakota, due to either no suitable hibernacula being present or a lack of survey effort (USFWS 2013g). This bat species occupies a wide range of rocky and forested habitats. Suitable winter habitat includes large caves and mines (USFWS 2015d). Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, under loose bark, and rock fissures (Jones and Choate 1978). The summer roosting period is from May through October. Removal of any potential roost trees may impact the northern long-eared bat.

Suitable winter habitat for northern long-eared bats does not occur in the project ROW. Nearby trees and rocky outcrops can act as suitable summer day roosts. Suitable habitat in the project area does not occur and the 4(d) rule exempts incidental take for the proposed project; therefore, the northern long-eared bat is not expected to be impacted by the proposed project.

3.8.12 Wildlife Observed

During the field survey, SWCA observed various wildlife species within the survey area (Table 3). Common wildlife species may be affected both directly via death or injury from construction activities or indirectly through the temporary fragmentation of habitat as a result of construction activities and disturbance which may disrupt normal activities such as breeding, feeding, and sheltering.

Table 3. Wildlife Observed during Field Surveys of the Proposed Project

Common Name	Scientific Name
Ring-necked pheasant	*Phasianus colchicus*
Mourning dove	*Zenaida macroura*
Mule deer	*Odocoileus hemionus*
Hungarian partridge	*Perdix perdix*
Sharp-tailed grouse	*Tympanuchus phasianellus*

3.8.13 Migratory Birds

Status: Protected under the MBTA

Marginally suitable habitat for migratory birds exists in the entire project ROW. Specifically, ground nesting birds have the potential to occur, feed, and nest in the project area, especially during the migratory bird breeding season, which generally occurs between February 1 and July 15. All take of migratory birds, their parts, or their active nests, including eggs and young, must be avoided to prevent a violation of the MBTA.

3.8.14 Bald Eagle

Federal Status: Delisted in 2007; protected under the MBTA and the BGEPA

The bald eagle (*Haliaeetus leucocephalus*) feeds on fish and carrion and typically roosts in large trees near a water source. Bald eagle nesting habitat is typically any mature stands of conifer (Pinophyta) or cottonwood (*Populus* sp.) trees in association with rivers, streams, reservoirs, lakes, or any significant body of water. Bald eagles in North Dakota are usually observed along the Missouri River (North Dakota Game and Fish Department 2015a) and Yellowstone River. Bald eagles frequently migrate through the grassland habitats. No bald eagles or nests were observed during the field surveys and the nearest known bald eagle nest is approximately 10.46 miles east of the project ROW (North Dakota Game and Fish Department 2015b). The USFWS generally recommends a buffer of 0.5 mile from any eagle nest. If any active nests are discovered within 0.5 mile of the project ROW, construction should halt and the USFWS should be contacted for further direction. If these recommendations are followed, bald eagles are not expected to be impacted by the proposed project.

3.8.15 Golden Eagle

Federal Status: Unlisted; protected under the MBTA and the BGEPA

The golden eagle (*Aquila chrysaetos*) prefers habitat characterized by open prairie, plains, and forested areas. Usually, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. Golden eagles may occur within or near the survey area; however, no

golden eagles or nests were observed during the field surveys. The USFWS generally recommends a buffer of 0.5 mile from any eagle nest. If any active nests are discovered within 0.5 mile of the project ROW, construction should halt and the USFWS should be contacted for further direction. If these recommendations are followed, golden eagles are not expected to be impacted by the proposed project.

4.0 CONCLUSIONS AND RECOMMENDATIONS

1. SWCA did not record any wetlands or waterbodies within the survey area.
2. SWCA did not record any tree, sapling, or shrub individuals that may be impacted by construction activities. WV1 - WV4 are located on the northern edge of the survey corridor and would not be impacted by construction.
3. No threatened or endangered species or habitat were observed during the field survey.

   The following threatened and endangered species are listed in McKenzie County: gray wolf, black-footed ferret, whooping crane, interior least tern, pallid sturgeon, piping plover and its critical habitat, Dakota skipper and its critical habitat, rufa red knot, and northern long-eared bat; however, these species are not likely to be impacted by construction of the proposed project.
4. No active raptor nests were observed within 0.5 mile of the project area. No bald or golden eagle nests were observed. No impacts to eagles are anticipated.

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APPENDIX A
Vicinity Site Layout and Soil Maps

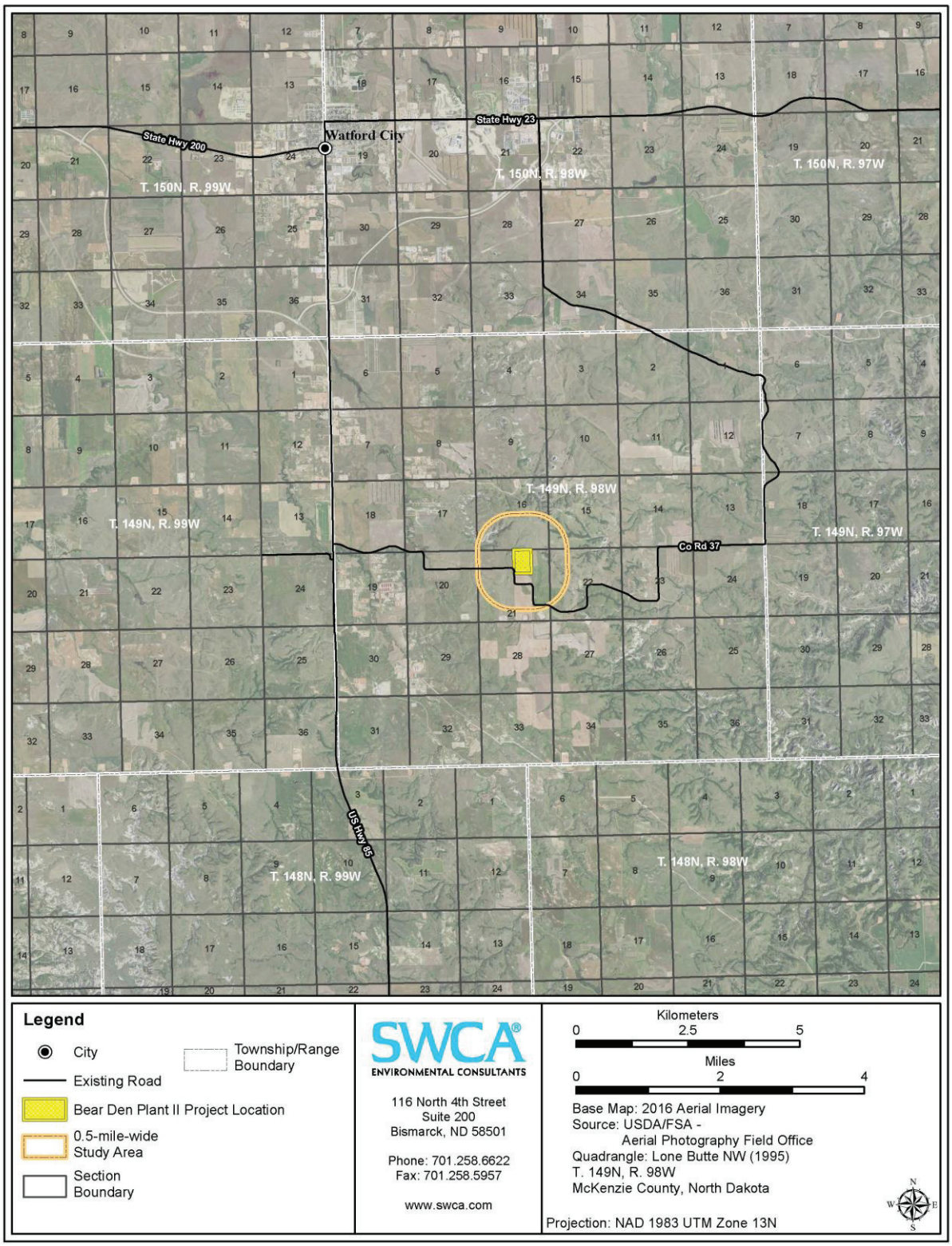

Figure A1. General location of the Arrow Bear Den Gas Processing Plant II, McKenzie County, North Dakota.

Figure A2. Arrow Bear Den Gas Processing Plant II, McKenzie County, North Dakota.

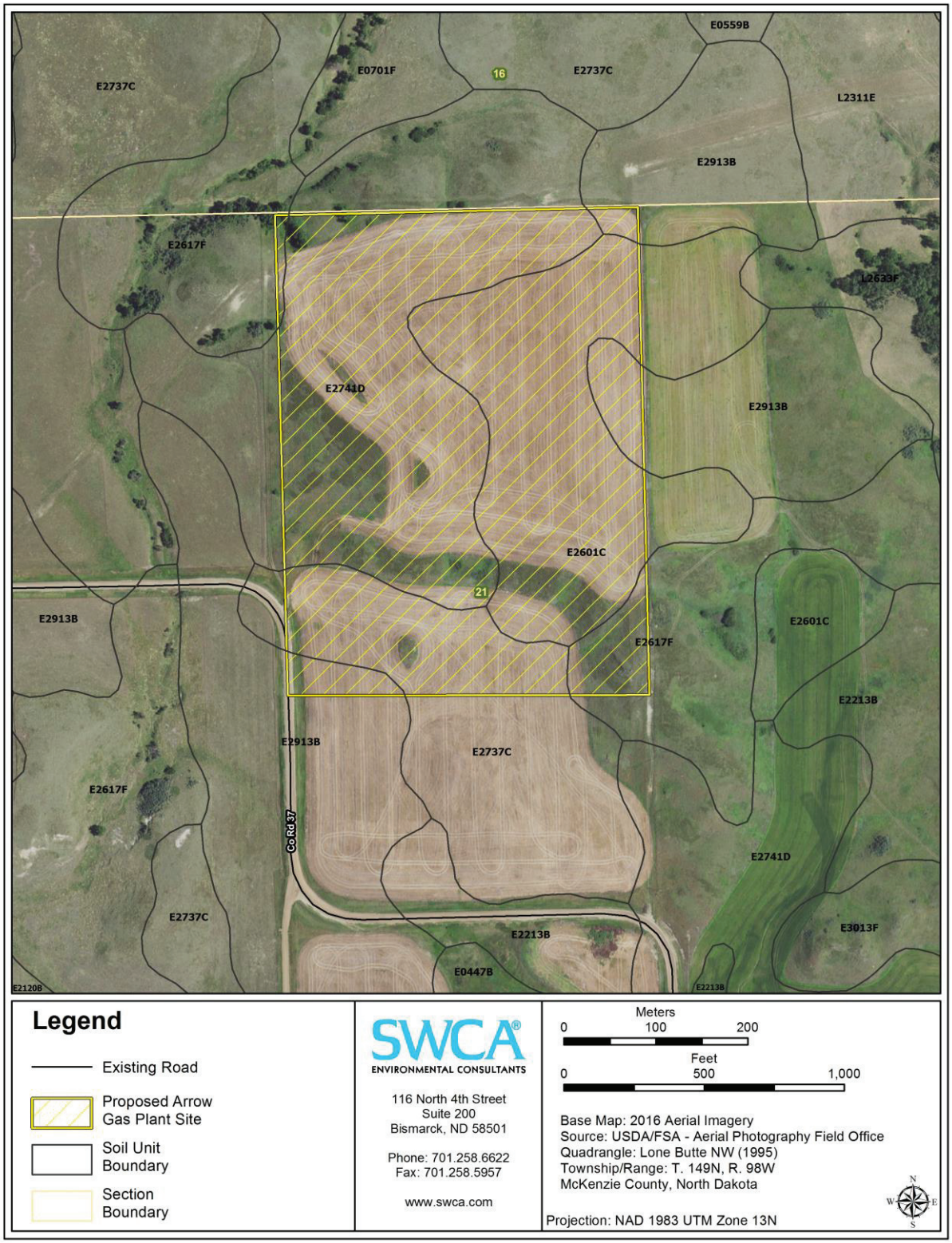

Figure A3. Soils - Arrow Bear Den Gas Processing Plant II, McKenzie County, North Dakota.

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APPENDIX B
Photographs of Project Area

Figure B1. South Overview, facing northeast (photograph taken March 22, 2017).

Figure B2. North Overview, facing southeast (photograph taken March 23, 2017).

Figure B3. Middle overview, facing southeast (photograph taken March 22, 2017).

Figure B4. Middle overview, facing northwest (photograph taken March 23, 2017).

APPENDIX D
Cultural Resources Report

APPENDIX E
Agency Correspondence

SWCA®
ENVIRONMENTAL CONSULTANTS
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Bismarck Office
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
Tel 701.258.6622 Fax 701.258.5957
www.swca.com

July 27, 2017

{Name}
{Agency}
{Address}
{City, State, Zip}

RE: Arrow Field Services, LLC – Natural Gas Processing Plant
McKenzie County North Dakota
{Agency}

Dear {Name}:

Arrow Field Services, LLC (Arrow) is proposing the Natural Gas Processing Plant project (Project) that will consist of a processing plant to remove natural gas liquids (NGLs) from an influent natural gas stream, with subsequent transmission of the residue gas and NGLs through pipelines permitted under North Dakota Public Service Commission Certificate of Corridor Compatibility No. 199 and Route Permit No. 210, as well as a proposed NGL pipeline that will be permitted separately. The natural gas plant processing capacity will be up to 200 million cubic feet per day (MMCFPD), which makes the plant an Energy Conversion Facility, as defined in North Dakota Century Code Chapter 49.22.03.5.c. The Project is located approximately 7.5 miles southeast of Watford City, in the W½NE¼ of Section 21, Township 149 North, Range 98 West, McKenzie County, North Dakota, as shown on the enclosed Project Location Map. The Project analysis area is a 1/2 – mile corridor around the Project site that encompasses the following legal locations in McKenzie County, North Dakota:

- Sections 15, 16, 21, and 22, Township 149 North, Range 98 West

The Project is scheduled to begin construction in the spring of 2018.

SWCA Environmental Consultants is notifying the {Agency} of the proposed project and offering the opportunity for comments. Information received from the {Agency} will be used in a North Dakota Public Service Commission application being prepared for the Project.

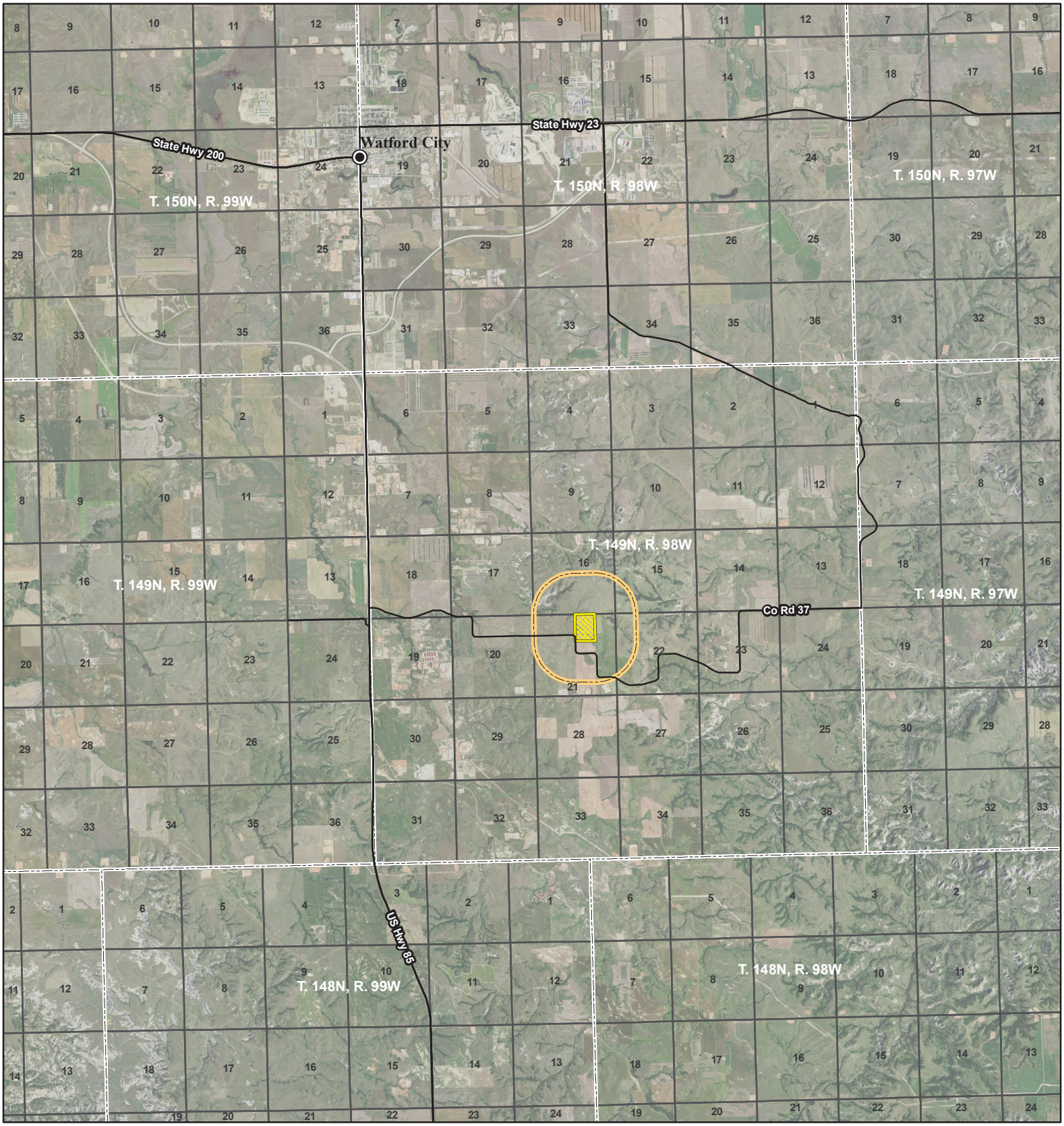
Please send your replies and/or requests for additional project information to:

James W. Dawson, Senior Project Manager
SWCA Environmental Consultants 116
North 4th Street, Suite 200 Bismarck,
North Dakota 58501 (701) 258-6622
jdawson@swca.com

Sincerely,

James W. Dawson

Enclosure: Project Location Map



Legend

- City
- Existing Road
- Bear Den Plant II Project Location
- 0.5-mile-wide Study Area
- Section Boundary
- Township/Range Boundary

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Kilometers
0 2.5 5

Miles
0 2 4

Base Map: 2016 Aerial Imagery
Source: USDA/FSA - Aerial Photography Field Office
Quadrangle: Lone Butte NW (1995)
T. 149N, R. 98W
McKenzie County, North Dakota

Projection: NAD 1983 UTM Zone 13N

N W E S

CONSULTATION LETTER AGENCIES				
NAME	**TITLE**	**COMPANY**	**ADDRESS 1**	**CITY, STATE ZIP**
Kyle C. Wanner	Director	North Dakota Aeronautics Commission	PO Box 5020	Bismarck, ND 58502
Wayne Stenehjem	ND Attorney General	State Capitol	600 East Boulevard Avenue, Dept 125	Bismarck, ND 58505
Mr. Doug Goehring	Agriculture Commissioner	North Dakota Department of Agriculture	600 E. Boulevard Avenue, Dept 602	Bismarck, ND 58505
Mr. David Glatt		North Dakota Department of Health	918 Divide Avenue, 4th Floor	Bismarck, ND 58501
Maggie D. Anderson	Executive Director	North Dakota Department of Human Services	600 East Boulevard Avenue, Dept 325	Bismarck, ND 58505-0250
Troy T. Seibel	Commissioner of Labor	North Dakota Department of Labor	600 East Boulevard Avenue, Dept 406	Bismarck, ND 58505-0340
Wayne Kutzer	State Director and Executive Officer	North Dakota Department of Career and Technical Education	600 East Boulevard Avenue, Dept. 270	Bismarck, ND 58505-0610
Al Anderson	Commissioner	North Dakota Department of Commerce	1600 E. Century Ave., Suite 2	Bismarck, ND 58503
Gerry Fisher	Director	North Dakota Energy Infrastructure and Impact Office	1707 North 9th Street	Bismarck, ND 58506-5523
Mr. Greg Link		North Dakota Game & Fish Department, Conservation and Communication Division	100 N. Bismarck Expressway	Bismarck, ND 58501
Lynn Helms	Director	NDIC Oil and Gas Division	600 East Boulevard Avenue, Dept 405	Bismarck, ND 58505-0840
Jack Dalrymple	Governor	State Capitol 14th Floor	600 East Boulevard Avenue, Dept 405	Bismarck, ND 58505-0840
Grant Levi	Director	North Dakota Department of Transportation	608 East Boulevard Avenue	Bismarck, ND 58505-0700
Ms. Claudia J. Berg	Director	State Historical Society of North Dakota, North Dakota Heritage Center	612 East Boulevard Avenue	Bismarck, ND 58505-0830
Scott Davis	Executive Director	North Dakota Indian Affairs Commission	600 East Boulevard Avenue	Bismarck, ND 58505-0300
Cheri Giesen,	Executive Director	Job Service North Dakota	PO Box 5507	Bismarck, ND 58506-5507
Mr. Keith Bayley		North Dakota State Trust Lands Department	1707 North 9th Street	Bismarck, ND 58506-5523
Ms. Kathy Duttenhefner		North Dakota Parks and Recreation Department	1600 East Century Avenue, Suite 3	Bismarck, ND 58503
Mr. Scott Hochhalter	State Soil Specialist	NDSU Extension Service, North Dakota State Soil Conservation Committee	2718 Gateway Avenue, Suite 104	Bismarck, ND 58503
Mr. Jared J. Huibregtse	Water Resource Planner IV	North Dakota State Water Commission	900 East Boulevard Avenue	Bismarck, ND 58505
U.S. Department of Defense		U.S. Department of Defense Minot AFB		
Mr. Kevin Shelley	N. Dakota State Supervisor	U.S. Fish and Wildlife Service	3425 Miriam Avenue	Bismarck, ND 58501
U.S. Army Corps of Engineers		U.S. Army Corps of Engineers North Dakota Regulatory Office	1513 South 12th Street	Bismarck, ND 58504
Laurie Suttmeier	Manager, Bismark Airports District Office (ADO)	U.S Federal Aviation Administration	2301 University Drive	Bismarck, ND 58504
Richard Cayko	Chairman	McKenzie County Board of County Commissioners	201 5th St NW, Suite 543	Watford City, ND 58854
	County Auditor	McKenzie County Board of County Commissioners	201 5th St NW, Suite 543	Watford City, ND 58854
Sandi Tabor	Director	North Dakota Transmission Authority	600 E Boulevard Ave. Dept. 405	Bismarck, ND 58505-0840
Justin Kringstad		North Dakota Pipeline Authority	600 E. Boulevard Ave. Dept. 405	Bismarck, ND 58505-0840
Jeff Shaffer	Director	McKenzie County Water Resource District	201 5th St NW, Suite 1456	Watford City, ND 58854
Ms. Amber Higgins	Weed Control Officer	McKenzie County Weed Control	201 5th St NW, Suite 543	Watford City, ND 58854
Jim Talbert	Director	McKenzie County Planning and Zoning Department	201 5th St NW, Suite 699	Watford City, ND 58854
Mr. Nick Chevance	Environmental Planner	U.S. National Park Service	601 Riverfront Drive	Omaha, NE 68102
Mr. Kelly McPhillips		U.S. Bureau of Reclamation, Great Plains Region	P.O. Box 1017	Bismarck, ND 58502
Mr. Bill L. Bowman	State Senator, District 39	North Dakota Legislature	408 First Street SW	Bowman, ND 58623-4272
Mr. Jordan Kannianen	State Senator, District 4	North Dakota Legislature	8011 51st Street NW	Stanley, ND 58784-9562
Mr. Terry B. Jones	State Representative, District 4	North Dakota Legislature	P.O. Box 1964	New Town, ND 58763-1964
Mr. Keith Kempenich	State Representative, District 39	North Dakota Legislature	9005 151st Avenue SW	Bowman, ND 58623-8857
Mr. Bill Oliver	State Representative, District 4	North Dakota Legislature	P.O. Box 1264	New Town, ND 58763-1264
Mr. Denton Zubke	State Representative, District 4	North Dakota Legislature	P.O. Box 927	Watford City, ND 58854-0927

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

January 5, 2017

Regulatory Branch (NWO-2016-02333-BIS)

COPY

SWCA Environmental Consultants
Attn: Mr. James Dawson
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

Dear Mr. Dawson:

This is in response to your letter dated December 16, 2016, on behalf of Arrow Field Services, LLC, requesting US Army Corps of Engineers (Corps) comments concerning the proposed Natural Gas Processing Plant and Transmission Pipeline Project. The proposed project will consist of a natural gas processing plant to remove natural gas liquids (NGLs) from an influent natural gas stream, with subsequent downstream transmission of the residue gas through a 12-inch diameter, 2.6 mile long welded steel pipeline and downstream transmission of the NGLs through a separate 8-inch diameter, 2.6 mile long welded steel pipeline. Both pipelines will be co-located within the same right-of-way and will deliver the residue gas and the NGLs to tow different third party entities. Your project has been assigned Corps #NWO-2016-02333-BIS. The proposed project is located in McKenzie County, North Dakota.

Corps Regulatory Offices administer Section 10 of the Rivers and Harbors Act (Section 10) and Section 404 of the Clean Water Act (Section 404). Section 10 regulates work impacting navigable waters. **This includes work over, through, or under Section 10 waters.** Section 10 waters in North Dakota are the Missouri River (including Lake Sakakawea and Lake Oahe), Yellowstone River, James River south of the railroad tracks in Jamestown, North Dakota, Bois de Sioux River, Red River of the North, and the Upper Des Lacs Lake. Section 404 regulates the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in waters of the United States.

Based on the information contained in your letter, the Corps has determined that your proposed project may need a Clean Water Act Section 404 permit. The permit application and instructions for completing the application may be found at:
http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit

In the future, you may email requests to: CENWO-OD-RND@usace.army.mil

A copy of this letter is being sent to Mr. Jim Berkley and Toney Ott, US Environmental Protection Agency, Region VIII, 1596 Wynkoop Street, Denver, Colorado, 80202-1129.

If we can be of further assistance or should you have any questions regarding our program, please do not hesitate to contact this office by letter or phone at (701) 255-0015, extension 2001.

Sincerely,

Patricia L. McQueary
Regulatory Program Manager
North Dakota

SWCA
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.

Bismarck Office
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
Tel 701.258.6622 Fax 701.258.5957
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July 27, 2017

Mr. Kevin Shelley
U.S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, ND 58501

RE: Arrow Field Services, LLC – Natural Gas Processing Plant
McKenzie County North Dakota
U.S. Fish and Wildlife Service

Dear Mr. Kevin Shelley,

Arrow Field Services, LLC (Arrow) is proposing the Natural Gas Processing Plant project (Project) that will consist of a processing plant to remove natural gas liquids (NGLs) from an influent natural gas stream, with subsequent transmission of the residue gas and NGLs through pipelines permitted under North Dakota Public Service Commission Certificate of Corridor Compatibility No. 199 and Route Permit No. 210, as well as a proposed NGL pipeline that will be permitted separately. The natural gas plant processing capacity will be up to 200 million cubic feet per day (MMCFPD), which makes the plant an Energy Conversion Facility, as defined in North Dakota Century Code Chapter 49.22.03.5.c. The Project is located approximately 7.5 miles southeast of Watford City, in the NW¼NE¼ and the SW¼NE¼ of Section 21, Township 149 North, Range 98 West, McKenzie County, North Dakota, as shown on the enclosed Project Location Map. The Project analysis area is a 1/2 – mile corridor around the Project site that encompasses the following legal locations in McKenzie County, North Dakota:

- Sections 15, 16, 21, and 22, Township 149 North, Range 98 West

The Project is scheduled to begin construction in the spring of 2018.

SWCA Environmental Consultants is notifying the U.S. Fish and Wildlife Service of the proposed project and offering the opportunity for comments. Information received from the U.S. Fish and Wildlife Service will be used in a North Dakota Public Service Commission application being prepared for the Project.

Please send your replies and/or requests for additional project information to:

James W. Dawson, Senior Project Manager
SWCA Environmental Consultants 116
North 4th Street, Suite 200 Bismarck,
North Dakota 58501 (701) 258-6622
jdawson@swca.com

Sincerely,

James W. Dawson

Enclosure: Project Location Map

U.S. FISH AND WILDLIFE SERVICE
ND Ecological Services Field Office

Project as described is not expected to have significant impacts on fish and wildlife resources. Contact this office if changes to the project are made or new information becomes available.

8/23/17
Date

North Dakota State Supervisor

North Dakota Game and Fish Department

No response has been received to date. Additional attempts were made to obtain a response from the agency on October 17, 2017. As of the date of this filing, no additional response has been received. Any comments received hereafter will be filed with the Commission.

North Dakota Parks and Recreation Department

No response has been received to date. Additional attempts were made to obtain a response from the agency on October 17, 2017. As of the date of this filing, no additional response has been received. Any comments received hereafter will be filed with the Commission.

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

August 1, 2017

Mr. James W. Dawson
Project Manager
SWCA
116 North 4th, Suite 200
Bismarck, ND 58501

ND SHPO REF.: 17-1290 PSC Arrow Field Services LLC Natural Gas Processing Plant and Transmission Pipelines 5.2 miles in portions of [T149N R98W Section 21] McKenzie County, North Dakota

Dear Mr. Dawson:

We received your letter regarding ND SHPO REF.: 17-1290 PSC Arrow Field Services LLC Natural Gas Processing Plant and Transmission Pipelines 5.2 miles in portions of [T149N R98W Section 21] McKenzie County, North Dakota.

We recommend a Class III (pedestrian) cultural resources survey of the entire project area as there are areas of concern and known archeological sites in the vicinity.

Thank you for the opportunity to review the project to date. We look forward to review of the Class III report prior to any earth work. If you have questions, please contact Susan Quinnell at (701) 328-3576 or squinnell@nd.gov

Sincerely,

Claudia J. Berg
Director, State Historical Society of North Dakota

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

October 30, 2017

William M. Harding
Principal Investigator
SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

NDSHPO REF.: 18-0062 PSC Class I and Class III CRI Report for Arrow Gas Plant Project, McKenzie County, North Dakota
[T149N R98W Section 21]

Dear Bill:

We have reviewed project correspondence and document: **18-0062** "A Class I and Class III Cultural Resources Inventory for the Arrow Gas Plant Project, McKenzie County, North Dakota," by Paul Swader (SWCA 17-174, April 2017), and find it acceptable.

We concur with a *"No Significant Sites Affected"* determination provided the project is of the nature stated and it take in the location mapped in the project documentation.

Thank you for the opportunity to review this project. If you have questions please contact either Paul Picha at ppicha@nd.gov or (701) 328-3574 or Susan Quinnell at squinnell@nd.gov or (701) 328-3576.

Sincerely,

Claudia J. Berg
Director, State Historical Society of North Dakota
and
State Historic Preservation Officer (North Dakota)

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October 17, 2017

Paul Picha
Chief Archaeologist
State Historical Society of North Dakota
Archeology & Historic Preservation Division
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck, North Dakota 58505-0830

Subject: Submittal of *A Class I and Class III Cultural Resources Inventory for the Arrow Gas Plant Project, McKenzie County, North Dakota*

Dear Mr. Picha:

I have attached to this letter one copy of the cultural resources report entitled *A Class I and Class III Cultural Resources Inventory for the Arrow Gas Plant Project, McKenzie County, North Dakota* prepared by SWCA Environmental Consultants on behalf of Arrow Field Services, LLC (Arrow). The report documents the results of the Class I conducted on October 5, 2016, and updated on October 26, 2016, and the Class III inventory conducted on March 22 and 23, 2017, for the proposed gas plant. The inventory was conducted at the request of Arrow as a due diligence survey; no federal or other governmental historic preservation laws apply to the proposed project. The project is located entirely on fee lands in McKenzie County, North Dakota.

SWCA surveyed 63.57 non-overlapping acres for the gas plant location.

During the inventory, SWCA personnel did not identify any newly or previously recorded cultural resources within the project area, although three field-clearing piles were noted, but not formally recorded. The report has been submitted to the State Historical Society of North Dakota as a courtesy and for filing purposes; however, SWCA requests a response from the State Historic Preservation Office.

Thank you for your consideration of these matters. Please contact me at wharding@swca.com or (701) 258-6622 if you have any questions regarding the attached report.

Sincerely,

William M. Harding

William M. Harding, RPA, Principal Investigator
WMH:wh
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Jim Dawson

From: Bement, Allisen C. <abement@nd.gov>
Sent: Monday, July 31, 2017 8:13 AM
To: Jim Dawson
Subject: Arrow Field Services LLC

James,

We agree that the data provided fairly represents the approximate location of the Natural Gas Processing Plant project indicated by SWCA Environmental Consultants and the proximity of mineral interests managed by this office to that project for use in a filing with the PSC in the state of North Dakota.

Allisen Bement, RPL
Land Professional
ND Department of Trust Lands
701.328.1952
abement@nd.gov

NORTH DAKOTA
DEPARTMENT *of* HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

August 14, 2017

Mr. James W. Dawson
Senior Project Manager
SWCA Environmental Consultants
116 North 4th Street, Suite 200
Bismarck, ND 58501

Re: Arrow Field Services, LLC – Natural Gas Processing Plant
McKenzie County

Dear Mr. Dawson:

This department has reviewed the information concerning the above-referenced project submitted under date of July 27, 2017, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

2. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Also, cities may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

3 The proposed construction project does not overlie a defined glacial drift aquifer; however, several domestic and/or stock water supply wells are located in close proximity to the project location. In addition, two non-community wellhead protection areas are located less than one mile from the project's boundaries. Care should be taken to avoid spills of any

materials that may have an adverse effect on groundwater quality. All spills must be immediately reported to this Department and appropriate remedial actions performed.

4. The proposed project appears to have the potential to be a source of emissions to the air capable of causing or contributing to air pollution and may be required to have an Air Pollution Control Permit to Construct/Operate as required by Chapter 33-15-14 of the North Dakota Air Pollution Control Rules. The applicant should contact the Department's Air Pollution Control Program at 701-328-5188 prior to commencing construction.

5. Projects that involve construction of pipelines should select locations that minimize the potential for impacts to human health and the environment during and after construction by avoiding, when possible, source water protection areas and sensitive surface and groundwater environments. Additionally, when possible, pipeline routes should select areas with natural barriers to both surface and ground waters. Human health and the environment should be further protected by developing a spill response plan that emphasizes rapid deployment of prepositioned assets necessary to contain spills and subsequent cleanup. Proper surveillance and monitoring for early detection of leaks should be required.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
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Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

North Dakota Department of Transportation

Thomas K. Sorel
Director

Doug Burgum
Governor

August 24, 2017

James W. Dawson
SWCA
116 N 4th St., Suite 200
Bismarck, ND 58501

CONSTRUCT NATURAL GAS PROCESSING PLANT, MCKENZIE COUNTY, NORTH DAKOTA

We have reviewed your July 31, 2017, letter.

This project should have no adverse effect on the North Dakota Department of Transportation highways.

However, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Joel Wilt at 701-774-2700.

Roger Weigel

fy ROBERT A. FODE, P.E., DIRECTOR - OFFICE OF PROJECT DEVELOPMENT

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c: Joel Wilt, Williston District Engineer

Jim Dawson

From: Amber Higgins <mcweed@restel.net>
Sent: Thursday, August 03, 2017 6:37 AM
To: Jim Dawson
Subject: Weed Managment Plan
Attachments: Weed Management Plan - Copy.doc

James-

I received your two letters regarding the proposed Arrow Field Natural Gas Processing plant. I've attached a C.U.P. If you could fill one out and return it to me that would be great if you have any questions or concerns feel free to contact us.

Amber Higgins
McKenzie County Weed Officer
Phone- 701-842-4131
Fax -701-8424731

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
(701) 328-2750 • TTY 1-800-366-6888 or 711 • FAX (701) 328-3696 • http://swc.nd.gov

August 24, 2017

James W. Dawson
SWCA Environmental Consultants
116 N 4th Street, STE 200
Bismarck, ND 58501

Dear Mr. Dawson:

This is in response to your request for a review of the environmental impacts associated with the Arrow Field Services, LLC – Natural Gas Processing Plant project located in McKenzie County, ND.

The proposed project has been reviewed by State Water Commission staff, and the following comments are provided:

- No permits relative to the NFIP are required based on the current effective FIRM and state minimum standards.

- If surface water or groundwater will be diverted for construction or operation of the project, a water permit is required per North Dakota Century Code § 61-04-02. Permits for temporary surface water diversions within the Little Missouri Basin, if issued, have additional conditions per an Interim Policy signed by the State Engineer on June 22, 2017. Please consult with the Water Appropriations Division of the Office of the State Engineer at 701-328-2754 or waterpermits@nd.gov if you have questions.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 701-328-4967.

Sincerely,

Jared Huibregtse
Water Resource Planner IV

JH:dm/1570