United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Great Plains Regional Office
115 Fourth Avenue S.E., Suite 400
Aberdeen, South Dakota 57401

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
DESCRM
MC-208

SEP 02 2011

MEMORANDUM

TO: Superintendent, Fort Berthold Agency

FROM: Acting Regional Director, Great Plains Region

SUBJECT: Environmental Assessment Addendum and Finding of No Significant Impact

In compliance with the regulations of the National Environmental Policy Act (NEPA) of 1969, as amended, an Environmental Assessment has been completed and a Finding of No Significant Impact (FONSI) has been issued. The Environmental Assessment authorizes land use for Arrow Pipeline, LLC Phase 3 Southwest pipeline on the Fort Berthold Indian Reservation.

All the necessary requirements of the National Environmental Policy Act have been completed. Attached for your files are copies is a copy of the EA, FONSI and Notice of Availability. The Council on Environmental Quality (CEQ) regulations require that there be a public notice of availability of the FONSI (40 C.F.R. Part 1506.6(b)). Please post the attached notice of availability at the Agency and Tribal buildings for 30 days.

If you have any questions, please call Marilyn Bercier, Regional Environmental Scientist, Division of Environment, Safety and Cultural Resources Management, at (605) 226-7656.

Attachment

cc: Tex Hall, Chairman, Three Affiliated Tribes (with attachment)
Elgin Crows Breast, Tribal Historic Preservation Officer (with attachment)
Derek Enderud, BLM, Bureau of Land Management (with attachment)
Jonathon Shelman, Corps of Engineers (with attachment)
Jeff Hunt, Fort Berthold Agency

Finding of No Significant Impact
Arrow Pipeline, LLC

Phase 3 Southwest Pipeline
Dunn County, North Dakota

The U.S. Bureau of Indian Affairs (BIA) received a proposal to authorize the land use by Arrow Pipeline, LLC (Arrow) to construct and operate the Phase 3 Southwest pipeline on the Fort Berthold Reservation. At this time, potential connections and gathering lines associated with this trunk line are unknown and will require additional National Environmental Policy Act (NEPA) analysis at a later date. Associated federal actions by BIA include determinations of effect regarding cultural resources and approvals of leases, rights-of-way and easements.

Potential of the proposed action to impact the human environment is analyzed in the attached Environmental Assessment (EA), as required by the National Environmental Policy Act. Based on the recently completed EA, I have determined the proposed project will not significantly affect the quality of the human environment. No Environmental Impact Statement is required for any portion of the proposed activities.

This determination is based on the following factors:

1. Agency and public involvement was solicited and environmental issues related to the proposal were identified.

2. Protective and prudent measures were designed to minimize impacts to air, water, soil, vegetation, wetlands, wildlife, water resources, and cultural resources. The potential for impacts was disclosed for both the proposed action and the No Action alternative.

3. Guidance from the U.S. Fish and Wildlife Service has been fully considered regarding wildlife impacts, particularly in regard to threatened or endangered species. This guidance includes the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.) (MBTA), the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.) (NEPA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250) (BGEPA), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", and the Endangered Species Act (16 U.S.C. 1531 et seq.) (ESA).

4. The proposed action was designed to avoid adverse effects to historic, archaeological, cultural, and traditional properties, sites, and practices. The Tribal Historic Preservation Officer has concurred with BIA's determination that no historic properties will be affected.

5. Environmental justice was fully considered.

6. Cumulative effects to the environment are either mitigated or minimal.

7. No regulatory requirements have been waived or require compensatory mitigation measures.

8. The proposed project will improve the socioeconomic condition of the affected Indian community.

Tim LaFromboise

Acting Regional Director – Great Plains Regional Office

9-2-2011

Date

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ENVIRONMENTAL ASSESSMENT

United States Department of the Interior
Bureau of Indian Affairs

Great Plains Regional Office
Aberdeen, South Dakota

North Dakota State Office
Dickinson, North Dakota

Arrow Midstream Holdings, LLC

Phase 3 Southwest Pipeline:
Dunn County, North Dakota

Fort Berthold Indian Reservation

September 1, 2011

For information contact:
Bureau of Indian Affairs, Great Plains Regional Office
Division of Environment, Safety and Cultural Resources Management
115 4th Avenue SE, Aberdeen, South Dakota 57401 (605) 226-7656

Environmental Assessment: Phase 3 Southwest Pipeline;

Arrow Midstream Holdings, LLC

Prepared for

United States Department of the Interior
Bureau of Indian Affairs

Prepared by

SWCA Environmental Consultants

September 2011

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Arrow Midstream Holdings, LLC (Arrow) is proposing to construct and operate an oil, gas, and water pipeline on the Fort Berthold Indian Reservation (Reservation). The pipeline will be known as Phase 3 Southwest (PHASE 3 SW). The following Environmental Assessment (EA) will only address the installation of the proposed trunk line. At this time, potential connections and gathering lines associated with this trunk line are unknown and will require additional National Environmental Policy Act (NEPA) analysis at a later date.

Developments have been proposed on lands held in trust by the United States in Dunn County, North Dakota. The Bureau of Indian Affairs (BIA) is the surface management agency for potentially affected tribal lands and individual allotments. The proposed pipeline would connect producing wells on the Reservation to the approved Dakota-3 Bearstail #32-29H Pipeline (Figures 1-1 through 1-11). The proposed pipeline would begin at a point in the NE¼ NE¼ Section 36, Township (T) 148 North (North), Range (R) 94W, and travel in a northwesterly direction through the following sections in Dunn County:

- Sections 25, 24, 23, 14, 15, 22, 21, 20, 19, 18, and 7, T148N, R94W
- Sections 12 and 1, T148N, R95W
- Section 32, T149N, R94W

However, additional area was surveyed that may be used for future pipelines in the following sections in Dunn and McKenzie counties.

- Section 36, T148N, R94W, Dunn County
- Section 31, T148N, R93W, Dunn County
- Sections 6, 7, and 8, T147N, R93W, Dunn County
- Sections 32 and 31, T149N, R94W, McKenzie County
- Section 36, T149N, R95W, McKenzie County

1.2 FEDERAL AND OTHER RELEVANT REGULATIONS AND AUTHORITIES

The BIA's general mission is to represent the interests, including the trust resources, of members of the Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara (MHA) Nation, as well as those of individual tribal members. The PHASE 3 SW has been proposed to remove oil, gas, and waste products from well sites and remove the impacts and resource loss from continuing to flare natural gas. PHASE 3 SW will also mitigate environmental and public safety concerns such as truck traffic, loud noise, and road deterioration. Oil and gas exploration and subsequent development are under the authority of the Energy Policy Act of 2005 (42 United States Code [USC] 15801, et seq.), the Federal Onshore Oil and Gas Royalty Management Act of 1982 (30 USC 1701, et seq.), the Indian Mineral Development Act of 1982 (25 USC 2101, et seq.), and the Indian Mineral Leasing Act of 1938 (25 USC 396a, et seq.). The BIA's role in the proposed project includes approving easements and rights-of-way

(ROWs) for both access roads and the PHASE 3 SW, and determining effects on cultural resources. Compliance with the National Environmental Policy Act (NEPA) is required due to the project's location on federal lands. This Environmental Assessment (EA) analyzes potential impacts to elements in the natural and human environment for both the No Action Alternative and the Proposed Action. Impacts may be beneficial or detrimental, direct or indirect, and short-term or long-term. The EA also analyzes the potential for cumulative impacts and ultimately makes a determination as to the significance of any impacts.

In the absence of significant negative consequences, this EA would result in a Finding of No Significant Impact (FONSI). Should significant adverse impacts be identified as a result of the direct, indirect, or cumulative effects of the Proposed Action, then the NEPA requires the preparation of an environmental impact statement.

Arrow will comply with all applicable federal, state, and tribal laws, rules, policies, regulations, and agreements. Arrow also agrees to follow all best management practices (BMPs) and monitoring mitigations listed in this document. No disturbance of any kind can begin until all required clearances, consultations, determinations, easements, leases, permits, and surveys are in place.

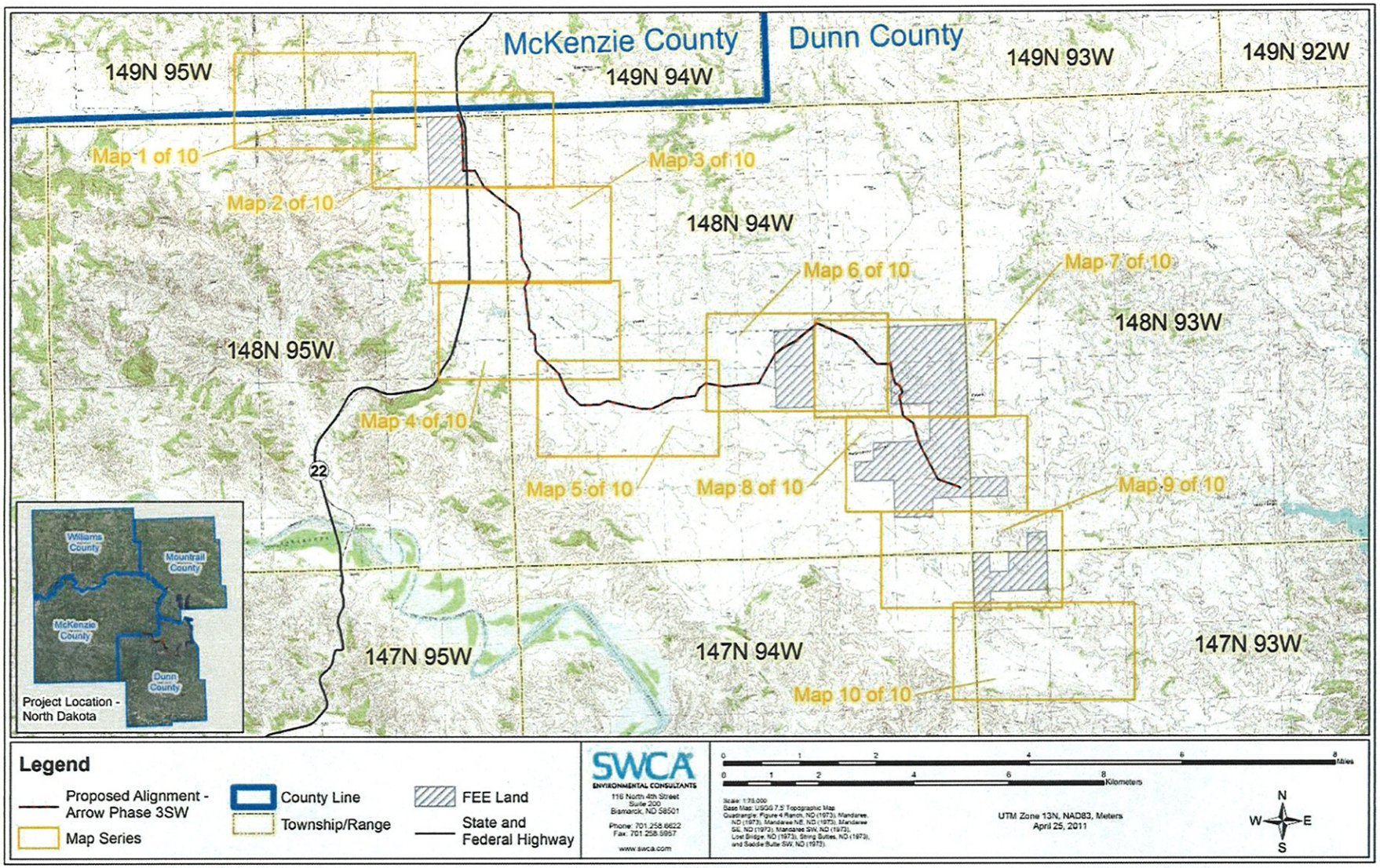

Figure 1-1. Project overview map.

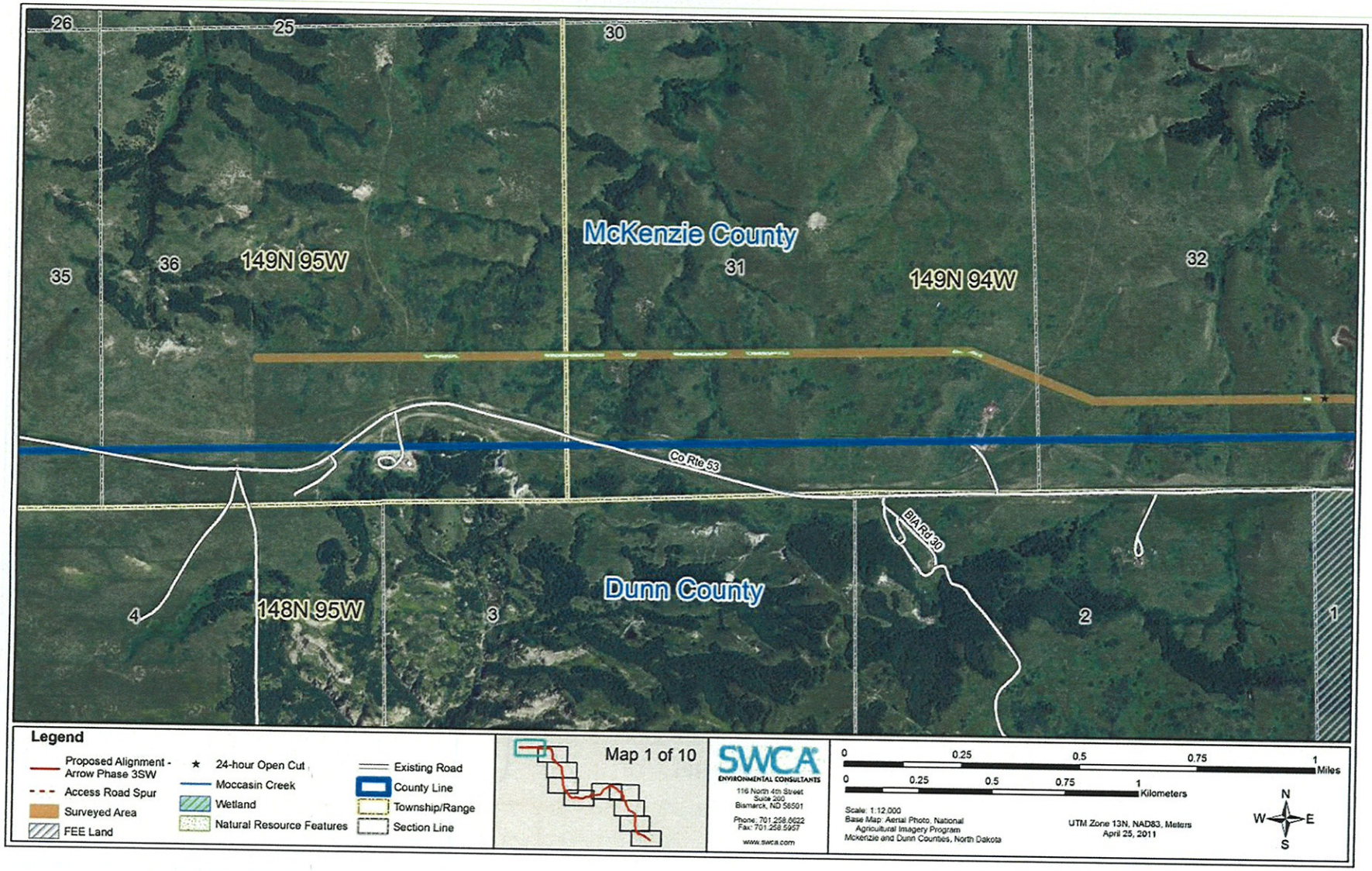

Figure 1-2. Phase 3 Southwest project area (Map 1 of 10).

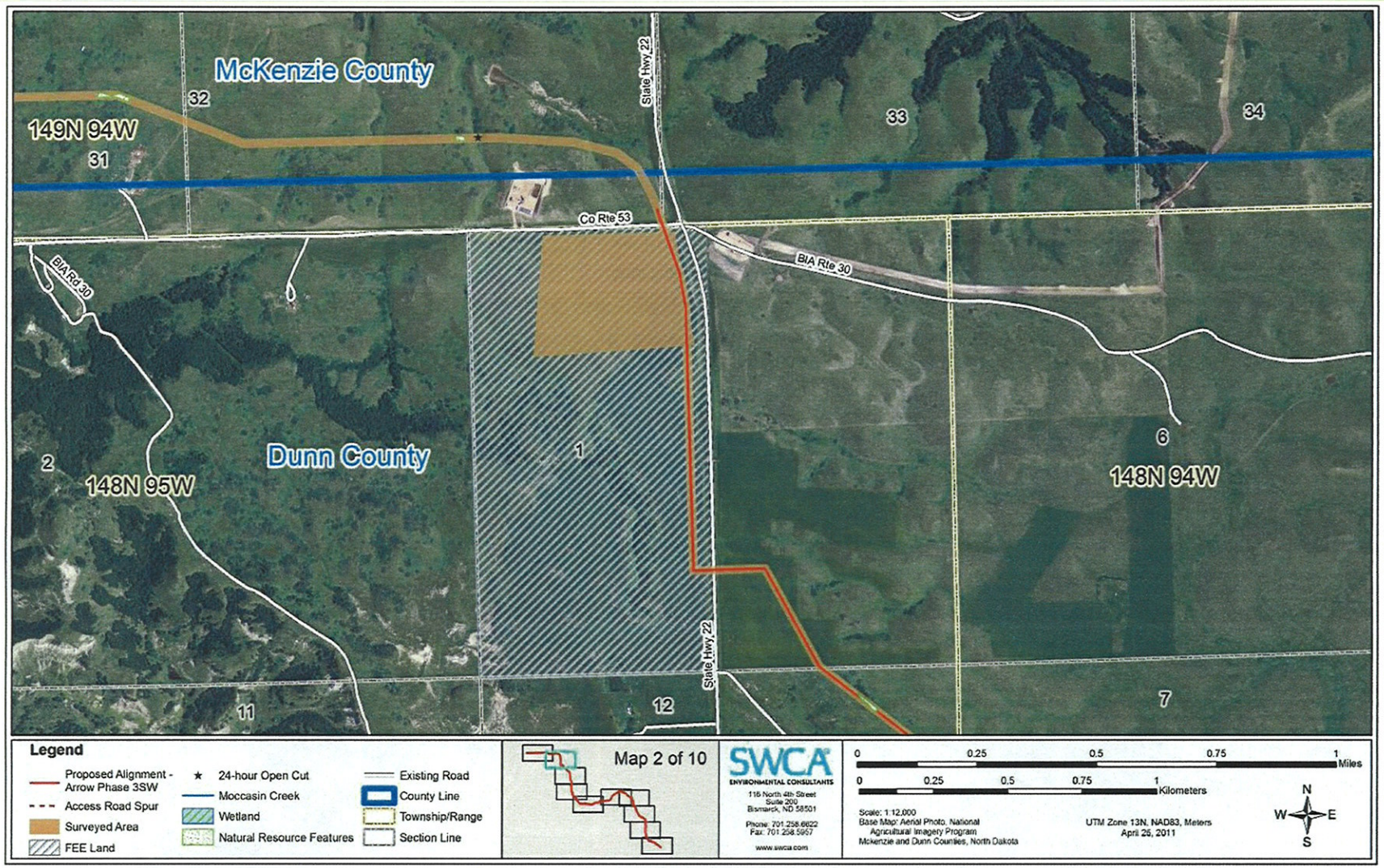

Figure 1-3. Phase 3 Southwest project area (Map 2 of 10).

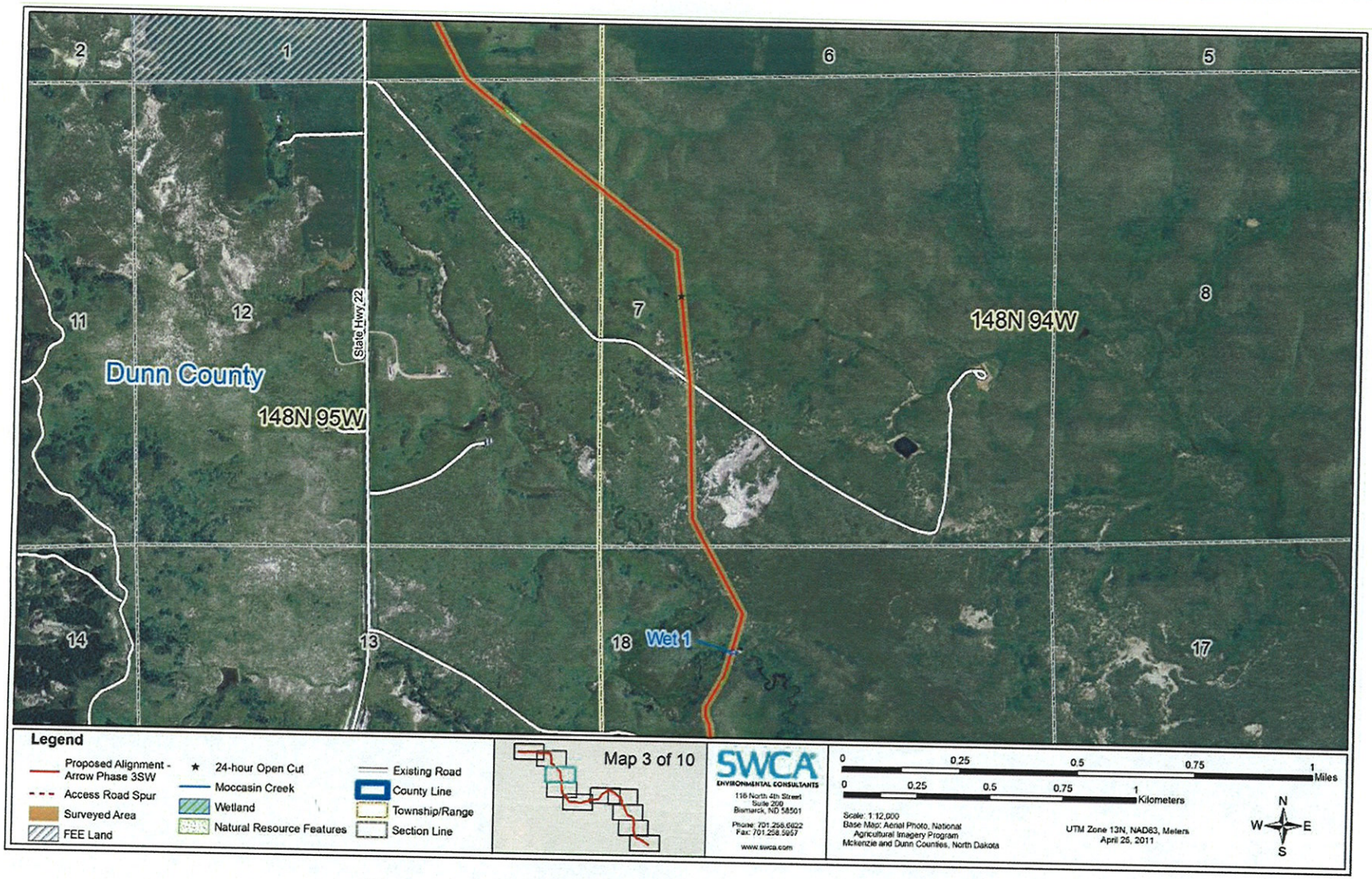

Figure 1-4. Phase 3 Southwest project area (Map 3 of 10).

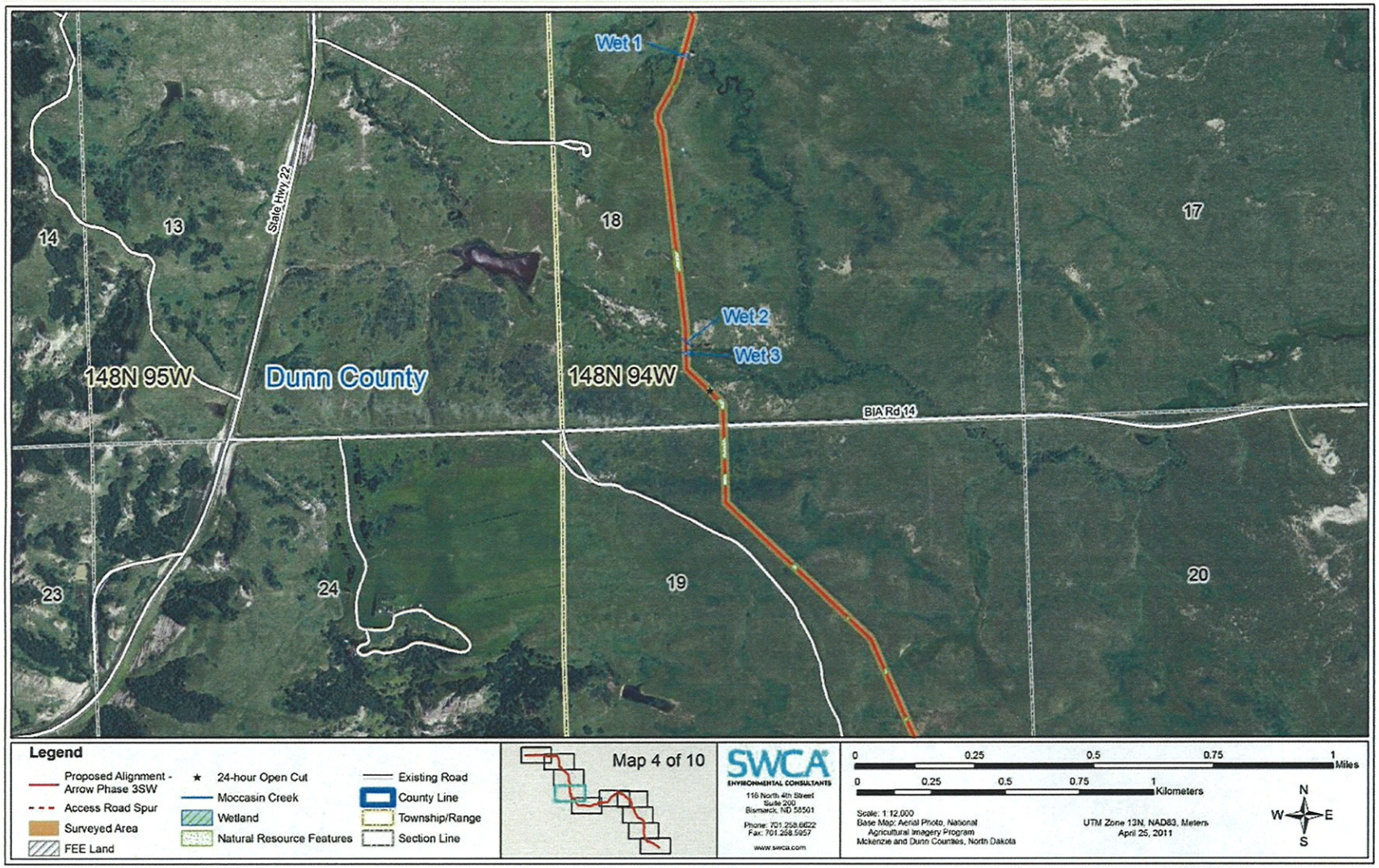

Figure 1-5. Phase 3 Southwest project area (Map 4 of 10).

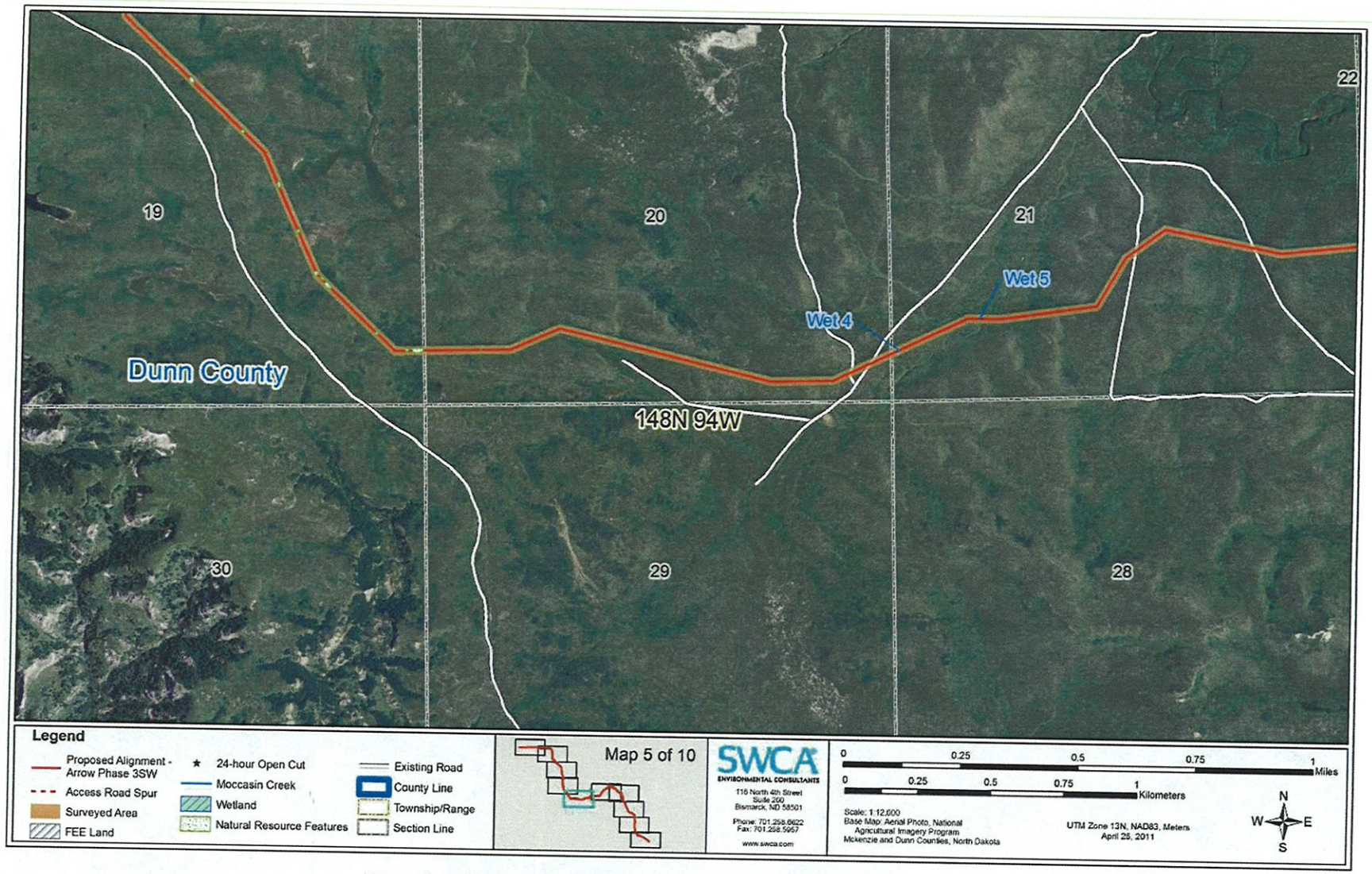

Figure 1-6. Phase 3 Southwest project area (Map 5 of 10).

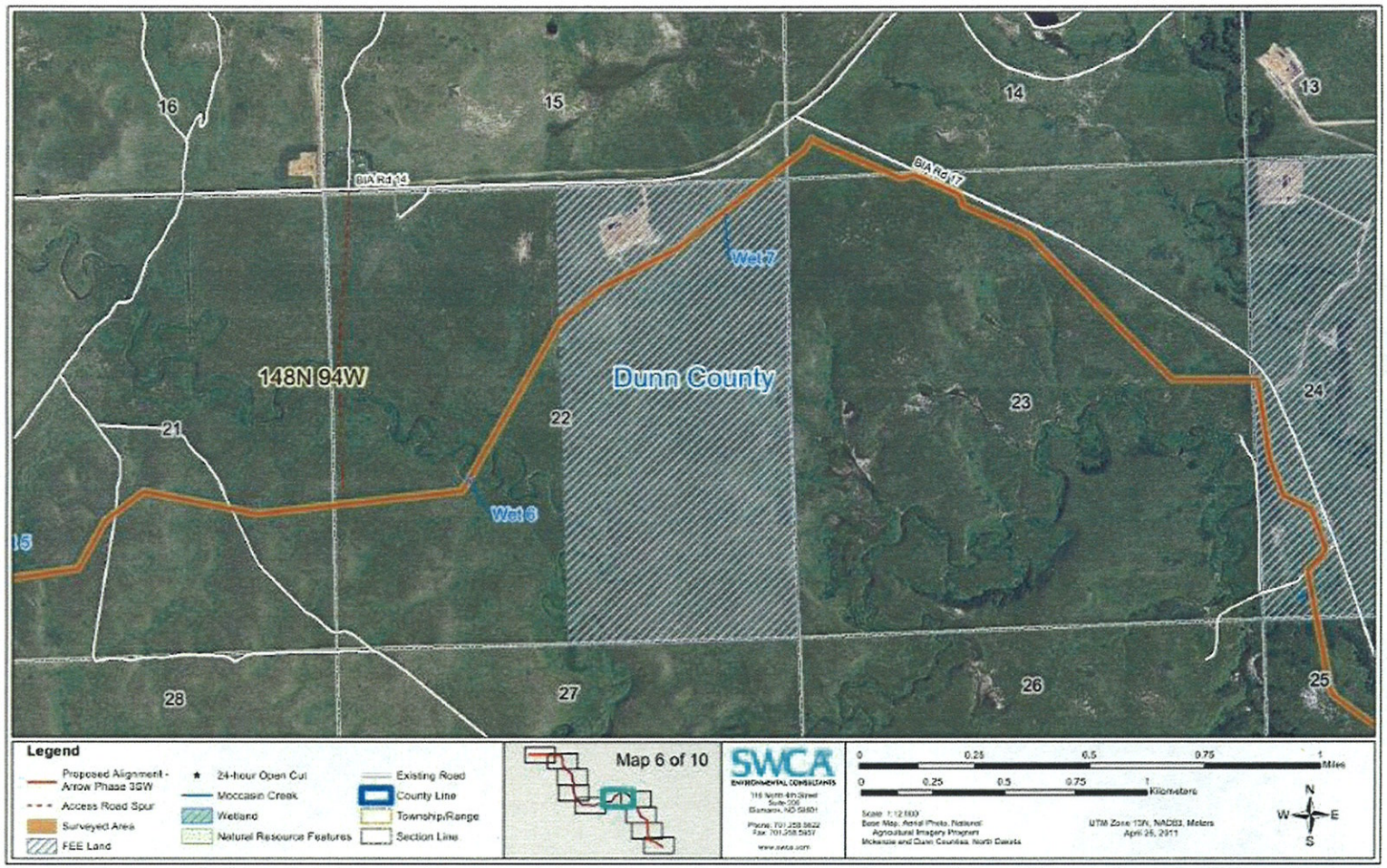

Figure 1-7. Phase 3 Southwest project area (Map 6 of 10).

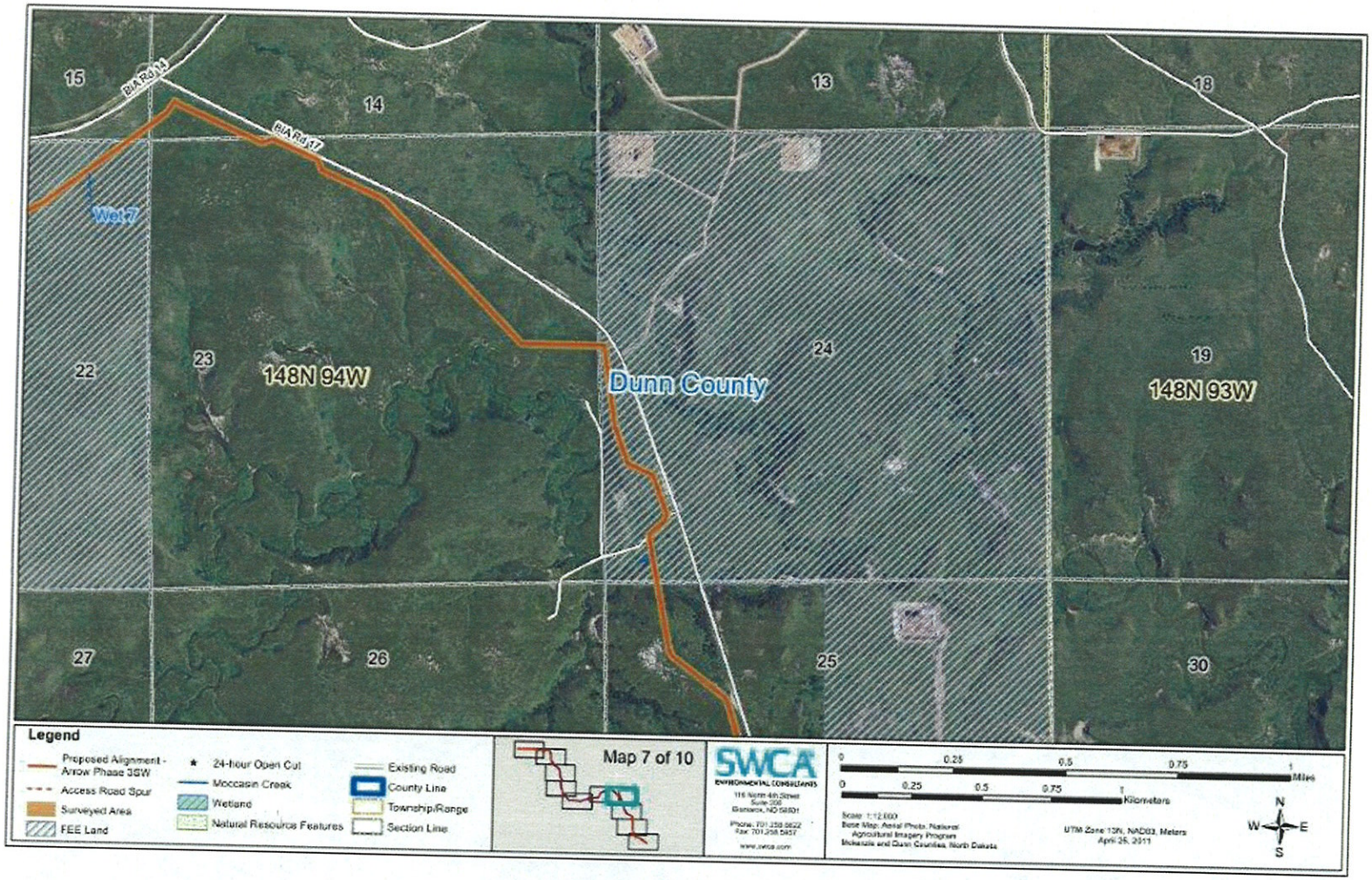

Figure 1-8. Phase 3 Southwest project area (Map 7 of 10).

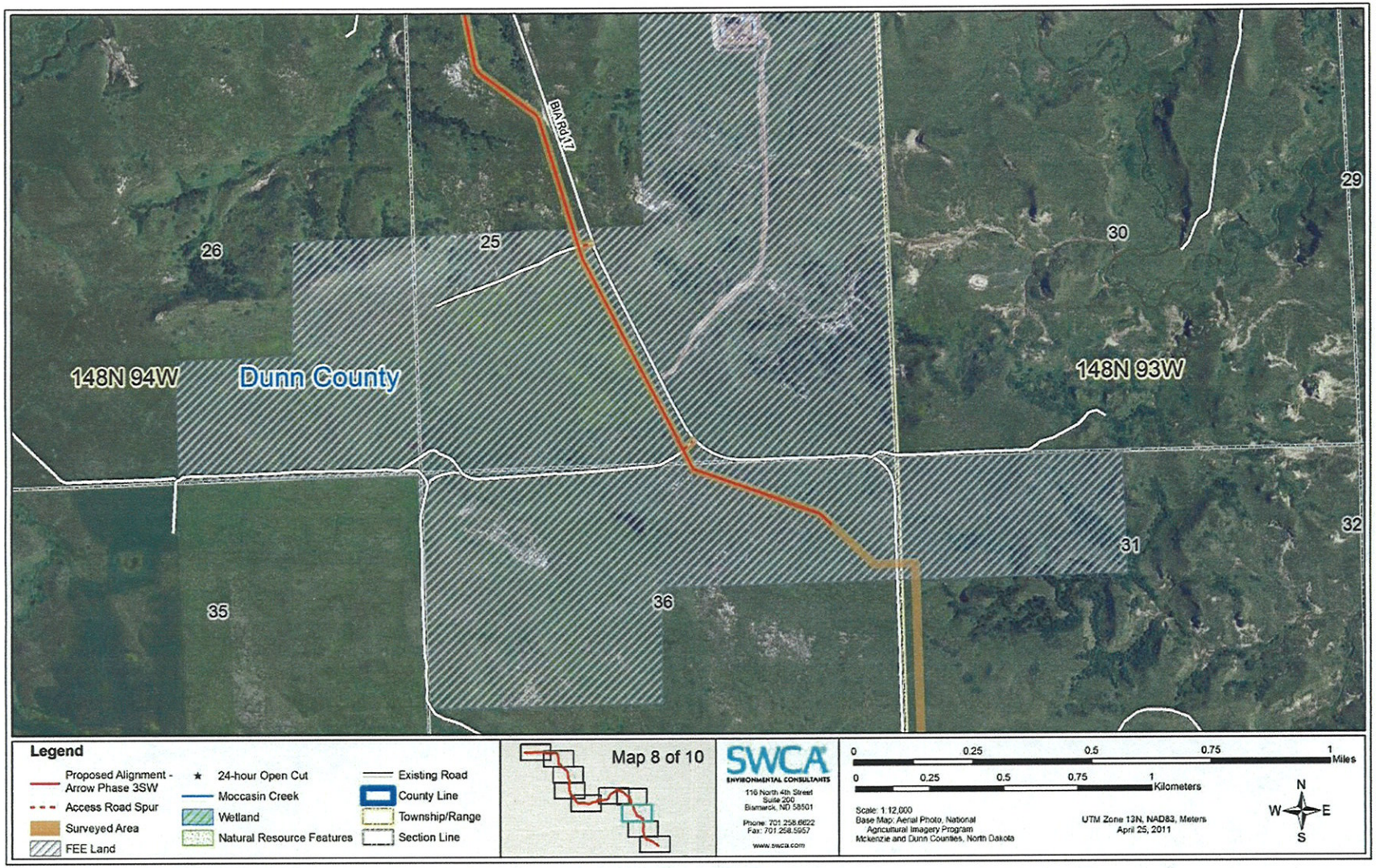

Figure 1-9. Phase 3 Southwest project area (Map 8 of 10).

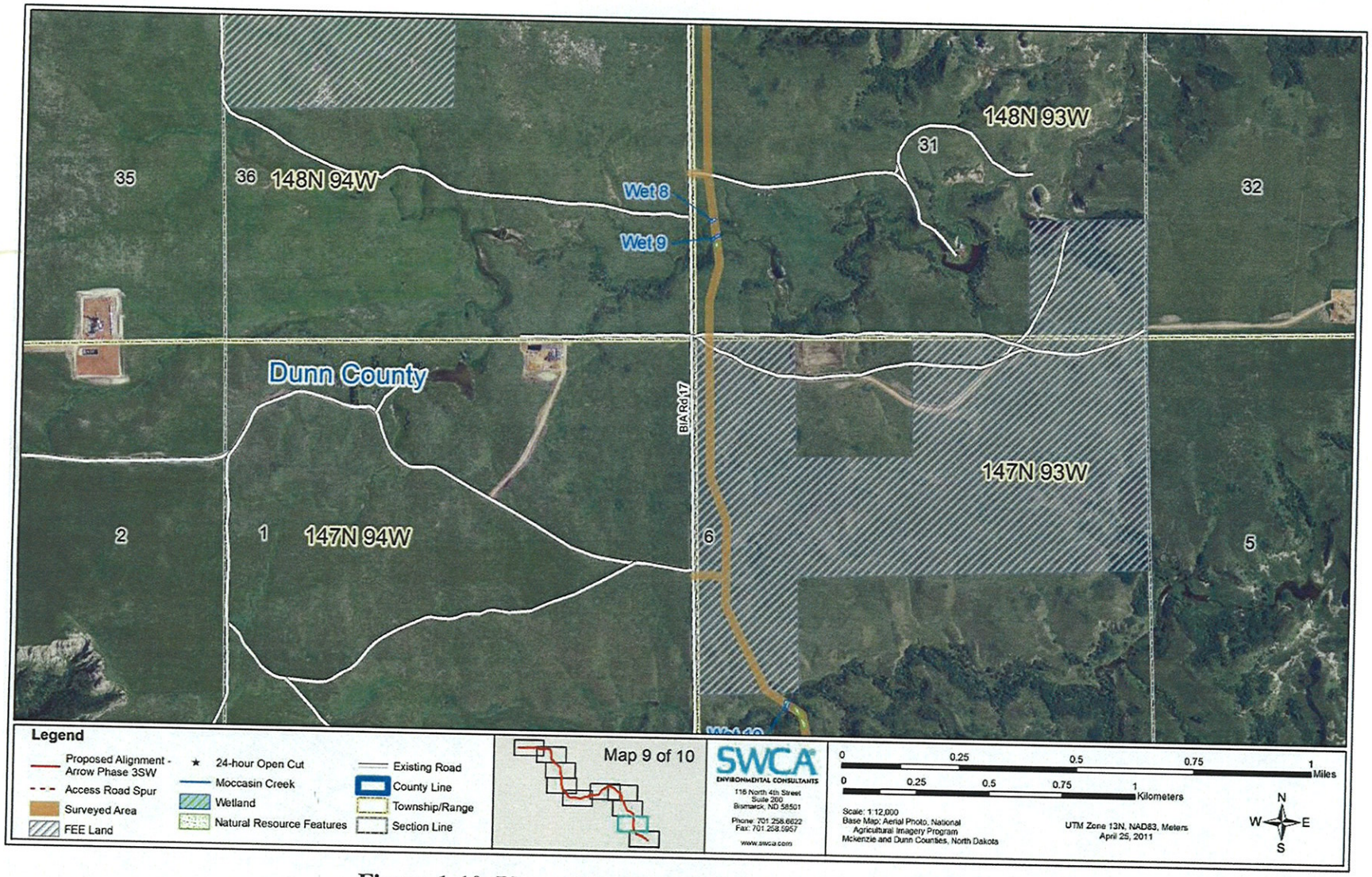

Figure 1-10. Phase 3 Southwest project area (Map 9 of 10).

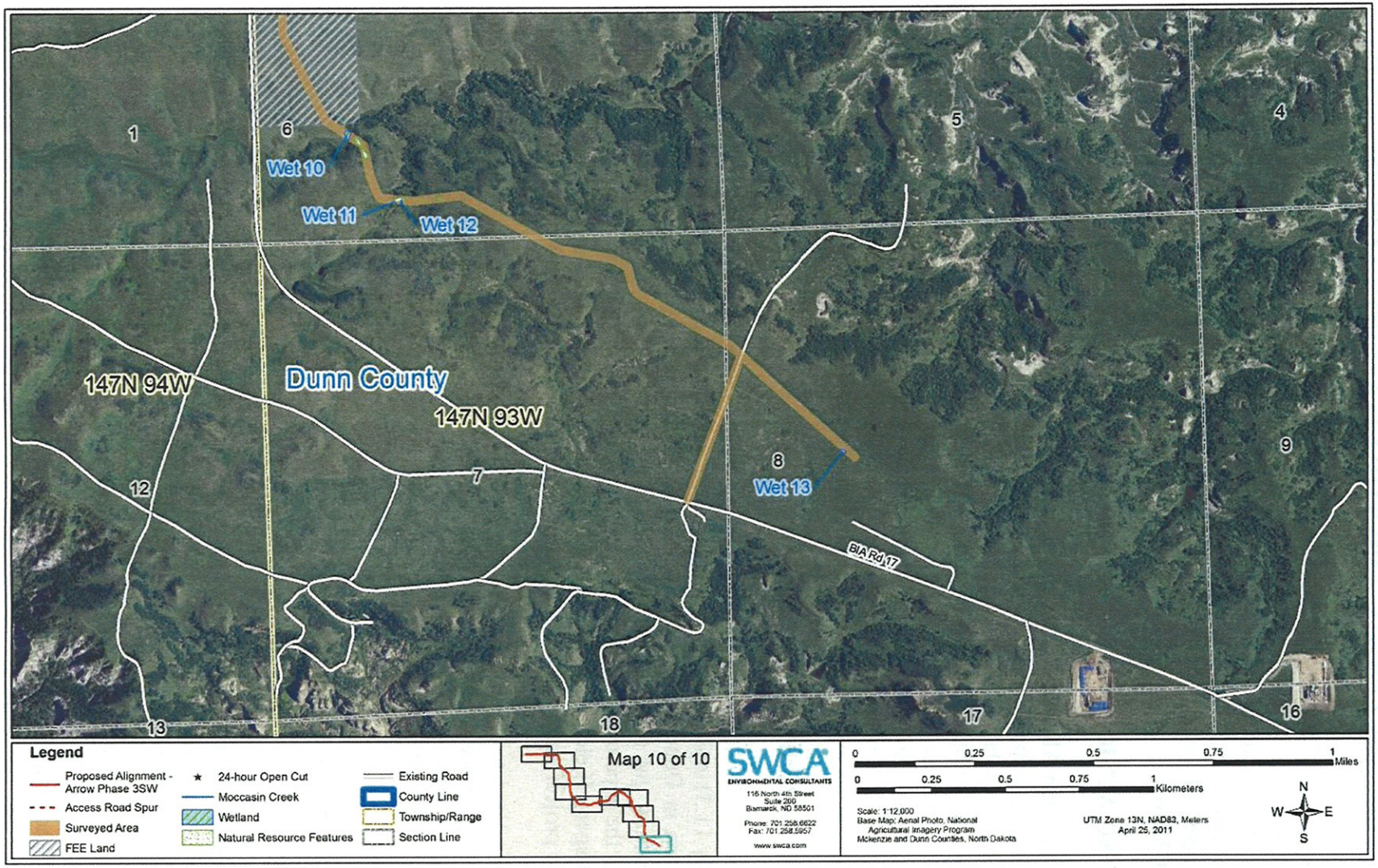

Figure 1-11. Phase 3 Southwest project area (Map 10 of 10).

2.0 PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

The BIA, as required by the NEPA, must "study, develop, and describe appropriate alternatives to the recommended course of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources..." (NEPA Sec 102[2][e]). Developing a range of alternatives allows for exploration of options designed to meet the purpose and need for the action. Along with the No Action Alternative, the BIA is considering the Proposed Action.

2.1 THE NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed project would not be constructed or operated. The BIA would not approve easements, leases, or ROWs for the proposed project. There would be no project-related surface disturbance. Oil and water would continue to be stored on site and hauled away by truck. Gas would continue to be flared at locations. Under the No Action Alternative, the MHA Nation, tribal members, and allottees would not have the opportunity to realize potential financial gains resulting from the transportation of natural gas to market rather than continuing to utilize flares. Also, pollution and other hazards from trucking oil and water away from the site and flaring the natural gas would not be reduced.

2.2 THE PROPOSED ACTION

In addition to the No Action Alternative, this document analyzes the potential impacts of an approximately 11.31-mile pipeline and its infrastructure located in the west-central portions of the Reservation in Dunn County, North Dakota. The proposed project would transport oil, water, and natural gas from producing wells to markets and appropriate disposal facilities. Placement of the pipeline was decided upon by Arrow in consultation with tribal and BIA resource managers. If electrical lines are installed in association with this project or to provide service to this project, they will be installed underground within the approved ROW.

All activities related to the construction of the PHASE 3 SW would follow guidelines and standards in the Surface Operating Standards for Oil and Gas Exploration and Development (Bureau of Land Management [BLM] and U.S. Forest Service 2007) and any conditions required by the BIA. The pipeline would be operated in full compliance of applicable laws and regulations.

2.2.1 Construction Specifics

The proposed project would consist of a 10-inch oil, 12-inch natural gas, and 6-inch water pipeline. Figures 1-1 and 1-3 through 1-9 show the pipeline beginning in the NE¼ NE¼ Section 36, T148N, R94W, and terminating in the NE¼ NE¼ Section 36, T148N, R94W. The PHASE 3 SW would travel in a northwesterly direction for approximately 11.31 miles. The proposed project consists of a trunk line only and no secondary gathering pipelines are associated with this project. Construction materials would either be staged at a storage facility or trucked directly to the pipeline corridor from another location using state, federal, and tribal roads. At all access points, heavy daily truck traffic would be expected during construction. The pipeline will tie into the Dakota-3 Bearstail #32-29H Pipeline.

Prior to the start of construction, photographs would be taken of the roads used to document their conditions. These photographs would be submitted to the BIA. At the request of the BIA or as necessary, erosion control measures would be put into place. All temporary access roads used to access the PHASE 3 SW would have a ROW width of 50 feet and be maintained until the corridor is reclaimed (Table 2-1). All traffic would be limited to the ROW and approved access roads to the PHASE 3 SW. Driving outside the approved areas would be strictly prohibited.

Table 2-1. Proposed Access Roads for the PHASE 2 SW Pipeline as shown in Figures 1-8 and 1-10 through 1-12.

Access Road Number	Location (Township, Range, Section)	Ownership	Length (feet)	Disturbance (acres)*
1	T148N R94W S22	Trust	359.09	0.5
2	T148N R94W S25	Fee	197.49	0.3
3	T148N R94W S25	Fee	138.83	0.3

* Calculation assumes a 66-foot right-of-way.

The proposed pipeline would be constructed within a temporary 100-foot-wide construction ROW except in areas containing forested upland and/or shrubland habitat, in which case the construction ROW would be reduced to a maximum width of 50 feet. In total, construction of the proposed pipeline is estimated to temporarily impact a maximum area of 137.25 acres within the 100-foot-wide construction ROW. The proposed pipeline would be buried at an average depth of approximately 6 feet. After the pipeline is constructed Arrow would maintain a 50-foot-wide permanent ROW (68.63 acres) along the entire length of the proposed pipeline.

Arrow has suggested it may connect up to approximately 14 wells during the first year of operation and potentially 5 wells per year thereafter. At low pressure, no additional compression or pumping stations would be required on the Reservation. However, in the future and based on need, additional high-pressure facilities may be proposed. These additional facilities would require additional NEPA analysis and BIA approval.

Clearing and grading within the temporary ROW would be required prior to pipeline construction. The topsoil would be separated and stockpiled. Rotary trenching equipment or backhoes would be used to excavate the trench to a depth of 66 inches to avoid frost heaving and the pipeline would be covered in backfilled soil. The ROW would be re-seeded as quickly as possible using a seed mixture determined by the BIA.

The proposed pipeline would act in conjunction with the Dakota-3 Bearstail #32-29H Pipeline and could operate at both low and high pressure. At low pressure (less than 100 pounds per square inch gauge), the pipeline could transport more than 15 million cubic feet of gas per day (assuming randomly distributed wells). The Bakken and Three Forks formations initially produce high productions yields. However, they drastically decrease after the first few months. Therefore, the gas flowed through the line would reduce.

The pipeline would consist of 10-inch and 12-inch steel oil and natural gas pipes, respectively, and a 6-inch Fiberspar® or similar material water pipe. The pipeline would be constructed to high-pressure specifications and hydrostatically tested to more than 1,100 pounds per square inch gauge. The thickness of the pipe walls would allow for a minimum of 0.0625 inch internal corrosion and the pipeline could work at either low or high pressures.

For the pipeline to be functional, a gathering line system from producing wells to the PHASE 3 SW would be constructed. At low pressure, no compression stations would be needed. However, in the future, high-pressure stations may be proposed in response to the increase in production and interest from producers. Any construction that is not covered in this document would require additional NEPA analysis and BIA approval.

Trenches may need to remain open for several days between the time when they are dug and the time they are backfilled. Short-term pedestrian and vehicle crossings would be created by temporarily filling in the trench. Inside the trench, ramps would be installed to help wildlife and domestic stock escape. Other installation efforts include, but are not limited to, stringing, bending, welding, x-ray inspection, lowering the pipe in the trench, hydrostatic testing, backfilling the trench, and regrading. Any requirements from the BIA would be binding to the operator/installer.

The pipeline would also require pipeline inspection gauges, tie-in valves, and staging areas. These gauges would clean and inspect the walls. A pipeline inspection gauge launcher and receiver would be needed for this process. The tie-in valves would connect lateral lines to the PHASE 3 SW where needed. The topsoil in the staging areas would be cleared and stockpiled until construction is complete, at which time the topsoil would be redistributed and the area reclaimed.

Items such as wood, paper, and plastic, which are non-hazardous, would be collected and stored in waste containers with lids. A sanitation company would be responsible for moving solid non-hazardous waste from the site area to approved landfills. Portable toilets would be located on trailers on the ROW.

2.2.2 Directional Drilling

Directional drilling or boring reduces/mitigates traffic disturbances, damage to roads, and environmental impacts (waterways, wetlands, etc.) and cultural resources. A hole would be bored beneath a surface or near-surface asset in an arch from one surface hole to another. Then, the pipe would be pulled through the hole (either bare or in a casing). Areas where boring has been identified as needed are located where either the North Dakota Department of Transportation requires them or in areas where BMPs are logical (waterways, wooded draws, etc.). These locations are listed in Table 2-2 and include all paved highway, stream, and wetland crossings.

Table 2-2. Proposed Directional Drilling Locations.

No.	Location	Asset Type	Asset Name
1	47° 36' 05.47"N 102° 35' 34.08" W	Creek	n/a
2	47° 37' 05.56"N 102° 36' 24.86" W	Creek	Moccasin
3	47° 37' 54.19"N 102° 42' 30.37" W	Road	BIA 14
4	47° 37' 21.06"N 102° 38' 45.17" W	Creek	Moccasin
5	47° 39' 49.29"N 102° 43' 34.66" W	Road	State Hwy 22

2.2.3 Operation and Maintenance

All roads used by the PHASE 3 SW (private, county, state, BIA) would be maintained at the condition they were in prior to the project or would be improved. Roads used to access the ROW would be maintained for the life of the pipeline and until final abandonment and reclamation occurs. If rutting does occur, roads would be fixed immediately. However, rutting should be avoided if at all possible.

Maintenance on the pipeline would be limited to the permanent 50-foot ROW. Systems may need to be replaced if corrosion or leaking occurs. If there is a leak, contaminated soil around the leak will be removed. All applicable regulations and BMPs would be implemented to eliminate both loss of product and environmental contamination.

2.2.4 Reclamation

Interim Reclamation

Reclamation would continue to occur over the life of the pipeline. Initial reclamation would be required after the initial construction and then following any maintenance work or additions of infrastructure. Reclamation would be required before final abandonment of the decommissioned pipeline. A successful reclamation would at all times be the responsibility of the system's operator.

With the exceptions of the soil being frozen or saturated, the trenches would be filled in immediately after the pipe is installed and testing is complete. Applicable short- and long-term BMPs would be used to minimize and control erosion in disturbed areas. To reduce compaction, the ROW would be plowed before the stockpiled topsoil is distributed.

The disturbed areas would be reclaimed and contoured as soon as possible after construction is complete (fall/spring). The ROW would be covered with stockpiled topsoil and reseeded with a seed mixture determined by the BIA. Arrow would control noxious weeds within the ROW and other applicable facilities by approved chemical or mechanical methods. The entire ROW would be monitored for erosion, subsidence, or noxious weeds. In areas where problems are found to occur, reclamation efforts would continue until the BIA feels the ROW is successfully reclaimed. Reclamation is considered successful when:

- seeded areas are established;
- adjacent vegetative communities spread back into the disturbed areas; and
- noxious weeds are under control.

If after two growing seasons the new seeding is not successful, the BIA may require additional efforts to establish vegetation. For noxious weeds, a survey was conducted on the ROW prior to the construction commencing. The BIA has developed a weed management plan to treat known or likely to occur noxious weed species.

Final Reclamation

Final reclamation would occur when the pipeline is decommissioned. All disturbed areas would be reclaimed, reflecting the BIA view of oil and gas exploration and production as temporary intrusions on the landscape. All facilities would be removed. Access roads and work areas would be leveled or backfilled as necessary, scarified, recontoured, and seeded. Exceptions to these reclamation measures might occur if the BIA approves assignment of an access road either to the BIA roads inventory or to concurring surface allottees. It is economically and environmentally unfeasible to excavate and remove the decommissioned pipeline. Instead it would be purged with water of any natural gas remaining in the lines and then abandoned in place.

2.3 PREFERRED ALTERNATIVE

The preferred alternative is to complete all administrative actions and approvals necessary to authorize or facilitate the construction of this natural gas pipeline.

3.0 THE AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS

The broad definition of NEPA leads to the consideration of the following elements of the human and natural environment: air quality, public health and safety, water resources, wetland/riparian habitat, threatened and endangered species, soils, vegetation and invasive species, cultural resources, socioeconomic conditions, and environmental justice.

3.1 PHYSICAL SETTING

The proposed pipeline is in a rural area located on the Reservation in west-central North Dakota. The Reservation is the home of the MHA Nation. The Reservation encompasses more than one million acres, of which almost half, including the project area, are held in trust by the United States for either the MHA Nation or individual allottees.

The proposed pipeline is situated geologically within the Williston Basin, where the shallow structure consists of sandstones, silts, and shales dating to the Tertiary period (65 to 2 million years ago), including the Sentinel Butte and Golden Valley formations. The underlying Bakken Formation is a well-known source of hydrocarbons. Although earlier oil/gas exploration activity within the Reservation was limited and commercially unproductive, recent economic changes and technological advances now make accessing oil in the Bakken Formation feasible.

The Reservation is within the northern Great Plains ecoregion, which consists of four physiographic units: 1) the Missouri Coteau Slope north of Lake Sakakawea; 2) the Missouri River trench (not flooded); 3) the Little Missouri River badlands; and 4) the Missouri Plateau south and west of Lake Sakakawea (Williams and Bluemle 1978). Much of the Reservation is on the Missouri Coteau Slope. Elevations of the glaciated, gently rolling landscape range from a normal pool elevation of 1,838 feet at Lake Sakakawea to over 2,600 feet on Phaelan's Butte near Mandaree. Annual precipitation on the plateau averages between 15 and 17 inches. Mean temperatures fluctuate between -3 and 21 degrees Fahrenheit (°F) in January and between 55°F and 83°F in July, with 95 to 130 frost-free days each year (Bryce et al. 1998; High Plains Regional Climate Center 2008).

3.2 AIR QUALITY

3.2.1 Air Quality Standards for Criteria Pollutants

The federal Clean Air Act (CAA) (USC § 7401–7671, as amended in 1990) established national ambient air quality standards (NAAQS) for criteria pollutants to protect public health and welfare. It also set standards for other compounds that can cause cancer, regulated emissions that cause acid rain, and required federal permits for large sources. NAAQS have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead (U.S. Environmental Protection Agency [EPA] 2010a). The primary NAAQS have been set for pervasive compounds that are generally emitted by industry or motor vehicles. Standards for each pollutant meet specific public health and welfare criteria; thus, they are called the 'criteria pollutants.'

The CAA mandates prevention of significant air quality deterioration in certain designated attainment areas and has designated more stringent air quality standards, known as Secondary Standards, for these areas. Class I attainment areas have national significance and include national parks greater than 6,000 acres, national monuments, national seashores, and federal wilderness areas larger than 5,000 acres that were designated prior to 1977 (Ross 1990). The Class I regulations (40 Code of Federal Regulations [CFR] 51.307) attempt to protect visibility through a review of major new and modified sources of pollutants, and requiring strict air quality emission standards if they will have an adverse impact on visibility within the Class I area (National Park Service 2010).

The nearest designated attainment area to the project area is the Theodore Roosevelt National Park (TRNP), a Class I area that covers about 110 square miles in three units within the Little Missouri National Grassland. The TRNP is located approximately 16 miles south of Watford City, North Dakota, and approximately 50 miles west of the proposed pipeline location. Two air quality monitoring stations are located there, with the North Unit monitoring most criteria pollutants (National Park Service 2010; North Dakota Department of Health [NDDH] 2010). All other parts of the state, including the Reservation, are classified as Class II attainment areas, affording them protections through the Primary NAAQS (NDDH 2010).

Some states have adopted more stringent standards for criteria pollutants, or have chosen to adopt new standards for other pollutants. For instance, the NDDH has established a standard for hydrogen sulfide (H_2S) (NDDH 2010).

Criteria pollutants and their health effects include the following.

- **Sulfur dioxide (SO_2):** SO_2 is a colorless gas with a strong, suffocating odor. SO_2 is produced by burning coal, fuel oil, and diesel fuel, and can trigger constriction of the airways, causing particular difficulties for asthmatics. Long-term exposure is associated with increased risk of mortality from respiratory or cardiovascular disease. SO_2 emissions are also a primary cause of acid rain and plant damage (EPA 2010a).
- **Inhalable Particulate Matter (PM10 and PM2.5):** PM10 and PM2.5 are classes of compounds that can lodge deep in the lungs, causing adverse health problems, depending on their size, concentration, and content. Based on extensive health studies, particulate matter is regulated under two classes: PM10 is the fraction of total particulate matter 10 microns or smaller, and PM2.5 is two and one-half microns or smaller. Inhalable particulate matter can range from inorganic wind-blown soil to organic and toxic compounds found in diesel exhaust. Toxic compounds such as benzene often find a route into the body via inhalation of fine particulate matter (EPA 2010a).
- **Nitrogen dioxide (NO_2):** NO_2 is a reddish-brown gas with an irritating odor. Primary sources include motor vehicles, industrial facilities, and power plants. In the summer months, NO_2 is a major component of photochemical smog. NO_2 is an irritating gas that may constrict airways, especially of asthmatics, and increase the susceptibility to infection in the general population. NO_2 is also involved in ozone smog production (EPA 2010a).

- **Ozone (O_3):** O_3 is a colorless gas with a pungent, irritating odor and creates a widespread air quality problem in most of the world's industrialized areas. Ozone smog is not emitted directly into the atmosphere but is primarily formed through the reaction of hydrocarbons and nitrogen oxides (NOx) in the presence of sunlight. Health effects associated with O_3 can include reduced lung function, aggravated respiratory illness, and irritated eyes, nose, and throat. Chronic exposure can cause permanent damage to the alveoli of the lungs. O_3 can persist for many days after formation and travel several hundred miles (EPA 2010a).
- **Carbon monoxide (CO):** CO is a colorless, odorless gas that is a byproduct of incomplete combustion. CO concentrations typically peak nearest a source, such as roadways or areas with high fireplace use, and decrease rapidly as distance from the source increases. Ambient levels are typically found during periods of stagnant weather, such as on still winter evenings with a strong temperature inversion. CO is readily absorbed into the body from the air. It decreases the capacity of the blood to transport oxygen, leading to health risks for unborn children and people suffering from heart and lung disease. The symptoms of excessive exposure are headaches, fatigue, slow reflexes, and dizziness (EPA 2010a).

The Primary and Secondary NAAQS for criteria pollutants are summarized in Table 3-1. NEPA assessments require analysis of both near-field and far-field as part of the cumulative effects of proposals on air quality. Therefore, the North Dakota Ambient Air Quality Standards (AAQS) are shown as well as federal standards.

Table 3-1. NAAQS and Other Air Quality Standards.

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
SO_2 in parts per million of air (ppm)	3-hour	-	0.5	0.273 (1-hour)
	24-hour	0.14	-	0.099
	Annual Mean	0.03	-	0.023
PM10 in micrograms per cubic meter of air ($\mu g/m^3$)	24-hour	150	-	150
	Expected Annual Mean	50		50
PM2.5 ($\mu g/m^3$)	24-hour	35	35	-
	Weighted Annual Mean	15	15	-
NO_2 (ppm)	Annual Mean	0.053	0.053	0.053
CO (ppm)	8-hour	9	-	9
	1-hour	35	-	35
O_3 (ppm)	8-hour	0.075	0.075	-
	1-hour	-	-	0.12
Lead ($\mu g/m^3$)	Quarterly Mean	1.5	1.5	1.5

Pollutant	Averaging Period	Primary Standard (NAAQS)	Secondary Standard (National Parks)	North Dakota AAQS
Hydrogen sulfide (H_2S) (ppm)	Instantaneous	-	-	10
	1-hour	-	-	0.20
	24-hour	-	-	0.10
	3-month	-	-	0.02

Sources: EPA 2010a; NDDH 2010.

North Dakota has separate state standards for several pollutants that are different from the federal criteria standards. These are the standards for SO_2 and H_2S. All other state criteria pollutant standards are the same as federal. North Dakota was one of 13 states that met standards for all federal criteria pollutants in 2008.

In addition, the EPA averages data from monitoring stations within each county to determine the Air Quality Index (AQI), a general measure of air quality for residents of the county. An AQI greater than 100 is indicative of unhealthy air quality conditions for the county residents, although residents may experience greater or lesser risks depending on their proximity to the sources of pollutants (EPA 2010b).

3.2.2 Greenhouse Gas Emissions and Responses to the Threat of Climate Change

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). Some GHGs such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The EPA (2010c) identifies the principal GHGs that enter the atmosphere because of human activities as the following.

- **Carbon Dioxide (CO_2)**: CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)**: CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- **Nitrous Oxide (N_2O)**: N_2O is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- **Fluorinated Gases**: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are typically emitted in small quantities, but are potent GHGs thought to contribute significantly to global warming processes (EPA 2010c).

CO_2 is the primary GHG, responsible for approximately 90 percent of radiative forcing, which is the rate of energy change as measured at the top of the atmosphere. Radiative forcing can be positive (warmer) or negative (cooler) (EPA 2010c). To simplify discussion of the various GHGs, the term 'Equivalent CO_2' or 'CO_2e' has been developed. CO_2e is the amount of CO_2 that would cause the same level of radiative forcing as one unit of one of the other GHGs. For example, one ton of CH_4 has a CO_2e of 22 tons; therefore, 22 tons of CO_2 would cause the same level of radiative forcing as one ton of CH_4. N_2O has a CO_2e value of 310 (EPA 2010c). These GHGs are all positive radiative forcing GHGs Thus, control strategies often focus on the gases with the highest positive CO_2e values (EPA 2010c). This document incorporates by reference cited studies and reports from the Pew Center (2009) and the Intergovernmental Panel on Climate Change (IPPC) (2007) concerning GHGs and their impacts.

On May 13, 2010, EPA issued a final rule that establishes thresholds for GHG emissions that define when permits under the New Source Review Prevention of Significant Deterioration (PSD) and title V Operating Permit programs are required for new and existing industrial facilities (EPA 2010d). This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain PSD and title V permits. Facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities. Emissions from small farms, restaurants, and all but the very largest commercial facilities will not be covered by these programs at this time; however, the EPA recently initiated additional hearings to help determine the types of industries to be held to new standards under these federal permits (EPA 2010d).

Energy production and supply was estimated to emit up to 25.9 percent of GHGs world-wide in 2004 (Pew Center 2009). Methane gas (CH_4), with a high radiative forcing CO_2e ratio, is a common fugitive gas emission in oil and gas fields (EPA 2010d). Oil and gas production, however, is highly variable in potential GHG emissions. Oil and gas producers in the United States are not considered large GHG emitters by the EPA, and are not the subject of any current federal proposals that would regulate GHG emissions.

3.2.3 Hazardous Air Pollutants

Hazardous air pollutants (HAPs) are a class of compounds known to cause cancer, mutation, or other serious health problems. HAPs are usually a localized problem near the emission source. HAPs are regulated separately from criteria air pollutants. There are several hundred HAPs recognized by the EPA and State of North Dakota. Health effects of HAPs may occur at exceptionally low levels; for many HAPs it is not possible to identify exposure levels that do not produce adverse health affects. Major sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), wood smoke, and motor vehicle exhaust. Unlike regulations for criteria pollutants, there are no ambient air quality standards for HAPs. Examples of HAPs found in gases released by oil field development and operation include benzene, toluene, xylene, and formaldehyde (BLM 2009). HAP emissions receive evaluation based on the degree of exposure that can cause risk of premature mortality, usually from cancer.

Risk assessments express premature mortality in terms of the number of deaths expected per one million persons. The NDDH typically reviews projects and either requires an applicant to prepare a risk assessment or assign the state engineers to do the work. For new sources emitting HAPs with known negative health effects, an applicant must demonstrate that the combined impact of new HAP emission does not result in a maximum individual cancer risk greater than one in one hundred thousand.

3.2.4 Existing Air Quality in the Project Area

Federal air quality standards apply in the project area, which is designated as a Class II attainment area. Although the State of North Dakota does not have jurisdiction over air quality matters on the Reservation and no air quality monitoring stations occur within the boundaries of the Reservation, monitoring efforts are being made by the state and industry in the area. The NDDH operates a network of monitoring stations around the state that continuously measure pollution levels. Industry also operates monitoring stations as required by the state. The data from all these stations are subject to quality assurance, and when approved, it is published on the World Wide Web and available from the EPA and NDDH (NDDH 2010).

Monitoring stations providing complete data near the project area include Theodore Roosevelt National Park North Unit (TRNP-NU) (Air Quality Station #380530002) in McKenzie County, and Dunn Center (Air Quality Station #38025003) in Dunn County (NDDH 2010). These stations are located west and southeast of the proposed pipeline, respectively. Bear Paw Energy and Amerada Hess operate site-specific monitoring stations in the region. However, these stations do not provide coverage that is applicable to this analysis (NDDH 2010).

Criteria pollutants measured at the two monitoring stations include SO_2, PM10, NO_2, and O_3. Lead and CO are not monitored by either station. Table 3-2 summarizes the NAAQS and the maximum levels of criteria pollutants. The highest value at either of the two monitoring locations is shown for each year from 2007 through 2009.

Table 3-2. Maximum Levels of Monitored Pollutants, 2007–2009, as Measured at Dunn Center and Theodore Roosevelt National Park North Unit Monitoring Stations.

Criteria Pollutant	Averaging Period	Primary Standard (NAAQS)	Maximum Reported Level from Dunn Center and TRNP-NU Monitoring Stations		
			2009	2008	2007
SO_2 (parts per million [ppm])	24-hour	0.14	0.006	0.004	0.004
	Annual Mean	0.03	0.0005	0.0004	0.0011
PM10 (micrograms per cubic meter [$\mu g/m^3$])	24-hour	150	54	108	57.4
	Expected Annual Mean	50	11.3	14.2	13.2
PM2.5 ($\mu g/m^3$)	24-hour	35	15	35.7	22.2
	Weighted Annual Mean	15	3.4	3.7	3.6
NO_2 (ppm)	Annual Mean	0.053	0.0015	0.0018	0.0015
O_3 (ppm)	8-hour	0.08	0.057	0.0063	0.0071

Source: NDDH 2010.

All monitored criteria pollutants are well below federal and state standards in the project area for all years in the study period from 2007 through 2009. In addition to the low levels of monitored criteria pollutants, the EPA reports that Dunn County and McKenzie County had zero days in which the AQI exceeded 100 in 2007 and 2008, indicating that general air quality does not pose an unhealthy condition for residents of these counties (EPA 2010b). The AQI was not available for 2009, but is also likely to be zero for these counties.

3.2.5 Typical Air Emissions from Oil Field Development

According to EPA Emission Inventory Improvement documents (EPA 1999), oil field emissions encompass three primary areas: combustion, fugitive, and vented. Typical processes that occur during exploration and production include the following.

- Combustion emissions include SO_2, ozone precursors called volatile organic compounds (VOCs), GHGs, and HAPs. Sources include engine exhaust, dehydrators, and flaring (EPA 1999).
- Fugitive emissions include criteria pollutants, H_2S, VOCs, HAPs, and GHGs. Sources of fugitive emissions include mechanical leaks from well field equipment such as valves, flanges, and connectors that may occur in heater/treaters, separators, pipelines, wellheads, and pump stations. Pneumatic devices such as gas actuated pumps and pressure/level controllers also result in fugitive emissions. Other sources of fugitive emissions include evaporation ponds and pits, condensate tanks, storage tanks, and wind-blown dust (from truck and construction activity) (EPA 1999).
- Vented emissions include GHGs, VOCs, and HAPs. Primary sources are emergency pressure relief valves and dehydrator vents (EPA 1999).

Pipeline construction, access road construction, and truck traffic would generate emissions of criteria pollutants and HAPs. Primary emission sources during drilling are diesel exhaust, wind-blown dust from disturbed areas and travel on dirt roads, evaporation from pits and sumps, and gas venting. Diesel emissions are being progressively controlled by the EPA in a nationwide program (EPA 2010d). This program takes a two-pronged approach. First, fuels are improving to the ultra-low sulfur standard, and secondly manufacturers must produce progressively lower engine emissions.

3.2.6 Air Quality Best Management Practices

Under the CAA, federal land management agencies have an affirmative responsibility to protect air quality. Tribes, federal land managers, and private entities can make emission controls part of a lease agreement. BMPs can be adopted for various portions of a pipeline's lifecycle. BMPs fall into the following two general categories.

- Transportation BMPs to reduce the amount of fugitive dust and vehicle emissions
  - use water or dust suppressants to control fugitive dust on roads;
  - control road speeds; and
  - utilize van or carpooling.

- Monitoring and repair
  - use directed inspection and maintenance methods to identify and cost-effectively fix fugitive gas leaks; and
  - install an air quality monitoring station.

3.2.7 Potential Air Quality Impacts

Based on the existing air quality of the region, typical air levels and types of emissions from similar oil field projects, and Arrow's commitment to implementation of BMPs identified in Section 3.2.6, the Proposed Action would not produce significant increases in criteria pollutants, GHGs, or HAPs. The decrease in flaring activities and the number of trucks operating on the Reservation should improve overall air quality.

3.3 WATER RESOURCES

This section identifies the existing water resources within the project area and potential effects of the project. Specific subjects discussed in this section include surface water and surface water quality, groundwater resources, and the potential short-term and long-term impacts of the proposed project on these water resources.

3.3.1 Surface Water

The surface water resources in the project area would be managed and protected according to existing federal laws and policies regarding the use, storage, and disposal of the resource during the construction and operation of the project. Surface water resource use and protection is administered under the following federal laws:

- Clean Water Act of 1972, as amended (33 USC 1251 et seq.)
- Federal Land Policy and Management Act of 1976 (43 USC 1711–1712)
- National Environmental Policy Act of 1972 (42 USC 4321)
- Safe Drinking Water Act of 1974, as amended (42 USC 300 et seq.)

Water quality is protected under the Federal Water Pollution Control Act (as amended), otherwise known as the Clean Water Act (CWA). The CWA has developed rules for regulating discharges of pollutants into waters of the U.S. and also regulates water quality standards for surface waters. The CWA has also made it unlawful to discharge any pollutant from a point source into any navigable waters of the U.S., unless a permit has been obtained from the National Pollution Discharge Elimination System (NPDES) program.

The Environmental Division of the MHA Nation has had an application for delegation of authority to set federally approved water quality standards on the Reservation pending with the EPA since 1996. In the absence of tribal surface water quality authorities, enforcement of federal environmental laws regarding surface water on the Reservation is accomplished through permitting, inspection, and monitoring activities of the NPDES program, as administered by the EPA.

The project area is located within the Lake Sakakawea and Lower Little Missouri River watersheds (Hydrologic Unit Codes [HUCs] 10110101 and 10110205, respectively), and within the Upper Bear Den Creek (HUC 101101012001), Upper Moccasin Creek (HUC 101102050604), Dry Creek (HUC 101102050506), and Lower Moccasin Creek (HUC 101102050605) sub-watersheds (Figure 3-1). Runoff throughout the project area is by sheet flow until collected by ephemeral and perennial streams, including Moccasin Creek draining to Lake Sakakawea. The proposed pipeline also crosses Squaw Creek. Figure 3-1 illustrates the surface water runoff direction for the project area. Lake Sakakawea is approximately 3.5 miles from the closest part of the proposed pipeline. Fringe wetlands do occur adjacent to the project area, along Moccasin Creek.

All wetlands and intermittent and perennial waterbodies would be directionally drilled to avoid impact. Ephemeral drainages would be trenched and in most cases the pipe would be laid within a 24-hour period to reduce the probability for sediment transportation. BMPs would be implemented for all ground-disturbing activities, as required by the CWA. With the implementation of all the provisions of the CWA NPDES, including federal requirements for implementation of adequate spill prevention, control and countermeasures during drilling and construction, no impacts to water resources are anticipated.

As part of the NPDES Construction Permit, the proposed project would be engineered and constructed to minimize the suspended sediment (i.e., turbidity) concentration of surface runoff, avoid disruption of drainages, and avoid direct impacts to surface water. Any chemicals or potentially hazardous materials would be handled in accordance with the operator's spill prevention, control, and countermeasure plan. Provisions established under this plan would minimize potential impacts to any surface waters associated with an accidental spill.

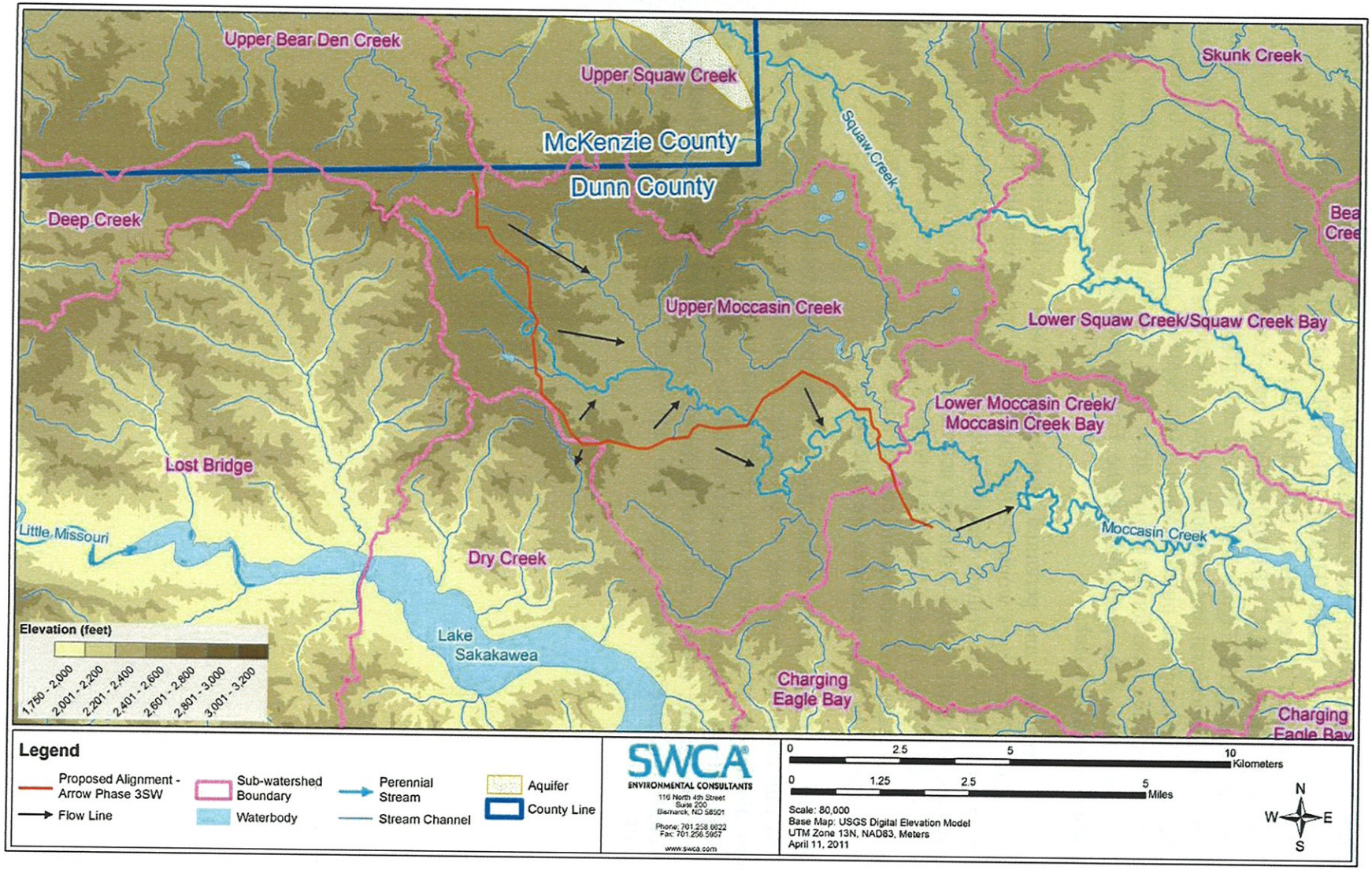

Figure 3-1. Sub-watershed and water flow map.

3.3.2 Groundwater

Aquifers in the project area include, from deepest to shallowest, the Cretaceous Fox Hills and Hell Creek formations and the Tertiary Ludlow, Tongue River, and Sentinel Butte formations (Table 3-3). Several shallow aquifers related to post-glacial outwash composed of till, silt, sand, and gravel are located in Dunn County. However, none are within the proposed project areas.

Table 3-3. Common Aquifers in the Proposed Project Area and Surrounding Region.

Period	Formation		Depth Range (feet)	Thickness (feet)	Lithology	Water-Yielding Characteristics
Quaternary	Alluvium		0–40	40	Silt, sand, and gravel	Maximum yield of 50 gal/min to individual wells from sand and gravel deposits.
Tertiary	Fort Union Group	Sentinel Butte	0–670	0–670	Silt, clay, sand, and lignite	5 to 100 gal/min in sandstone. 1 to 200 gal/min in lignite.
		Tongue River	140–750	350–490	Silt, clay, sand, and lignite	Generally less than 100 gal/min in sandstone.
		Cannonball/ Ludlow	500–1,150	550–660	Fine- to medium-grained sandstone, siltstone, and lignite	Generally less than 50 gal/min in sandstone.
Cretaceous	Hell Creek		1,000–1,750	200–300	Claystone, sandstone, and mudstone	5 to 100 gal/min in sandstone.
	Fox Hills		1,100–2,000	200–300	Fine- to medium-grained sandstone and some shale	Generally less than 200 gal/min in sandstone. Some up to 400 gal/min.

Sources: Croft 1985; Klausing 1979.
gal/min = gallons per minute

The shallow Sentinel Butte Formation, commonly used for domestic supply in the area, outcrops in Dunn and McKenzie counties. This aquifer meets standards of the NDDH (Croft 1985). Detailed analyses are available from the North Dakota Geological Survey, Bulletin 68, Part III, 1976.

3.3.2.1 Potential Impacts to Surface Water and Groundwater Resources

The proposed project would be located (at its closest point) 3.5 miles from Lake Sakakawea. Several protective measures have been included in the construction plan, such as implementing proper hazardous materials management. Based on the location and design, no significant adverse impacts to surface water or groundwater resources are anticipated from the Proposed Action.

3.4 SOILS

Soils in the project area vary depending on the topography, slope orientation, and parent material from which the soil is derived. The project area is located toward the center of the Williston Basin. The Greenhorn Formation, which consists of thin limestone and dark gray to black organic-rich shale, is found from the surface to a depth of approximately 4,000 feet. The Greenhorn is subdivided into lower and upper intervals of limestone and calcareous shale with a middle interval of shale. Near-surface sediment is of Recent, Pleistocene, or Tertiary age, and includes Sauk, Tippecanoe, Kaskaskia, Absaroka, Zuni, and Tejas Sequences. The Natural Resources Conservation Service (NRCS) soil data for soil series found in the project area are described in this section.

3.4.1 Natural Resources Conservation Service Soil Data

Twenty-two soil types are found throughout the project area. The distribution of each soil type is summarized in Tables 3-4 through 3-6 and illustrated in Figures 3-2 through 3-8, followed by individual descriptions of each soil type. Each individual soil series may exist individually within the project area or in combination with other soil types.

Table 3-4. Soil Types of the Proposed Pipeline in Dunn County, North Dakota, and the Disturbed Acres.

Map Unit #	Soil Map Unit	Acres
3	Straw loam, channeled, 0 to 2 percent slopes	1.72861
7	Straw-Rhoades loams, 0 to 2 percent slopes	0.64296
15	Belfield-Farland silt loams, 0 to 2 percent slopes	0.55246
18	Belfield-Grail silty clay loams, 0 to 2 percent slopes	1.43749
105	Harriet silt loam, 0 to 2 percent slopes	0.97092
105	Harriet silt loam, 0 to 2 percent slopes	0.86416
105	Harriet silt loam, 0 to 2 percent slopes	2.05029
105	Harriet silt loam, 0 to 2 percent slopes	0.66534
106B	Daglum silt loam, 0 to 6 percent slopes	4.25568
106B	Daglum silt loam, 0 to 6 percent slopes	2.98935
106B	Daglum silt loam, 0 to 6 percent slopes	0.76741
106B	Daglum silt loam, 0 to 6 percent slopes	0.58500
106B	Daglum silt loam, 0 to 6 percent slopes	0.66861
10D	Cabba extremely stony loam, 3 to 25 percent slopes	3.83427
13D	Wabek gravelly loam, 2 to 15 percent slopes	2.20570
29B	Farland-Rhoades silt loam, 0 to 6 percent slopes	0.91428
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	2.47851
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	1.40644

Map Unit #	Soil Map Unit	Acres
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	0.22101
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	4.18362
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	6.90045
30E	Cohagen-Vebar fine sandy loams, 9 to 25 percent slopes	0.84621
46B	Bowdle loam, 2 to 6 percent slopes	0.60871
46B	Bowdle loam, 2 to 6 percent slopes	0.47208
46B	Bowdle loam, 2 to 6 percent slopes	0.89001
49B	Morton silt loam, 3 to 6 percent slopes	0.03501
4B	Arnegard loam, 2 to 6 percent slopes	1.42363
52B	Morton -Dogtooth silt loams, 0 to 6 percent slopes	2.18257
52C	Morton -Dogtooth silt loams, 6 to 9 percent slopes	1.95716
54B	Parshall fine sandy loam, 0 to 6 percent slopes	1.29440
62B	Rhoades silt loam, 0 to 6 percent slopes	0.00117
62B	Rhoades silt loam, 0 to 6 percent slopes	8.04327
62B	Rhoades silt loam, 0 to 6 percent slopes	2.92021
62B	Rhoades silt loam, 0 to 6 percent slopes	0.96766
62B	Rhoades silt loam, 0 to 6 percent slopes	5.21770
62B	Rhoades silt loam, 0 to 6 percent slopes	2.64062
62B	Rhoades silt loam, 0 to 6 percent slopes	4.38554
62B	Rhoades silt loam, 0 to 6 percent slopes	0.75224
62B	Rhoades silt loam, 0 to 6 percent slopes	1.11536
62B	Rhoades silt loam, 0 to 6 percent slopes	5.70659
62B	Rhoades silt loam, 0 to 6 percent slopes	2.71477
62D	Dogtooth-Cabba complex, 9 to 15 percent slopes	0.97707
71B	Sen silt loam, 3 to 6 percent slopes	6.81453
71C	Sen silt loam, 6 to 9 percent slopes	2.68655
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	1.22671
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	0.68001
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	0.22024
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	1.58048
81B	Vebar-Parshall fine sandy loams, 0 to 6 percent slopes	3.17811
81C	Vebar-Parshall fine sandy loams, 6 to 9 percent slopes	0.52953
81C	Vebar-Parshall fine sandy loams, 6 to 9 percent slopes	0.14337
81C	Vebar-Parshall fine sandy loams, 6 to 9 percent slopes	1.30235
81D	Vebar fine sandy loams, 9 to 15 percent slopes	0.05309
81D	Vebar fine sandy loams, 9 to 15 percent slopes	4.60272
81D	Vebar fine sandy loams, 9 to 15 percent slopes	1.64194
81D	Vebar fine sandy loams, 9 to 15 percent slopes	4.08116
81D	Vebar fine sandy loams, 9 to 15 percent slopes	0.95272
82D	Vebar extremely stony fine sandy loam, 3 to 15 percent slopes	3.12673
88B	Williams loam, 3 to 6 percent slopes	1.87932
88C	Williams loam, 6 to 9 percent slopes	3.58236
91B	Williams-Noonan loams, 3 to 6 percent slopes	0.47065
93D	Zahl-Williams loams, 9 to 15 percent slopes	1.74118
9D	Amor-Cabba loams, 9 to 15 percent slopes	0.81162
9D	Amor-Cabba loams, 9 to 15 percent slopes	1.34805
9D	Amor-Cabba loams, 9 to 15 percent slopes	0.76974

Map Unit #	Soil Map Unit	Acres
9E	Cabba loam, 15 to 45 percent slopes	0.04681
9E	Cabba loam, 15 to 45 percent slopes	2.79382
9E	Cabba loam, 15 to 45 percent slopes	1.31110
9E	Cabba loam, 15 to 45 percent slopes	2.02998
9E	Cabba loam, 15 to 45 percent slopes	1.47433
	Total	**136.55375**

Source: NRCS 2009.

Table 3-5. Soil Types of the Proposed Pipeline in McKenzie County County, North Dakota, and the disturbed acres.

Map Unit #	Soil Map Unit	Acres
63B	Vebar-Flasher complex, 3 to 6 percent slopes	0.51

Source: NRCS 2009.

Table 3-6. Soil Types of the Proposed Access Roads in Dunn County, North Dakota.

Map Unit #	Soil Map Unit	Acres
3	Straw loam, channeled, 0 to 2 percent slopes	0.687984
7	Straw-Rhoades loams, 0 to 2 percent slopes	1.117180
7	Straw-Rhoades loams, 0 to 2 percent slopes	1.140790
18	Belfield-Grail silty clay loams, 0 to 2 percent slopes	0.442527
106B	Daglum silt loam, 0 to 6 percent slopes	2.920740
106B	Daglum silt loam, 0 to 6 percent slopes	0.792261
62B	Rhoades silt loam, 0 to 6 percent slopes	0.014958
88B	Williams loam, 3 to 6 percent slopes	0.483916
9D	Amor-Cabba loams, 9 to 15 percent slopes	0.382429
9E	Cabba loam, 15 to 45 percent slopes	1.217210
	Total	**9.20**

Source: NRCS 2009.

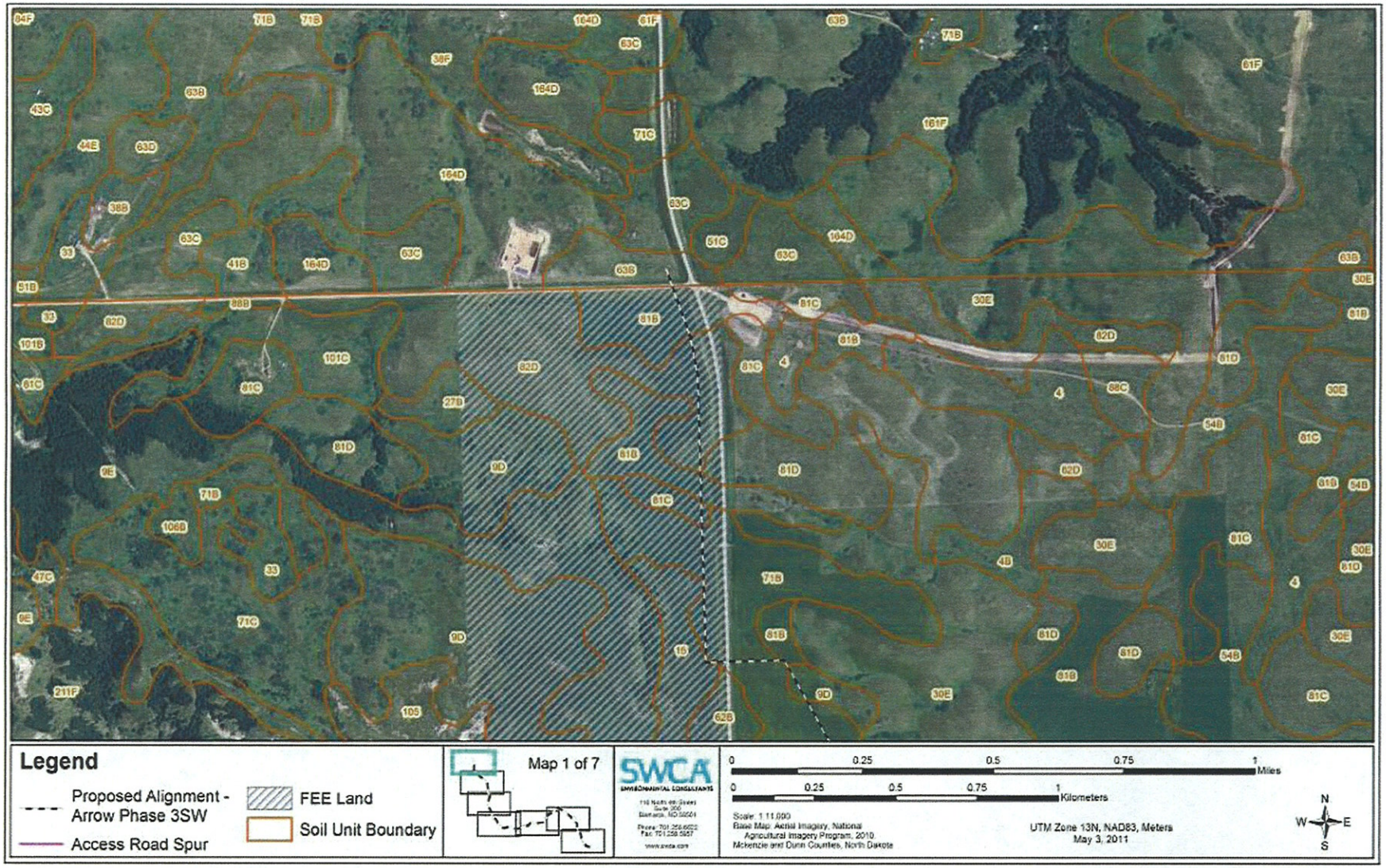

Figure 3-2. Approximate spatial extent of soil types within and around the project area (Map 1 of 7).

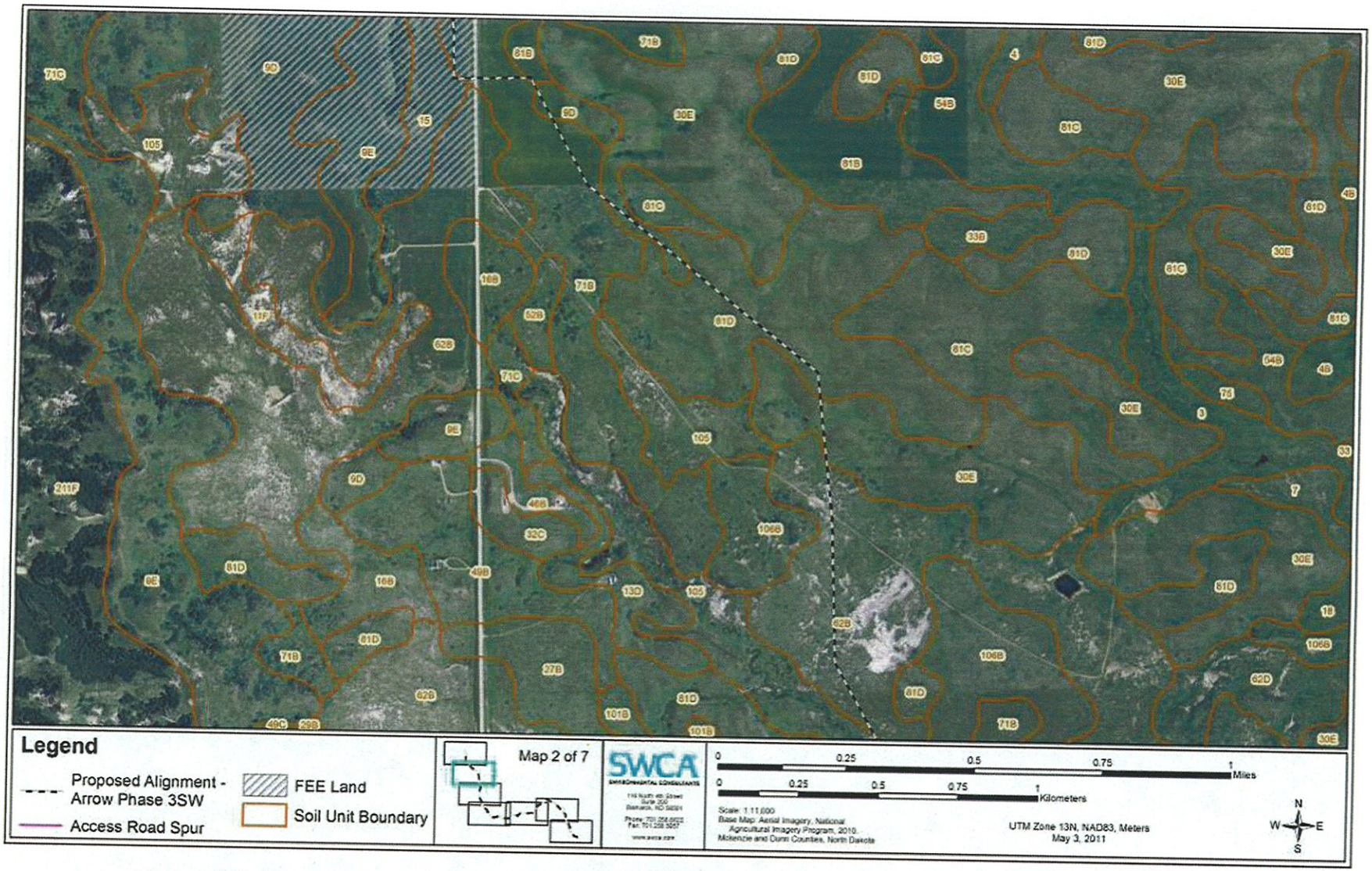

Figure 3-3. Approximate spatial extent of soil types within and around the project area (Map 2 of 7).

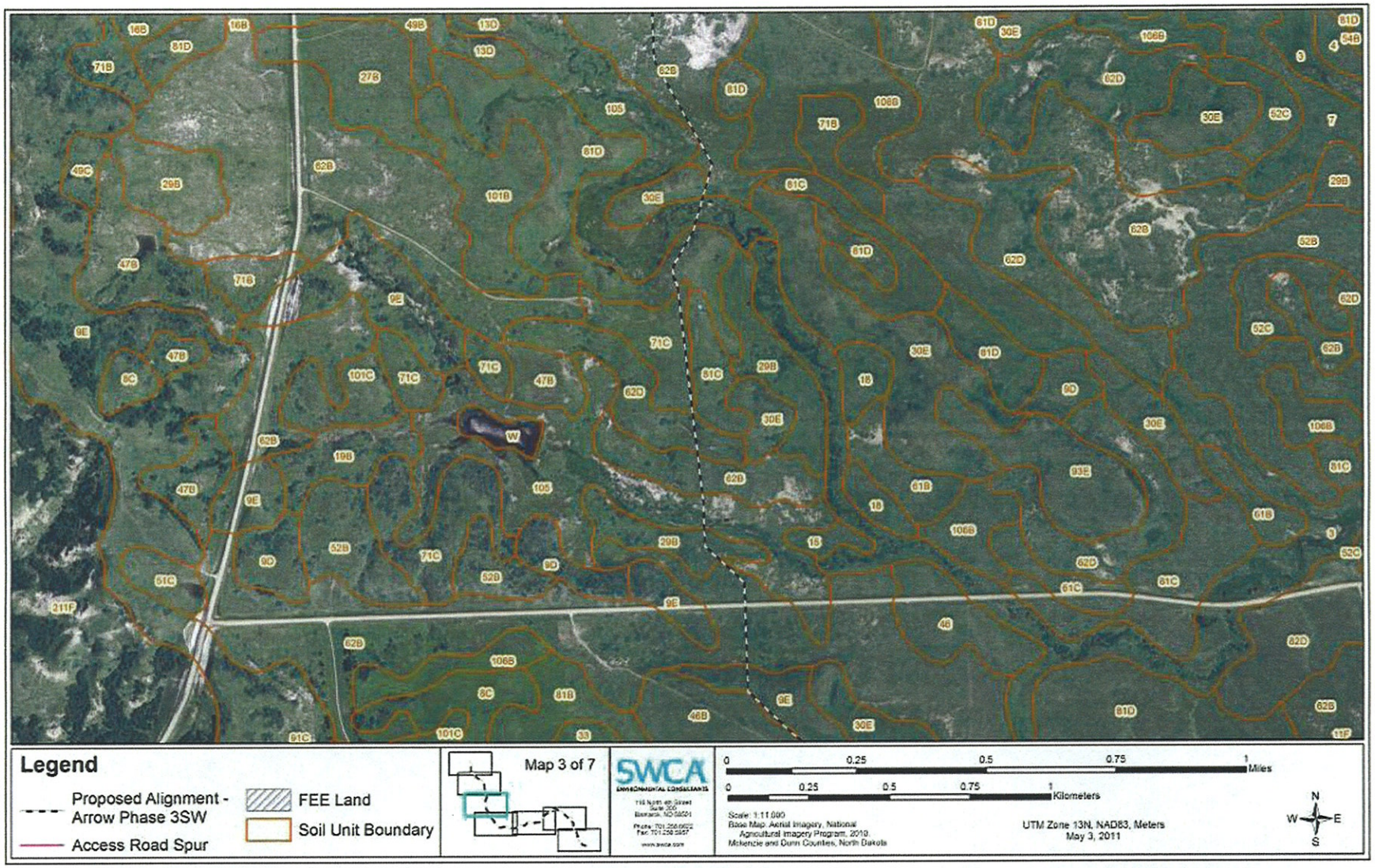

Figure 3-4. Approximate spatial extent of soil types within and around the project area (Map 3 of 7).

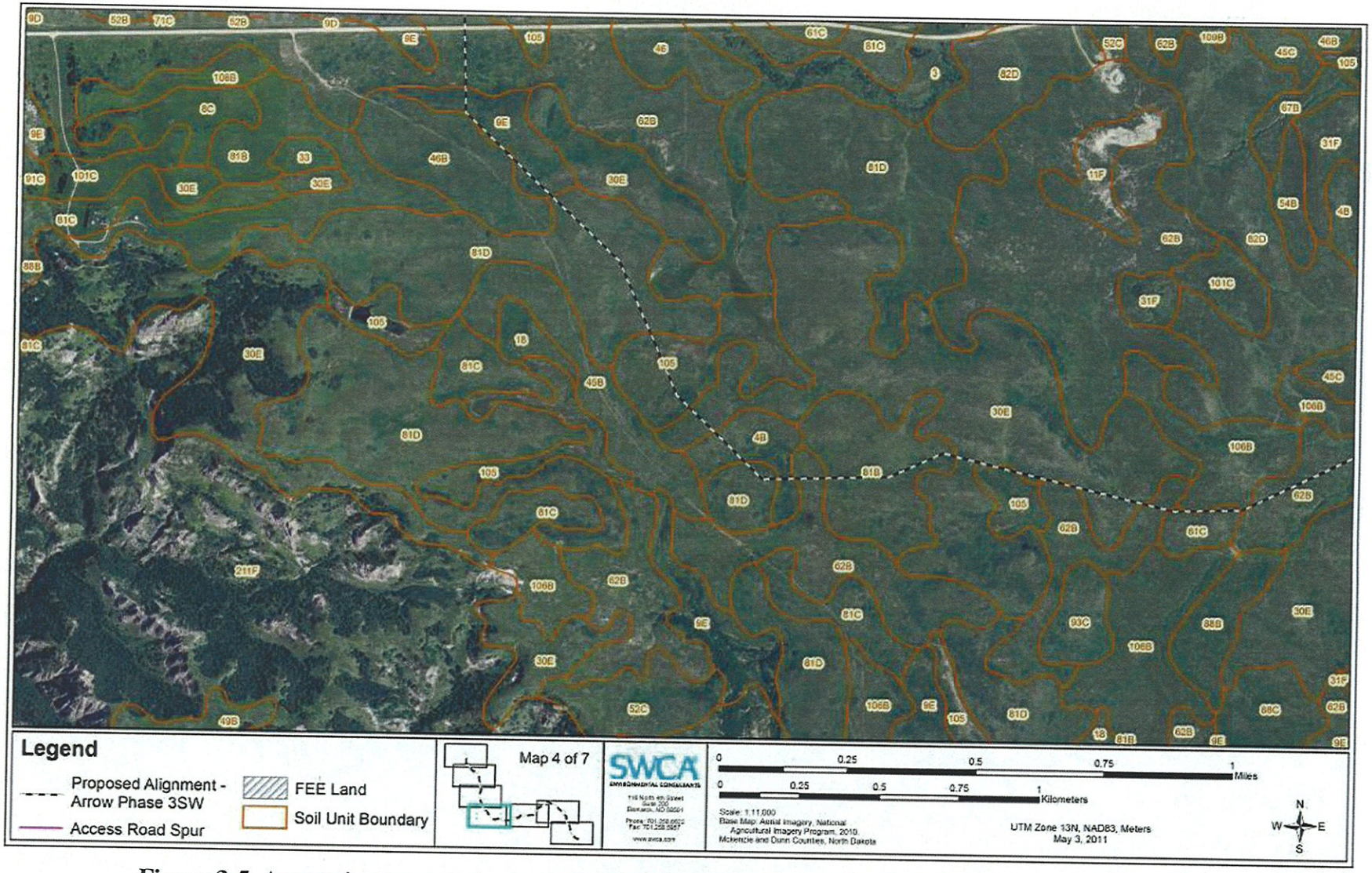

Figure 3-5. Approximate spatial extent of soil types within and around the project area (Map 4 of 7).

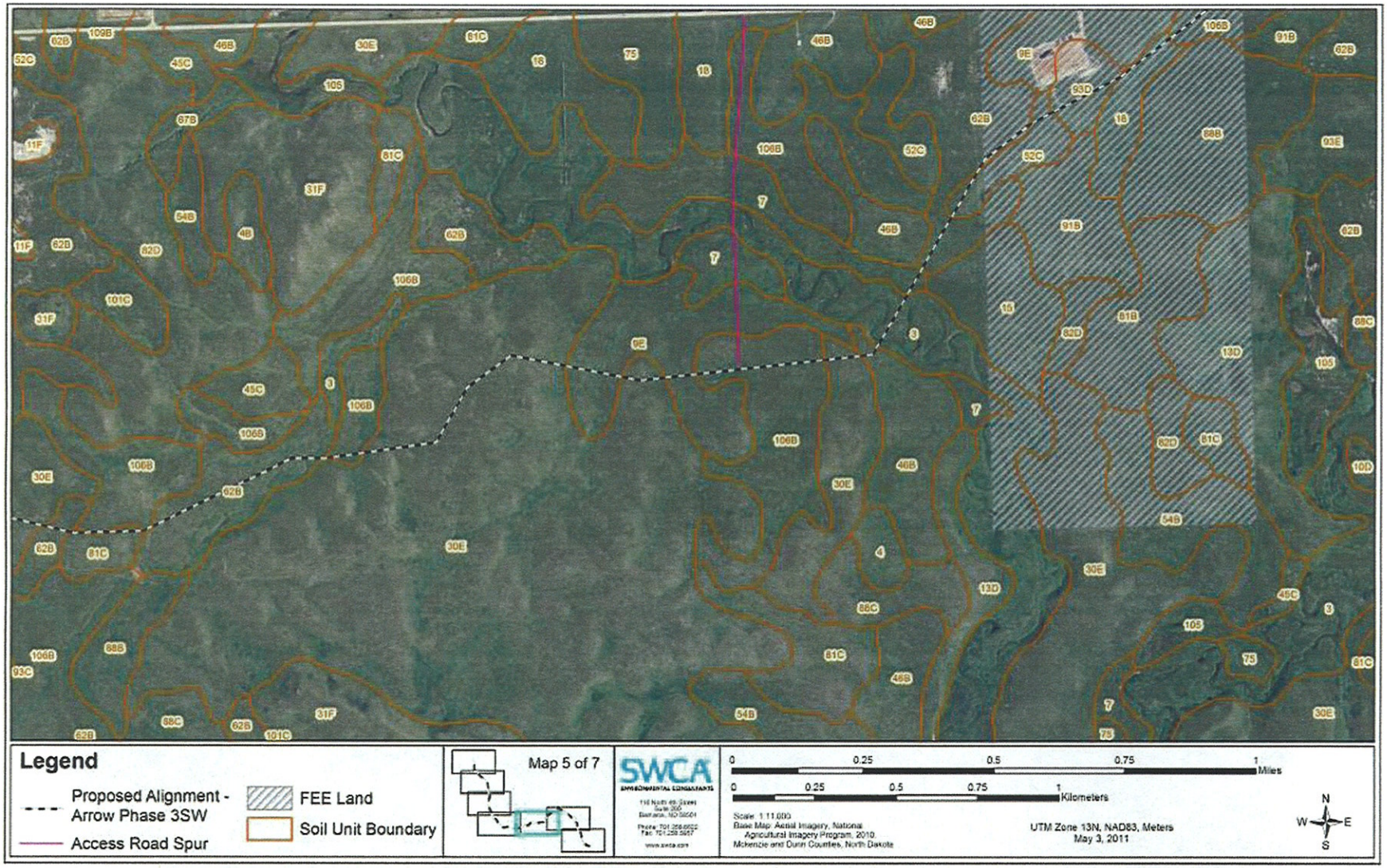

Figure 3-6. Approximate spatial extent of soil types within and around the project area (Map 5 of 7).

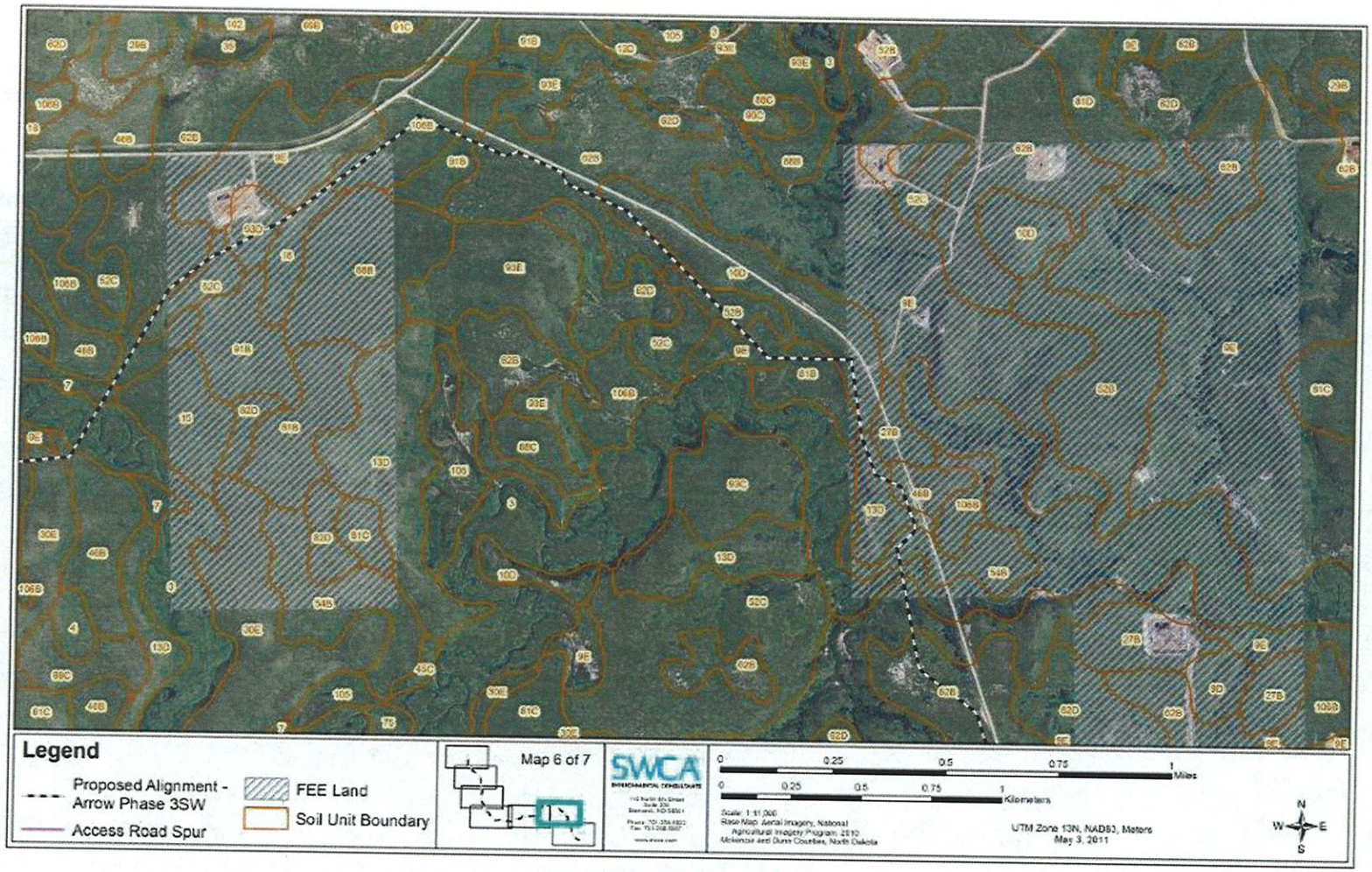

Figure 3-7. Approximate spatial extent of soil types within and around the project area (Map 6 of 7).

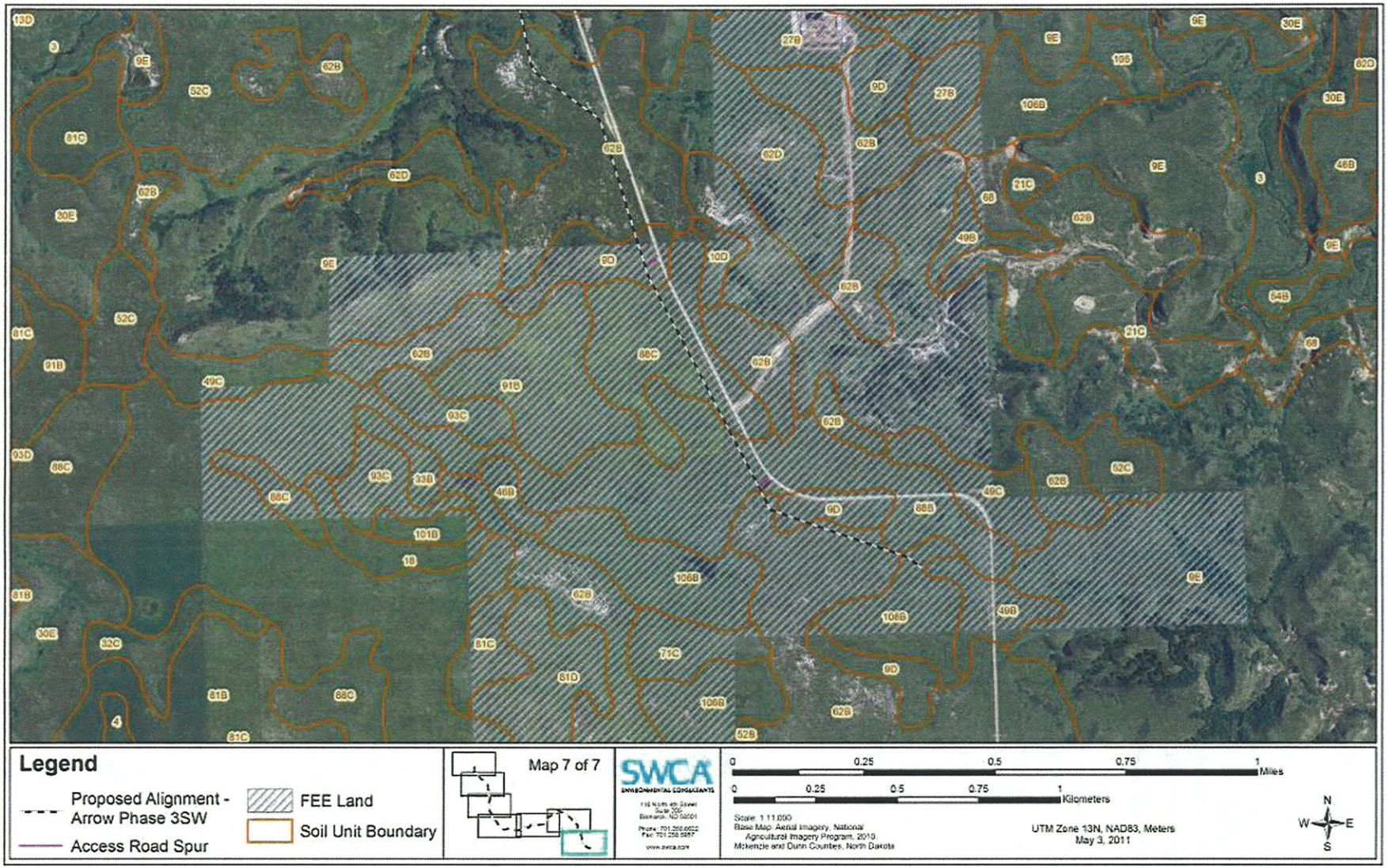

Figure 3-8. Approximate spatial extent of soil types within and around the project area (Map 7 of 7).

3.4.1.1 Arnegard

The Arnegard series consists of very deep, well- or moderately well-drained soils that formed in calcareous loamy alluvium on upland swales, terraces, fans, and foot slopes. Permeability is moderate. Slopes range from 0 to 25 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 14 inches. Most areas are cropped to spring wheat, oats, barley, and hay. Native vegetation is mid, tall, and short grasses such as western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nasella viridula*), big bluestem (*Andropogon geradii*), and blue grama (*Bouteloua gracilis*) (NRCS 2010).

3.4.1.2 Amor

The Amor series consists of well-drained, moderately permeable soils that are moderately deep to soft sandstone bedrock. They formed in material weathered from stratified soft sandstone, siltstone, and mudstone. These soils are on uplands and have slopes of 0 to 25 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 15 inches. These soils are commonly cropped to small grains, flax, corn, hay, and grass in a crop summer fallow rotation. Native vegetation is mid and short prairie grasses such as green needlegrass, needleandthread (*Hesperostipa comata*), western wheatgrass, and blue grama (NRCS 2010).

3.4.1.3 Belfield

The Belfield series consists of deep and very deep, well- to moderately well-drained, very slowly permeable soils found on upland flats, terraces, and swales with slopes ranging from approximately 0 to 9 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 43°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, blue grama, and green needlegrass (NRCS 2010).

3.4.1.4 Bowdle

The Bowdle series consists of well-drained soils formed in loamy alluvium underlain by sand and gravel. The soils are moderately deep over sand and gravel and are on outwash plains and stream terraces. Permeability is moderate in the solum and rapid or very rapid in the underlying material. Slopes range from 0 to 15 percent. Mean annual precipitation is 18 inches, and mean annual air temperature is 44°F. This soil type is primarily cropped to small grain, alfalfa, and some flax and corn. Native vegetation is primarily western wheatgrass, blue grama, green needlegrass, needleandthread, forbs, and sedges (NRCS 2010).

3.4.1.5 Cabba

The Cabba series consists of shallow, well-drained, moderately permeable soils found on hills, escarpments, and sedimentary plains. The soil slopes broadly range between 2 and 70 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is approximately 43°F. The most common vegetation species found on this soil type are little bluestem (*Schizachyrium scoparium*), green needlegrass, and other various herbs, forbs, and shrub species (NRCS 2010).

3.4.1.6 Cohagen

The Cohagen series consists of shallow, well- to excessively well-drained soils formed in materials weathered from soft sandstone bedrock on uplands. These soils have moderate or moderately rapid permeability. Slopes range from 3 to 70 percent. Mean annual air temperature is about 42°F, and mean annual precipitation is about 16 inches. Potential native vegetation is bluestem, needleandthread, prairie sandreed (*Calamovilfa longifolia)*, upland sedges (*Carex* sp.), and western wheatgrass (NRCS 2010).

3.4.1.7 Daglum

The Daglum series consists of deep and very deep, moderately well- and well-drained soils formed in clayey alluvium or residuum on foot slopes and swales on terraces and uplands. These soils have slow or very slow permeability. Slopes range from 0 to 25 percent. Mean annual air temperature is about 42°F, and the mean annual precipitation is about 16 inches. This soil type is commonly used for range, pasture, and small grains. Native vegetation is western wheatgrass, blue grama, green needlegrass, needleleaf sedge (*Carex duriuscula*), and forbs (NRCS 2010).

3.4.1.8 Dogtooth

The Dogtooth series consists of moderately deep, well-drained, very slowly permeable soils found in uplands where the predominant slope is between 0 and 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. The most common vegetation species found on this soil type are range and pasture grasses including western wheatgrass and blue grama (NRCS 2010).

3.4.1.9 Farland

The Farland series consists of very deep, well-drained soils that formed in stratified alluvium on terraces, valley foot slopes, and fans on uplands. Permeability is moderate or moderately slow. Slope ranges from 0 to 20 percent. Mean annual precipitation is about 14 inches, and mean annual temperature is about 42°F. Potential native vegetation found on this soil type is needleandthread, green needlegrass, western wheatgrass, and blue grama (NRCS 2010).

3.4.1.10 Flasher

The Flasher series consists of shallow, somewhat excessively drained soils formed in soft sandstone on side slopes, shoulder slopes, and summits of hills and ridges on uplands and side slopes of valleys. Permeability is moderately rapid or rapid. Slopes range from 3 to 70 percent. Mean annual precipitation is about 14 inches and mean annual temperature is about 42°F. This soil type is used mainly for range and pasture. Native vegetation is prairie sandreed, blue grama, little bluestem, upland sedges, some creeping cedar (*Juniperus horizontalis*), and other shrubs (NRCS 2010).

3.4.1.11 Grail

The Grail series consists of deep to very deep, slowly permeable soils which are well- to moderately well-drained. This soil type is found on uplands with slopes ranging from 0 to 15 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 15 inches and mean annual air temperature is approximately 42°F. This soil

type is largely used for cultivating crops. Native vegetation species common to this soil type include western wheatgrass, big bluestem, and green needlegrass (NRCS 2010).

3.4.1.12 Harriet

The Harriet series consists of very deep, poorly drained, slowly and very slowly permeable soils that formed in calcareous alluvium. These soils are on low-lying flats, terraces, drainageways, and bottom lands. Slope ranges from 0 to 3 percent. Mean annual air temperature is about 42°F, and mean annual precipitation is about 16 inches. Almost all areas of Harriet soils are used for native rangeland or hayland. Native vegetation consists mainly of western wheatgrass, Nuttall's alkaligrass (*Puccinellia nuttalliana*), and inland saltgrass (*Distichlis spicata*) (NRCS 2010).

3.4.1.13 Morton

The Morton series consists of moderately deep, well-drained, moderately permeable soils that formed in material weathered from soft calcareous silty shales, siltstones, and fine-grained sandstones. These soils are on uplands and have slopes of 0 to 15 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 15 inches. Cultivated areas are used for growing small grains, flax, corn, hay, and pasture. Native vegetation is mid- and short-prairie grasses such as western wheatgrass, green needlegrass, and blue grama (NRCS 2010).

3.4.1.14 Parshall

The Parshall series consists of very deep, well- or moderately well-drained, moderately rapidly permeable soils formed in alluvium. These soils are on terraces, outwash plains, and upland swales and have slopes of 0 to 25 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 16 inches. Most areas are cropped to small grains, flax, tame grass, and alfalfa. Native vegetation is medium and short prairie grasses such as needleandthread and some legumes (NRCS 2010).

3.4.1.15 Rhoades

The Rhoades series consists of deep and very deep, well- to moderately well-drained, very slowly permeable soils found on swales and uplands with slopes ranging from approximately 0 to 25 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 16 inches and mean annual air temperature is 42°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass and blue grama (NRCS 2010).

3.4.1.16 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 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 15 inches. This soil type is used for cultivation of small grains in a crop-summer fallow rotation. Native vegetation is mid and short prairie grasses such as green needlegrass, needleandthread, western wheatgrass, blue grama, and a variety of forbs (NRCS 2010).

3.4.1.17 Straw

The Straw series consists of very deep, moderately well- and well-drained soils that formed in alluvium. These soils are on floodplains, stream terraces, and drainageways. Slopes are 0 to 8 percent. Mean annual precipitation is approximately 16 inches, and mean annual air temperature is 43°F. Straw soils are used mainly for dryland cropland, irrigated cropland, and range. Potential native vegetation is mainly rough fescue (*Festuca* sp.), western wheatgrass, needleandthread, little bluestem, bluebunch wheatgrass (*Pseudoroegneria spicata*), green needlegrass, forbs, and shrubs (NRCS 2010).

3.4.1.18 Vebar

The Vebar series consists of well-drained, moderately deep, moderately rapidly permeable soils that formed in residuum weathered from soft calcareous sandstone. These soils are on uplands and have slopes ranging from 0 to 65 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 16 inches. Soils are cropped to corn and small grains. Some is used for hay or pasture. Native grasses are needleandthread and prairie sandreed (NRCS 2010).

3.4.1.19 Wabek

The Wabek series consists of very deep, excessively drained, rapidly and very rapidly permeable soils formed in sand and gravel glaciofluvial deposits. These soils are on outwash plains, beach ridges, terraces, and terrace escarpments, and have slopes of 0 to 45 percent. Mean annual air temperature is 42°F, and mean annual precipitation is 16 inches. This soil series is used mainly for range and pasture. Native vegetation is blue grama, upland sedges, western wheatgrass, needleandthread, and forbs (NRCS 2010).

3.4.1.20 Williams

The Williams series consists of very deep, slowly permeable, well-drained soils found on glacial till plains and moraines with slopes at approximately 0 to 35 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for cultivation. Native vegetation species common to this soil type include western wheatgrass, needleandthread, blue grama, and green needlegrass (NRCS 2010).

3.4.1.21 Zahl

The Zahl series consists of very deep, slowly permeable, well-drained soils found on glacial till plains, moraines, and valley side slopes at approximately 1 to 60 percent. The mean annual precipitation found throughout the spatial extent of this soil type is approximately 14 inches and mean annual air temperature is approximately 40°F. This soil type is largely used for rangeland foraging. Native vegetation species common to this soil type include western wheatgrass, little bluestem, and needleandthread (NRCS 2010).

3.4.2 Potential Impacts from Soil Erosion

Potential for erosion to occur may exist at some sites depending on surface disturbance, site-specific slope, soil type, and construction technique and/or long-term maintenance. The pipeline would be contoured to the original topography and revegetated immediately following construction, resulting in no potential soil loss.

Arrow has committed to the following specific protective measures that would prevent or reduce erosion potential at each site.

- All construction would include implementation of BMPs to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization. Sites would be inspected during construction in accordance with NPDES requirements, and monitored after construction to ensure that erosion does not occur.
- Roads would be constructed with crown and ditch to direct runoff away from gravel surfaces. Roads would be designed with appropriately sized culverts at any intermittent stream crossings, in accordance with BLM Gold Book Standards (BLM and U.S. Forest Service 2007). All disturbed areas except the road surface would be stabilized through seeding techniques as soon as practical following construction.
- Erosion and sedimentation control measures would be implemented in the project area, such as installing culverts with energy dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars along side slopes, and planting cover crops to stabilize soil following construction and before permanent seeding takes place.
- Any disturbance from operational maintenance actions along gathering pipelines would be followed by reclamation.

Most of the soils in the project area are known to support native grassland vegetation, which may substantially increase the probability for successful and permanent reclamation, provided care is taken in areas where the soils are less than ideal for vegetative growth (NRCS 2010). Proven construction BMPs are known to significantly reduce erosion of various types of soil, including those in the project area (BLM Instruction Memorandum 2004-124, www.blm.gov/bmp; BLM and U.S. Forest Service 2007; Grah 1997).

The project is not expected to create unmanageable erosion issues or interfere with reclamation of the area. Topsoil stripped from areas of new construction would be retained for use during reclamation. Any areas stripped of vegetation during construction would be seeded following construction activities. All construction sites would be monitored during and after construction, and BMPs would be used to prevent erosion, minimize runoff and loss of sediment, and ensure soil stabilization. The implementation of BMPs by the operator would reduce project effects and maintain negligible levels of erosion; therefore, no significant adverse impacts to soil resources are anticipated.

3.5 WETLANDS

Biologists from SWCA Environmental Consultants (SWCA) recorded 13 wetlands within the survey area (Table 3-7). No wetlands are anticipated to be temporarily impacted by the proposed project due to avoidance. Lake Sakakawea is at a minimum 3.5 miles away from the proposed project area. In order to prevent any downstream impact to Lake Sakakawea, Arrow would employ standard BMPs to reduce the potential for adverse impact.

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Table 3-7. Wetland Acreage within the Survey Area.

Wetland ID	Total Impacted Wetland Area (acres)	Wetland Area within 100-foot ROW (acres)	Crossing Distance (feet)
WET 1	0	0.06	32.32
WET 2	0	0.02	13.54
WET 3	0	0.07	31.20
WET 4	0	0.01	11.94
WET 5	0	0.01	0.00
WET 6	0	0.07	32.20
WET 7	0	0.00	0.00
WET 8	0	0.05	32.28
WET 9	0	0.08	32.03
WET 10	0	0.11	63.21
WET 11	0	0.01	0.00
WET 12	0	0.02	8.12
WET 13	0	0.04	0.00
Total	**0.00**	**0.55**	**256.84**

Note: The U.S. Army Corps of Engineers has the final authority on the jurisdictional status of a waterbody.

A qualified wetland specialist will mark the boundary of all wetlands and waterbodies within the construction ROW no more than five days before the commencement of construction activities. The wetland specialist will use either pink wetland delineation tape or pin flags to demarcate these boundaries. No construction activities will occur within the demarcated wetland or waterbody boundaries.

3.6 VEGETATION

3.6.1 Vegetation Data

The proposed project area occurs in the northwestern Great Plains ecoregion (River Breaks) (U.S. Geological Survey 2010), which is a western mixed-grass and short-grass prairie ecosystem (Bryce et al. 1998). Native grasses include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), blue grama (*Bouteloua gracilis*), and western wheatgrass (*Pascopyrum smithii*). Common wetland vegetation includes various sedge species (*Carex* spp.), bulrush (*Scirpus* spp.), and cattails (*Typha* spp.). Common plant species found in woody draws, coulees, and drainages include Juniper (*Juniperus* spp.), silver buffaloberry (*Shepherdia argentea*), and western snowberry (*Symphoricarpos occidentalis*).

The habitat types identified during the field surveys included mixed grass prairie, forested upland, shrubland, and cultivated hayland (Figures 3-9 through 3-11). Northern mixed grass prairie can include wetlands, native grassland, and grass-shrub habitats, with riparian and floodplain forests along major drainages. Hayland is land used in agriculture to produce forage for livestock with the intent of harvesting and letting cure before feeding. It can consist of native vegetation, but most often is comprised of introduced grasses and legumes.

Figure 3-9. Vegetation along the Phase 3 Southwest Pipeline right-of-way project area, facing west. Photo taken September 9, 2010.

Figure 3-10. Vegetation along the Phase 3 Southwest Pipeline right-of-way project area, facing north. Photo taken September 9, 2010.

Figure 3-11. Vegetation along the Phase 3 Southwest Pipeline right-of-way project area, facing southwest. Photo taken September 9, 2010.

Hayland in this survey consisted of a vegetative community dominated by alfalfa (*Medicago sativa*) and a cool season introduced grass mix. All other species listed were found within the mixed grass prairie, forested upland, or shrubland habitat.

Species observed within forested upland and shrubland habitat include green ash (*Fraxinus pennsylvanica*), eastern red cedar (*Juniperus virginiana*), bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), juneberry (*Amelanchier alnifloia*), downy hawthorn (*Crataegus mollis*), creeping juniper (*Juniperus horizontalis*), American plum (*Prunus americana*), common chokecherry (*Prunus virginiana*), American red raspberry (*Rubus idaeus*), silver buffaloberry (*Shepherdia argentea*), western snowberry (*Symphoricarpos occidentalis*), and western poison ivy (*Toxicodendron rydbergii*).

Native upland grasses identified during the survey include western wheatgrass, big bluestem (*Andropogon gerardii*), red three awn (*Aristida purpurea*), sideoats grama (*Bouteloua curtipendula*), blue grama, prairie sandreed (*Calamovilfa longifolia*), bearded wheatgrass (*Elymus trachycaulus subsecundus*), green needlegrass (*Nassella viridula*), scribner dichanthelium (*Panicum scribnerianum*), little bluestem, tall dropseed (*Sporobolus asper*), and porcupine grass (*Hesperostipa spartea*). Non-native grasses observed during the survey include crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), and Kentucky bluegrass (*Poa pratensis*).

Upland forbs identified within the project area include western yarrow (*Achillea millefolium*), meadow anemone (*Anemone canadensis*), green sagewort (*Artemisia campestris*), silver sagebrush (*Artemisia cana*), fringed sage (*Artemisia frigida*), white sagebrush (*Artemisia ludoviciana*), purple coneflower (*Echinacea angustifolia*), curlycup gumweed (*Grindella*

squarrosa), dotted gayfeather (*Liatris puncata*), rush skeletonplant (*Lygodesmia juncea*), yellow sweetclover (*Melilotus officinalis*), silverleaf scurfpea (*Psoralea argophylla*), prairie coneflower (*Ratibida columnifera*), prairie rose (*Rosa Arkansas*), black eyed Susan (*Rudbeckia hirta*), Missouri goldenrod (*Solidago missouriensis*), and goatsbeard (*Trapopogon dubius*).

Wetland vegetation identified within the project area includes sedges (*Carex* spp. and *Eleocharis palustris*), foxtail barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), fowl bluegrass (*Poa palustris*), smartweed (*Polygonum amphibium*), dock (*Rumex* sp.), prairie cordgrass (*Spartina pectinata*), and cattail (*Typha angustifolia*).

3.6.2 Noxious Weeds

Noxious weed is a term used to describe a plant species that is not native to a given area, spreads rapidly, and has adverse ecological and economic impacts. These 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 weeds have the potential to detrimentally affect public health, ecological stability, and agricultural practices. The North Dakota Century Code (Chapter 63-01.1) and the North Dakota Department of Agriculture (NDDA) recognize 11 species as noxious, as shown in Table 3-8 (NDDA 2010). Each county has the authority to add additional species to their list of noxious weeds. However, Dunn County does not maintain a list of other noxious species. In 2009, three state noxious weed species were found on 86,100 acres in Dunn County (NDDA 2010).

Table 3-8. Recognized Noxious Weed Occupied Area in Dunn County, North Dakota.

Common Name	Scientific Name	Dunn County (acres)
absinth wormwood	*Artemisia absinthium*	39,300
Canada thistle	*Cirsium arvense*	28,500
diffuse knapweed	*Centaurea diffusa*	0
leafy spurge	*Euphorbia esula*	18,300
musk thistle	*Carduus nutans*	0
purple loosestrife	*Lythrum salicaria*	0
Russian knapweed	*Acroptilon repens*	0
spotted knapweed	*Centaurea stoebe*	0
yellow toadflax	*Linaria vulgaris*	0
dalmatian toadflax	*Linaria dalmatica*	0
salt cedar	*Tamarix ramosissima*	0

Source: NDDA 2010

The following guidelines would be followed during construction, reclamation, and maintenance stages of the project to control the spread of noxious weeds.

- Construction equipment, materials, and vehicles would be stored at construction sites or at specified construction yards.
- All personal vehicles, sanitary facilities, and staging areas would be confined to a limited number of specified locations to decrease chances of incidental disturbance and spread of weeds.
- In areas with existing noxious weed infestations, vegetation, soils, and trench spoil material would be stockpiled adjacent to the removal point and, following construction, would be returned to its original locations to prevent spreading.
- Prompt re-establishment of the desired vegetation in disturbed areas is required. Seeding would occur during the frost-free periods after construction. Certified "noxious weed-free" seed would be used on all areas to be seeded.

3.6.3 Potential Impacts on Vegetation and Noxious Weeds

The Proposed Action would result in minor loss of native grassland vegetation and some improved livestock pasture vegetation. The potential disturbance associated with each project component would total approximately 137.25 acres overall.

In addition to the removal of native grasslands, removal of existing vegetation may facilitate the spread of noxious weeds. The operator would be required to control noxious weeds throughout the project area. If a noxious weed community is found, it would be eradicated unless the community is too large, in which case it would be controlled or contained to prevent further growth. The services of a qualified weed control contractor would be utilized.

Surface disturbance and vehicular traffic must not take place outside approved ROWs for the pipeline and access roads. Areas that are stripped of topsoil must be seeded and reclaimed at the earliest opportunity. Additionally, certified weed-free straw and seed must be used for all construction, seeding, and reclamation efforts. Prompt and appropriate construction, operation, and reclamation are expected to maintain minimal levels of adverse impacts to vegetation and would reduce the potential establishment of invasive vegetation species. Rapid reclamation and the implementation of BMPs would minimize any long-term loss of soil and degradation of vegetation resources in the pipeline ROW. The loss of acres, with implementation of BMPs and noxious weed management guidelines, would result in negligible levels of vegetation disturbance and would not result in significant adverse impacts to vegetation resources.

3.7 WILDLIFE

3.7.1 Threatened and Endangered Species Occurrence and Habitat

Several wildlife species that may exist or have been known to exist in Dunn and McKenzie counties are listed as threatened or endangered under the Endangered Species Act (16 USC 1531 et seq.) (ESA). According to the U.S. Fish and Wildlife Service (USFWS), listed species in Dunn and McKenzie counties, North Dakota, include the gray wolf, black-footed ferret,

whooping crane, piping plover and its Designated Critical Habitat, interior least tern, pallid sturgeon, as well as two federal candidate species, the Dakota skipper and Sprague's pipit. The listed species and their federal status are provided in Table 3-9. SWCA did not observe any of these species during their field surveys, although potential suitable habitat of the Dakota skipper, Sprague's pipit, whooping crane, and gray wolf was observed within or near the project area.

In addition to the ESA and the Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668–668d, 54 Sta. 250) the Migratory Bird Treaty Act (MBTA) protects nesting migratory bird species. Through the implementation of the migratory bird protective measures and other specific measures identified in Table 3-9, and owner-committed measures listed in Table 3-9, the proposed project is unlikely to adversely affect bald or golden eagles or nesting migratory birds.

Descriptions of listed threatened or endangered species known to exist in Dunn and McKenzie counties are provided in Appendix A.

3.7.2 General Wildlife Species Occurrence and Habitat

Wildlife species observed during the field survey include coyote (*Canis latrans*), prairie dog (*Cynomys ludovicianus*), deer (*Odocoileus* spp.), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), sandhill crane (*Grus canadensis*), juvenile bald eagle (*Haliaeetus leucocephalus*), western meadowlark (*Sturnella neglecta*), and sharp-tailed grouse (*Tympanuchus phasianellus*). SWCA ecologists observed no eagle nests within the project area.

3.7.3 Potential Impacts to Wetlands, Habitat, and Wildlife

With the implementation of standard BMPs, no riparian or wetland habitats are anticipated to be directly or indirectly impacted by the Proposed Action.

No impacts to listed species are anticipated because of the low likelihood of their occurrence within the proposed project area, confirmed by on-site assessments conducted by SWCA biologists (Table 3-9). If construction is planned during the critical season, a migratory bird survey would be conducted prior to commencement of construction. For additional information on general BMPs and other operator-committed measures, please see Sections 2.2.1, Construction Specifics, and 3.12, Mitigation and Monitoring.

Minor impacts to unlisted wildlife species and their habitats could result from the construction of the pipeline and its access roads. Ground clearing may impact habitat for small birds, small mammals, and other wildlife species. The proposed project may affect raptor and migratory bird species through direct mortality, habitat degradation, and/or displacement of individual birds. These impacts are regulated in part through the MBTA. Fragmentation of native prairie habitat can detrimentally affect grouse species; however, due to the ratio of each project area to the total landscape area, the overall disturbance would be negligible. Any wildlife species inhabiting the project area are likely to adapt to changing conditions, and continue to persist without adverse impact.

Table 3-9. Summary of Potential Effects to Threatened and Endangered Species.

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Black-footed Ferret (*Mustela nigripes)*	Endangered	Species is presumed extirpated from North Dakota.	None	No Effect
Gray Wolf (*Canis lupus)*	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming. Western North Dakota sightings in the late twentieth century are speculated to be solitary, transient, young adult males seeking to establish territory.	None	No Effect
Whooping Crane (*Grus americana)*	Endangered	Birds may occasionally stopover during migration due to the presence of suitable foraging habitat near the project areas.	Construction activity will cease and the Bureau of Indian Affairs (BIA) and U.S. Fish and Wildlife Service (USFWS) will be notified if whooping cranes are sighted within 1 mile of the project area.	May Affect, Is Not Likely to Adversely Affect
Piping Plover (*Charadrius melodus)*	Threatened	Birds are unlikely to be present due to lack of suitable foraging or nesting habitat.	See migratory bird protective measures.	May Affect, Is Not Likely to Adversely Affect
Designated Critical Habitat for Piping Plover	Designated Critical Habitat	Critical Habitat occurs within the watershed of the project area, on the shoreline and islands of Lake Sakakawea, at approximate minimum of 3.5 miles from the proposed pipeline.	Arrow will implement all best management practices (BMPs), erosion control measure, and spill prevention practices required by the Clean Water Act.	May Affect, Is Not Likely to Adversely Affect
Interior Least Tern (*Sterna antillarum)*	Endangered	The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, at an approximate minimum of 3.5 miles from the proposed pipeline. Migrating interior least terns may transition through the project area.	See migratory bird protective measures. See Designated Critical Habitat protective measures for piping plover.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Pallid Sturgeon (*Scaphirhynchus albus)*	Threatened	Lake Sakakawea, at a minimum, is approximately 9 river miles from proposed pipeline.	Arrow will implement all BMPs and erosion control measures as required by the BIA and the Clean Water Act. Wetlands and waterbodies, including Moccasin Creek, would be avoided via surveyed alternatives or through the use of trenchless methods. Therefore, no impact to wetlands or waterbodies is likely to result from construction activities.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper (*Hesperia dacotae)*	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	The proposed pipeline right-of-way (ROW) would be reclaimed as soon as possible after completion. Temporary access roads will be removed upon project completion. Impacted areas will be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect
Sprague's Pipit (*Anthus spragueii)*	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	The proposed pipeline ROW would be reclaimed as soon as possible after completion. Temporary access roads will be removed upon project completion. Impacted areas will be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Other Federally Protected Species				
Bald Eagle (*Haliaeetus leucocephalus)*	Bald and Golden Eagle Protection Act (BGEPA).	Raptor habitat survey was conducted. No evidence of bald eagle foraging or nesting habitat occurs in the project area although one juvenile bald eagle was observed near the project area.	A 0.5-mile line of sight survey was conducted during the initial field survey and no suitable nesting habitat or nests were observed within the project area. No additional bald eagle surveys will be conducted.	No Adverse Effects Anticipated
Golden Eagle (*Aquila chrysaetos)*	BGEPA	Raptor habitat survey was conducted. No eagle nests were observed in the project area. Nesting habitat was present and golden eagles may occasionally visit or forage within or around the project area.	A 0.5-mile line of sight survey was conducted during the initial field survey. Suitable nesting and foraging habitat exists within the project area, however no nests were observed. The closest known golden eagle nest occurrence is approximately 1.6 miles west of the proposed project area. The nest was listed as unoccupied during the assumed last survey dated 04/12/2006. The nest is located at 47.635306°, -102.743279°, west of State Highway 22. No additional golden eagle surveys will be conducted.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Migratory Birds	Migratory Bird Treaty Act (MBTA)	Suitable habitat for nesting migratory grassland birds occurs in the project area.	Arrow will reduce their construction ROW to 50 feet through forested upland and shrubland habitat recorded by SWCA. If Arrow clears the ROW of vegetation through either blading or mowing before February 1, weather permitting, then no additional avian surveys will be conducted assuming the ROW is kept clear of vegetation until reclamation begins. If construction is to occur during bird breeding season (February 1–July 15) and vegetation has not been removed to deter nesting then an avian survey will be conducted of the pipeline ROW no greater than 5 days before the commencement of construction activities. If no nesting birds are located within the ROW during the avian survey, Arrow will clear the ROW of vegetation until reclamation commences. If active nests are located during the supplemental avian survey, Arrow will consult with the BIA and USFWS to determine acceptable options.	No Adverse Effects Anticipated

3.8 CULTURAL RESOURCES

Historic properties, or cultural resources, on federal or tribal lands are protected by many laws, regulations and agreements. The *National Historic Preservation Act of 1966* (16 USC 470 *et seq.*) at Section 106 requires, for any federal, federally assisted or federally licensed undertaking, that the federal agency take into account the effect of that undertaking on any district, site, building, structure or object that is included in the National Register of Historic Places (National Register) before the expenditure of any federal funds or the issuance of any federal license. Cultural resources is a broad term encompassing sites, objects, or practices of archaeological, historical, cultural and religious significance. Eligibility criteria (36 CFR 60.6) include association with important events or people in our history, distinctive construction or artistic characteristics, and either a record of yielding or a potential to yield information important in prehistory or history. In practice, properties are generally not eligible for listing on the National Register if they lack diagnostic artifacts, subsurface remains or structural features, but those considered eligible are treated as though they were listed on the National Register, even when no formal nomination has been filed. This process of taking into account an undertaking's effect on historic properties is known as "Section 106 review," or more commonly as a cultural resource inventory.

The area of potential effect (APE) of any federal undertaking must also be evaluated for significance to Native Americans from a cultural and religious standpoint. Sites and practices may be eligible for protection under the *American Indian Religious Freedom Act of 1978* (42 USC 1996). Sacred sites may be identified by a tribe or an authoritative individual (Executive Order 13007). Special protections are afforded to human remains, funerary objects, and objects of cultural patrimony under the *Native American Graves Protection and Repatriation Act* (NAGPRA) (25 USC 3001 et seq.).

Whatever the nature of the cultural resource addressed by a particular statute or tradition, implementing procedures invariably include consultation requirements at various stages of a federal undertaking. The MHA Nation has designated a Tribal Historic Preservation Officer (THPO) by Tribal Council resolution, whose office and functions are certified by the National Park Service. The THPO operates with the same authority exercised in most of the rest of North Dakota by the State Historic Preservation Officer (SHPO). Thus, BIA consults and corresponds with the THPO regarding cultural resources on all projects proposed within the exterior boundaries of the Fort Berthold Reservation.

A cultural resource inventory of this pipeline route was conducted by personnel of SWCA Environmental Consultants, using an intensive pedestrian methodology. Approximately 402.03 acres were inventoried between September 7 and November 9, 2010 (Smith and Lechert 2011). Five archaeological sites were located that may possess the quality of integrity and meet at least one of the criteria (36 CFR 60.6) for inclusion on the National Register. As the lead federal agency, and as provided for in 36 CFR 800.5, on the basis of the information provided, BIA reached a determination of **no historic properties affected** for this undertaking, as the archaeological sites will be avoided. This determination was communicated to the THPO on May 9, 2011; however, the THPO did not respond within the allotted 30 day comment period.

No cultural resources that are potentially eligible for listing on the National Register are known to be present in the final APE; therefore, there would be no adverse impacts to significant cultural resources as a result of the Proposed Action.

If cultural resources are discovered during construction or operation, the operator shall immediately stop work, secure the affected site, and notify the BIA and THPO. Unexpected or inadvertent discoveries of cultural resources or human remains trigger mandatory federal procedures that include work stoppage and BIA consultation with all appropriate parties. Following any such discovery, operations would not resume without written authorization from the BIA. Project personnel are prohibited from collecting any artifacts or disturbing cultural resources in the area under any circumstance. Individuals outside the ROW are trespassing. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. The presence of qualified cultural resource monitors during construction activities is encouraged.

3.9 PUBLIC HEALTH AND SAFETY

A variety of health and safety concerns may occur as a result of the PHASE 3 SW: heavy truck and equipment hazards during construction, hazardous materials used during installation or production, and burning or explosive hazards during operation of the pipeline. Noise, fugitive dust, and traffic hazards would be present during construction and then reduce considerably during operation. Negative impacts from construction would be largely temporary.

The EPA specifies chemical reporting requirements under Title III of the Superfund Amendments and Reauthorization Act (SARA), as amended. No chemicals subject to reporting under SARA Title III (hazardous materials) in an amount greater than 10,000 pounds would be used, produced, stored, transported, or disposed of annually in association with the Proposed Action. Furthermore, no extremely hazardous substances, as defined in 40 CFR 355, in threshold planning quantities would be used, produced, stored, transported, or disposed of in association with the Proposed Action. The most common and potentially hazardous substances used during the construction of the pipeline would include diesel fuel, gasoline, lubricating oils, and solvents. All potentially hazardous substances would be stored in designated and permitted areas away from waterways and wetlands. Material Safety Data Sheets for potentially hazardous substances would be maintained onsite in the control room and at the point of use at all times.

According to the Pipeline and Hazardous Materials Safety Administration (PHMSA), pipelines are a reliable and cost-effective means to transport oil, natural gas, and produced water. PHMSA statistics show one gallon of oil is spilled for every barrel of oil that is transported one million miles. In the event of a spill, Arrow would notify local emergency management authorities and state or federal response centers. After the PHASE 3 SW is operational, Arrow would also install and utilize the following programs for public safety: operator training, detailed ROW marking, regular inspections, and integrity management programs. Continuous computer monitoring systems located in the facility control room would be accessible both onsite and remotely. At both ends of the system, continuous monitoring of input and output volumes would detect minor leaks in the pipeline. Pipeline

pressure would also be monitored; significant leaks causing pressure drops would be located by launching special detection equipment down a line.

Combustion and explosive hazards are considered extremely unlikely for the proposed project. Satellite imagery shows three structures within 0.5 mile of the proposed pipeline route.

The impacts from traffic or hazardous materials can be mitigated through proper project design and precautions. The burial of the pipeline at least 5 feet 6 inches underground and the relatively small diameter of the proposed line limits the area potentially impacted by leaks, fire, or explosion. All operations would conform to instructions from BIA fire management staff. No laws, regulations or other requirements have been waived; no compensatory mitigation measures are required. Overall impacts, once the pipeline is complete, would reduce current public health and safety concerns.

3.10 SOCIOECONOMICS

3.10.1 Socioeconomic Analysis Area

The scope of analysis for social and economic resources includes a discussion of current social and economic data relevant to the Analysis Area and surrounding communities of the Reservation and McKenzie, Dunn, McLean, and Mountrail counties, North Dakota. These counties were chosen for analysis because their proximity to the proposed pipeline location and overlap with the Reservation could result in socioeconomic impacts. These communities are collectively referred to as the Analysis Area.

This section discusses community characteristics such as population, housing, demographics, employment, and economic trends within the Analysis Area. Also included are data relating to the State of North Dakota and the United States, which provide a comparative discussion when compared to the Analysis Area. Information in this section was obtained from various sources including, but not limited to, the U.S. Census Bureau, the U.S. Bureau of Economics, and the North Dakota State Government.

3.10.2 Population and Demographic Trends

Historic and current population counts for the Analysis Area, compared to the state, are provided below in Table 3-10. The state population showed little change between the previous two census counts (1990–2000); however, in 2010 the state population increased by 4.7% to 672,594 (U.S. Census Bureau 2011a). Populations in McKenzie and Mountrail counties have increased slightly from 2000 to 2009 while McLean and Dunn counties had a rate of decline of -10.8% and -6.5%, respectively (U.S. Census Bureau 2011b). These declines can be attributed to more people moving to metropolitan areas, which are perceived as offering more opportunities for growth. However, population on or near the Reservation has increased approximately 13.3% from 2000 to 2005 (BIA 2005). While Native Americans are the predominant group on the Reservation, they are considered the minority in all other areas of North Dakota.

As presented in Table 3-10, population growth on the Reservation (13.3%) exceeds the overall growth in the state of North Dakota (4.7%) and four counties in the Analysis Area. This trend in population growth for the Reservation is expected to continue in the next few years (Fort Berthold Housing Authority 2008).

Table 3-10. Population and Demographics.

County or Reservation	Population in 2009	% of State Population	% Change Between 1990–2000	% Change Between 2000–2009	Predominant Group in 2009 (%)	Predominant Minority in 2009 (Percent of Total Minority Population)
Dunn	3,365	0.5	-10.1	-6.5	Caucasian (85.3%)	American Indian (13.6%)
McKenzie	5,799	0.9	-10.1	1.1	Caucasian (76.7%)	American Indian (21.5%)
McLean	8,310	1.3	-11.0	-10.8	Caucasian (91.2%)	American Indian (7.1%)
Mountrail	6,791	1.0	-5.6	2.4	Caucasian (62.7%)	American Indian (35.1%)
On or Near Fort Berthold Indian Reservation[1]	11,897	1.8	178.0[2]	13.3[3]	American Indian	Caucasian (~27%)
Statewide	672,594[4]	100	0.5	4.7[4]	Caucasian (91.1)	American Indian (5.6%)

Source: U.S. Census Bureau 2011b.

[1] Bureau of Indian Affairs 2005. Population shown reflects the total enrollment in the tribe in 2005. 2008 data unavailable. All information related to the Fort Berthold Indian Reservation reflects 2005 data, including state population. 11,897 reflects tribal enrollment on or near the Reservation. According to the BIA, near the Reservation includes those areas or communities adjacent or contiguous to the Reservation.

[2] Bureau of Indian Affairs 2001. Reflects percent change between 1991 and 2001.

[3] Reflects percent change between 2001 and 2005.

[4] Refelects population levels in 2010 (U.S. Census Bureau 2011a)

3.10.3 Employment

The economy in the state of North Dakota, including the Reservation and four counties in the Analysis Area, has historically depended on agriculture, including grazing and farming. However, 2010 economic data indicate that the major employers in North Dakota include government and government enterprises, which employed 16.6%; health care and social assistance, which employed 11.9%; and retail trade, which employed at 10.8% of the state's labor force (U.S. Bureau of Economic Analysis 2011a). Energy development and extraction, power generation, and services related to these activities have become increasingly important over the last several years and many service sector jobs are directly and indirectly associated with oil and gas development.

In 2010, total employment in the state of North Dakota was approximately 355,000 (Table 3-11). The average weekly wage for all employees on private nonfarm payrolls was $697 in North Dakota. All counties in the Analysis Area showed average weekly wages that were higher than the state and national averages in 2010 (Table 3-10).

In 2010, the statewide unemployment rate was 3.8% of the workforce. This is the lowest unemployment rate in the nation (Bureau of Labor Statistics 2011a). While some counties in the Analysis Area experienced a slight increase in unemployment, others were unchanged or experienced a decreased unemployment since 2005 (Table 3-9).

Table 3-11. 2010 Total Employment, Average Weekly Wages, and Unemployment Rates.

Location	Total Employment	Average Weekly Wage	Unemployment Rate	Change in Unemployment Rate (2005–2010)
United States	139,909,000	$781	9.4%	**+4.3%**
North Dakota	355,000	$697	3.8%	**+0.4%**
Dunn County	1,684	$829	3.3%	**-0.1%**
McKenzie County	2,625	$1,006	2.6%	**-1.1%**
McLean County	2,674	$820	3.8%	**-1.2%**
Mountrail County	4,713	$947	2.4%	**-3.6%**
On or Near Fort Berthold Indian Reservation*	1,287	N/A	71.0%	**N/A**

Sources: Bureau of Labor Statistics 2011a, 2011b; U.S. Department of Agriculture 2010; Bureau of Indian Affairs 2005.
* Represents 2005 data only.

According to the 2005 American Indian Population and Labor Force Report, of the 8,773 tribal members that were eligible for BIA-funded services, 4,381 constituted the total available workforce. Approximately 29%, or 1,287 members, were employed in 2005, indicating a 71% unemployment rate (as a percent of the labor force) for members living on or near the Reservation; 55% of the employed members were living below poverty guidelines. Compared to the 2001 report, 2005 statistics reflect a 6.2% increase in the number of tribal members employed living on or near the Reservation, but unemployment (as a percent of the labor force) has stayed steady at 71% and the percentage of employed people living below the poverty guidelines has increased to 55% (BIA 2005).

Although detailed employment information for the Reservation is not provided by the U.S. Bureau of Economics or the State of North Dakota, residents of the Reservation are employed in similar ventures as those outside the Reservation. Typical employment includes ranching, farming, tribal government, tribal enterprises, schools, federal agencies, and recently, employment related to conventional energy development. The MHA Nation's Four Bears Casino and Lodge, located 4 miles west of New Town, employs approximately 320 people, of which 90% are tribal members (Fort Berthold Housing Authority 2008).

The Fort Berthold Community College, which is tribally chartered to meet the higher education needs of the people of the MHA Nation, had 11 full-time members and 25 adjunct members in academic year 2006–2007. Approximately 73% of the full-time faculty members are of American Indian/Alaska Native descent, approximately 88% of which are enrolled members of the MHA Nation. Additionally, 65% of the part-time faculty members are of American Indian/Alaska Native descent and all (100%) are tribal members.

3.10.4 Income

Per capita income is often used as a measure of economic performance, but it should be used with changes in earnings for a realistic picture of economic health. Since total personal income includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise even if the average wage per job declines over time. The North American Industry Classification System (NAICS) is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. Per capita income, median household income, and poverty rates for the Analysis Area and North Dakota are presented in Table 3-12.

Table 3-12. Income and Poverty in Analysis Area, 2008.

Unit of Analysis	Per Capita Income (2000)	Per Capita Income[1] (2008)	Median Household Income[3] (2009)	Percent of all People in Poverty[3] (2009)
Dunn County	$21,031	$29,558	$44,681	11.2%
McKenzie County	$22,269	$36,862	$49,465	12.8%
McLean County	$23,125	$42,466	$49,212	10.3%
Mountrail County	$23,045	$34,590	$49,884	12.4%
Fort Berthold Indian Reservation[4]	$8,855	$10,291[4]	$26,977[4]	N/A
North Dakota	$25,624	$39,874	$47,898	11.7%

[1] U.S. Bureau of Economic Analysis 2011a, 2011b
[2] U.S. Department of Agriculture 2010
[3] U.S. Department of Agriculture 2009
[4] Bureau of Indian Affairs 2005. Population shown reflects the total enrollment in the tribe in 2005. 2008 data unavailable. All information related to the Fort Berthold Indian Reservation reflects 2005 data, including state population.

From 2000 to 2008, per capita include increased by 28.8% for Dunn County, 39.6% for McKenzie County, 45.5% for McLean County, and 33.4% for Mountrail County. These figures compare to a 35.7% increase for the State of North Dakota per capital personal income (U.S. Bureau of Economic Analysis 2009).

According to a 2008 report published by the Fort Berthold Housing Authority, the average per capita income for the Reservation was $8,855 in 1999, compared to $17,769 for the state and the U.S. average of $21,587 at that time (Fort Berthold Housing Authority 2008). The median household income on the Reservation was $26, 977, compared to $41,994 in the U.S.

With the exception of McLean County, counties that overlap the Reservation tend to have per capita incomes and median household incomes below North Dakota statewide averages. As presented in Table 3-11, unemployment rates on the Reservation were above the state average of 3.8%. Subsequently, Reservation residents and MHA Nation members tend to have per capita incomes and median household incomes below the averages of the encompassing counties and statewide, as well as higher unemployment rates.

3.10.5 Housing

Workforce-related housing can be a key issue associated with development. Historical information on housing in the four counties in the Analysis Area was obtained from the U.S. Census Bureau, 2000 Census, with 2009 updates (U.S. Census Bureau 2011c). Because the status of the housing market and housing availability changes often, current housing situations can be difficult to characterize quantitatively. Therefore, this section discusses the historical housing market. Table 3-13 provides housing unit supply estimates in the Analysis Area, including the Reservation.

Table 3-13. Housing Development Data for the Reservation and Encompassing Counties.

Region	Total Housing Units						% Change 2000–2009
	Occupied	Owner Occupied	Renter Occupied	Vacant	Total	Total	
	2000	2000	2000	2000	2000	2009	
Dunn	1,378	1,102	276	587	1,965	1,985	+1.0
McKenzie	2,151	1,589	562	568	2,719	2,801	+2.9
McLean	3,815	3,135	680	1,449	5,264	5,461	+3.6
Mountrail	2,560	1,859	701	878	3,438	3,607	+4.7
Reservation	1,908	1,122	786	973	2,881	N/A	N/A
North Dakota	257,152	171,299	85,853	32,525	289,677	316,435	+8.5

Source: U.S. Census Bureau 2011c.

The Fort Berthold Housing Authority manages a majority of the housing units within the Reservation. Housing typically consists of mutual-help homes built through various government programs, low-rent housing units, and scattered-site homes. Housing for government employees is limited, with a few quarters in Mandaree and White Shield available to Indian Health Service employees in the Four Bears Community and to BIA employees. Private purchase and rental housing are available in New Town. New housing construction has recently increased within much of the Analysis Area, but availability remains low.

Availability and affordability of housing could impact oil and gas development and operations. The number of owner-occupied housing units (1,122) within the Reservation is approximately 58% lower than the average number of owner-occupied housing units found in the four overlapping counties (1,921).

In addition to the relatively low percent change of the total housing units compared to the state average, these four counties are ranked extremely low for both the state and national housing starts and have minimal new housing building permits, as presented in Table 3-14.

Table 3-14. Housing Development Data for the Encompassing Counties, 2000–2008.

Housing Development	North Dakota County			
	Dunn	McKenzie	McLean	Mountrail
New Private Housing Building Permits 2003–2008	14	14	182	110
Housing Starts-State Rank	51 / 53	15 / 53	21 / 53	17 / 53
Housing Starts-National Rank	3,112 / 3,141	2,498 / 3,141	2,691 / 3,141	2,559 / 3,141

Source: U.S. Census Bureau 2009a, 2009b.

3.10.6 Potential Impacts to Area Socioeconomics

Impacts to socioeconomic resources of the Analysis Area would be minimal and therefore would not adversely impact the local area. Short-term impacts to socioeconomic resources would generally occur during construction. Impacts would be significant if the affected communities and local government experienced an inability to cope with changes including substantial housing shortages, fiscal problems, or breakdown in social structures and quality of life.

The construction of this project is anticipated to require temporary short-term labor. A few full-time and/or temporary workers would be anticipated for long-term maintenance. It is anticipated that a mixture of local and Arrow employees would work in the project area. Therefore, any increase in workers would constitute a minor increase in population in the project area required for short-term operations and would not create a noticeable increase in demand for services or infrastructure on the Reservation or the communities near the project area.

Although some counties within the Analysis Area have experienced a recent decline in population between 2000 and 2009 (as shown in Table 3-10), the population on the Reservation itself has increased. This has not led to significant housing shortages. The historic housing vacancy rate (Table 3-13) indicates that housing has remained available despite the growth of the population on the Reservation. The levels of available housing are therefore anticipated to be able to absorb the projected slight increase in population related to this proposed project. As such, the proposed project would not have measurable impacts on housing availability or community infrastructure in the area. The proposed project also would not result in any identifiable impacts to social conditions and structures within the communities in the project area.

Implementation of the proposed project would likely result in direct and indirect economic benefits associated with industrial and commercial activities in the area, including the Reservation, State of North Dakota, and potentially local communities near the Reservation. Direct impacts would include increased spending by contractors and workers for materials, supplies, food, and lodging in Dunn County and the surrounding areas, which would be subject to sales and lodging taxes. Other state, local, and Reservation tax payments and fees would be incurred as a result of the implementation of the proposed project, with a small percentage of these revenues distributed back to the local economies. Wages due to employment would also impact per capita income for those that were previously unemployed

or underemployed. Indirect benefits would include increased spending from increased oil and gas production, as well as a slight increase in generated taxes from the short-term operations. Mineral severance and royalty taxes, as well as other relevant county and Reservation taxes on production would also grow directly and indirectly as a result of increased industrial activity in the oil and gas industry.

3.11 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, signed in 1994 by President Clinton, requires agencies advance environmental justice (EJ) by pursuing fair treatment and meaningful involvement of minority and low-income populations. Fair treatment means such groups should not bear a disproportionately high share of negative environmental consequences from federal programs, policies, decisions, or operations. Meaningful involvement means federal officials actively promote opportunities for public participation and federal decisions can be materially affected by participating groups and individuals.

The EPA headed the interagency workgroup established by the 1994 Order and is responsible for related legal action. Working criteria for designation of targeted populations are provided in *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (EPA 1998). This guidance uses a statistical approach to consider various geographic areas and scales of analysis to define a particular population's status under the Order.

EJ is an evolving concept with potential for disagreement over the scope of analysis and the implications for federal responsiveness. Nevertheless, due to the population numbers, tribal members on the Great Plains qualify for EJ consideration as both a minority and low-income population. Table 3-15 summarizes relevant data regarding minority populations for the Analysis Area.

In July 2009, the U.S. Census Bureau estimated that North Dakota's total minority population comprised approximately 57,732 persons, or 8.9% of the state's total population (i.e., 646,844 residents). This represents an increase of 26.9% over the 2000 minority population of the state. Within the Analysis Area, the number of Caucasian residents decreased, while minorities in nearly all categories increased, producing a strong increase in the percentage of minority population in each of the counties in the Analysis Area during the period from 2000 until 2009 (Table 3-16). The four counties of the Analysis Area showed an increase of 5.3% to 21.5% in minority population, compared with the statewide increase of 26.9%.

Table 3-15. Minority Population Breakdown by North Dakota County and Race, 2000–2009.

Race	Dunn		McKenzie		McLean		Mountrail		North Dakota	
	2000	2009	2000	2009	2000	2009	2000	2009	2000	2009
Total Population	3,600	3,365	5,737	5,799	9,311	8,310	6,629	6,791	642,204	646,844
Non-Hispanic	3,573	3,330	5,679	5,696	9,230	8,199	6,542	6,589	634,418	632,126
Hispanic or Latino[1]	27	35	58	103	81	111	87	202	7,786	14,718
Races										
Caucasian	3,123	2,827	4,457	4,450	8,632	7,577	4,546	4,259	596,722	589,112
African American	1	4	4	12	2	15	7	31	4,157	7,813
American Indians and Alaska Natives	448	459	1,216	1,249	568	587	1,988	2,385	31,440	36,258
Asian / Pacific Islanders	8	3	4	8	12	19	17	17	3,912	5,646
Two or More Races	25	30	39	80	97	112	71	99	5,973	8,015
All Minorities	477	538	1,280	1,349	679	733	2,083	2,532	45,482	57,732
% Minority Population	13.2	15.9	22.3	23.2	7.3	8.8	31.4	37.2	7.1	8.9
Change in Minority Population (2000–2009)	+12.8%		+5.3%		+7.9%		+21.5%		+26.9%	

[1] Hispanic or Latino may be of any race.

[2] U.S. Census Bureau estimates of population demographics were made in July 2009.

Sources: U.S. Census Bureau 2011d.

Table 3-16. Poverty Rates and Median Household Income for the Analysis Area.

Location	2000	2009	2009 Median Household Income
Dunn County	13.3%	11.2%	$44,681
McKenzie County	15.7%	12.8%	$49,465
McLean County	12.3%	10.3%	$49,212
Mountrail County	15.7%	12.4%	$49,884
North Dakota	10.4%	11.7%	$47,898

Source: U.S. Department of Agriculture 2009.

In 2009, the counties in the Analysis Area had a higher percentage of American Indian and Alaska Natives, ranging from 7.1% in McLean County to nearly 35.1% in Mountrail County, compared with the state as a whole which had approximately 5.6% in this category (U.S. Census Bureau 2011d). The North Dakota Indian Affairs Commission (NDIAC) reports that American Indian population (race alone or in combination) in North Dakota has increased 12% from 35,228 in 2000 to 35,666 in 2008 (NDIAC 2010), with estimates for the future American Indian population (one race only) at 47,000 in 2015 and 59,000 in 2025 (NDIAC 2010). The Reservation has a total population of 5,915 in the 2000 census, with 67.4% American Indian, mostly with tribal affiliations with MHA Nation (NDIAC 2010).

Poverty rate data for the counties in the Analysis Area are summarized in Table 3-16. The data show that poverty rates have decreased in the Analysis Area during the period from 2000 to 2009 (U.S. Department of Agriculture 2009). McKenzie and Mountrail counties continue to have poverty rates that exceed the statewide poverty rate of 11.7%. Only Dunn County has a lower median household income than the statewide household income of $47,898.

3.11.1 Potential Impacts to Environmental Justice

The Analysis Area, having larger and increasing minority populations, compared with statewide numbers, could result in disproportionately beneficial impacts from the proposed pipeline project. These would derive from direct and indirect economic opportunities for tribal members. Generally, existing oil and gas leasing has already benefited the MHA Nation government and infrastructure from tribal leasing, fees, and taxes. Current oil and gas leasing on the Reservation has also already generated revenue to MHA Nation members who hold surface and/or mineral interests. However, owners of allotted surface within the Analysis Area may not necessarily hold mineral rights. In such cases, surface owners do not receive oil and gas lease or royalty income, and their only related income would be compensation for productive acreage lost to road and pipeline construction. Those with mineral interests also may benefit from royalties on commercial production if the wells prove successful. Profitable production rates at proposed locations might lead to exploration and development of additional tracts owned by currently non-benefitting allottees. In addition to increased revenue for land and mineral holders, exploration and development would increase employment on the Reservation with oversight from the Tribal Employment Rights Office, which would help alleviate some of the poverty prevalent on or near the Reservation. Tribal members without either surface or mineral rights would not receive any direct benefits, except through potential employment, should they be hired. Indirect benefits of employment and general tribal gains would be the only potential offsets to negative impacts. Poverty rates in the Analysis Area have already begun to decrease since oil and gas development began after 2000, as shown in Table 3-16. There is potential for adverse economic impacts to tribal members who do not reside within the Reservation and therefore do not share in direct or indirect benefits.

Potential adverse impacts could occur to tribes and tribal members, as well, such as the potential disturbance of any traditional cultural properties and cultural resources. These potential impacts are reduced through surveys of proposed pipeline location and access road routes, mitigation measures required by the BIA, and thorough reviews and determinations by the BIA that there would be no effect to historic properties. The possibility of disproportionate impacts to tribes or tribal members is further reduced by the requirement for immediate work

stoppage following an unexpected discovery of cultural resources of any type. Mandatory consultation would take place during any such work stoppage, affording an opportunity for all affected parties to assert their interests and contribute to an appropriate resolution, regardless of their home location or tribal affiliation.

The proposed project has not been found to pose a threat for significant impact to any other critical element, including air quality, public health and safety, water quality, wetlands, wildlife, soils, or vegetation within the human environment. Through the avoidance of such impacts, no disproportionate impact is expected to low-income or minority populations. The Proposed Action offers many positive consequences for tribal members, while recognizing EJ concerns. Procedures summarized in this document and in the Application for Permit to Drill are binding and sufficient. No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required.

3.12 MITIGATION AND MONITORING

Monitoring programs would be initiated immediately following all reclamation efforts, whether following initial construction, any operational ground disturbance, or after final reclamation. Need for additional seeding, planting, or other soil stabilization measures would be decided by these monitoring efforts. Problem areas would be treated as soon as possible. All unauthorized vehicle access points on the PHASE 3 SW would be noted and subsequently blocked by the installation of signage or fencing. Other protective measures and procedures are described in this document.

No laws, regulations, or other requirements have been waived; no compensatory mitigation measures are required. Monitoring of cultural resource impacts by qualified personnel is recommended during all ground-disturbing activities. Each phase of construction and development through production will be monitored by the BIA and representatives of the MHA Nation to ensure the protection of cultural, archaeological, and natural resources. In conjunction with 43 CFR 46.30, 46.145, 46.310, and 46.415, a report will be developed by the BIA that documents the results of monitoring in order to adapt the projects to eliminate any adverse impact on the environment.

Mitigation opportunities can be found in general and operator-committed BMPs and mitigation measures. BMPs are loosely defined as techniques used to lessen the visual and physical impacts of development. Arrow would implement, to the extent possible, the use of BMPs in an effort to mitigate environmental concerns in the planning phase allowing for smoother analysis, and possibly faster project approval.

3.12.1 General BMPs

Although largely project-specific, there are a number of BMPs that can, and should, be considered on development projects in general. The following are examples of general BMPs.

- Planning roads to minimize visual impacts.
- Using existing roads to the extent possible, upgrading as needed.
- Reducing the size of facility sites and types of roads to minimize surface disturbance.

- Minimizing topsoil removal.
- Stockpiling stripped topsoil and protecting it from erosion until reclamation activities commence. At that time, the soil would be redistributed and seeded on the disturbed areas. The reclaimed areas would be protected and maintained until the sites are fully stabilized.
- Avoiding removal of, and damage to, trees, shrubs, and groundcover where possible. Trees near construction areas would be marked clearly to ensure that they are not removed.
- Mowing, instead of clearing, a facility or well site to accommodate vehicles or equipment.
- Maintaining buffer strips or using other sediment control measures to avoid sediment migration to stream channels as a result of construction activities.
- Planning for erosion control.
- Storing chemicals properly (including secondary containment).
- Keeping sites clean, including containing trash in a portable trash cage. The trash cage would be emptied at a state-approved sanitary landfill.
- Conducting snow removal activities in a manner that does not adversely impact reclaimed areas and areas adjacent to reclaimed areas.
- Avoiding or minimizing topographic alterations, activities on steep slopes, and disturbances within stream channels and floodplains to the extent possible.
- Maintaining buffers around work areas where there is a risk of fire as a result of construction activities.
- Keeping fire extinguishers in all vehicles.
- Planning transportation to reduce vehicle density.
- Posting speed limits on roads.
- Avoiding traveling during wet conditions that could result in excessive rutting.
- Practicing dust abatement on roads.
- Contouring disturbed areas to approximate the original contours of the landscape.
- Developing a final reclamation plan that allows disturbed areas to be quickly absorbed into the natural landscape.

Arrow will use several BMPs to mitigate environmental concerns specific to the project. These include:

- following the contour (form and line) of the landscape;
- avoiding locating ROWs on steep slopes;
- if steep slopes are unavoidable, the pipeline will be bored to minimize impact to the landscape; and
- sharing common ROWs when applicable.

Arrow would implement these and/or other BMPs to the extent that they are technically feasible and would add strategic and measurable protection to the project area.

3.12.2 Mitigation and Safety Measures Committed to by Arrow

3.12.2.1 Utility Lines

All lines (oil, gas, produced water, fiber optic, and electric) will be placed underground.

3.12.2.2 Dust Control

During construction, a watering truck may be kept on site and the access roads would be watered as necessary, especially during periods of high winds and/or low precipitation.

3.12.2.3 Fire Control

Arrow would implement fire prevention and control measures including, but not limited to:

- requiring construction crews to carry fire extinguishers in their vehicles and/or equipment;
- training construction crews in the proper use of fire extinguishers; and
- contracting with the local fire district to provide fire protection.

3.12.2.4 Traffic

Construction personnel would stay within the approved ROW or would follow designated access roads.

3.12.2.5 Wildlife

During an informal Section 7 consultation with the USFWS, the following mitigation measures were agreed upon to reduce the potential impact to protected species.

3.12.2.5.1 *Migratory Bird Protective Measures*

- Arrow will conduct all construction outside of the migratory bird breeding season (between February 1 and July 15); or, if construction occurs during bird breeding season, Arrow will either:
    - mow and maintain vegetation within the project construction area (access road and pipeline corridor) prior to and during the breeding season to deter migratory birds from nesting in the project area until construction is underway; or
    - conduct an ornithological survey of the project area five days before construction begins, and if nests are discovered, notify BIA and USFWS.

3.12.2.5.2 *ESA Protective Measures*

- Whooping Crane: If a whooping crane is sighted within 1 mile of the proposed project area, work will be stopped and the BIA and USFWS will be notified. In coordination with the USFWS, work may resume after the bird(s) leaves the area.

- Whooping Crane; Pallid Sturgeon; Interior Least Tern; Piping Plover; Designated Critical Habitat of Piping Plover: Arrow will install an emergency shut-off valve on both banks of Moccasin Creek in SW1/4 of Section 24, T148N, R94W.

- Whooping Crane; Pallid Sturgeon; Interior Least Tern; Piping Plover; Designated Critical Habitat of Piping Plover: Arrow has committed to avoiding impact associated with pipeline construction by boring or completing a horizontal directional drill of the Moccasin Creek crossing in SW1/4 of Section 24, T148 N R 94W.

3.12.2.6 Cultural Resources

Arrow recognizes the need to protect cultural resources on the PHASE 3 SW and has committed to the following:

- Avoiding, as recommended, all identified National Register-eligible or unevaluated cultural resources. Buffers would be placed between eligible or unevaluated cultural resources and the proposed infrastructure (100-foot-wide temporary construction corridor). When avoidance buffers of 50 feet or greater cannot be achieved due to project design constraints, temporary fencing is recommended along the edge of the construction corridor and monitoring by a qualified archaeologist is recommended during all ground-disturbing activities to ensure that inadvertent impacts to cultural resources are avoided.

- Prohibiting all project workers from collecting artifacts or disturbing cultural resources in any area under any circumstances.

- Avoiding impacts to National Register-eligible or unevaluated cultural resources on pipeline construction corridor. If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site be secured, and BIA and THPO notified. In the event of a discovery, work shall not resume until written authorization to proceed has been received from the BIA.

3.13 IRREVERSABLE AND IRRETIEVABLE COMMITMENT OF RESOURCES

Removal and consumption of gas may be increased due to the construction of this pipeline. This action would be an irreversible and irretrievable commitment of resources. Other potential resource commitments include land area devoted to the PHASE 3 SW, soil lost to erosion (i.e., wind and water), unintentionally destroyed or damaged cultural resources, wildlife killed as a result of collision with vehicles (i.e., construction machinery and work trucks), and energy expended during construction and operation.

3.14 SHORT-TERM VERSUS LONG-TERM PRODUCTIVITY

Short-term development activities would not detract significantly from long-term productivity, and use, of the project areas. The ROW of the PHASE 3 SW corridor would be temporarily unavailable for livestock grazing, wildlife habitat, or other uses. However, original uses would be re-established very quickly. Any allottees to which compensation for

land disturbance is owed would be properly compensated for the loss of land use. The initial disturbance area would decrease considerably once pipeline is backfilled and non-necessary areas have been reclaimed. Rapid reclamation of the project area would facilitate revived wildlife and livestock usage, stabilize the soil, and reduce the potential for erosion and sedimentation.

3.15 CUMULATIVE IMPACTS

Environmental impacts may accumulate either over time or in combination with similar events in the area. Unrelated and dissimilar activities may also have negative impacts on critical elements, thereby contributing to the cumulative degradation of the environment.

Past and current disturbances in the project area include farming, grazing, roads, oil and gas wells, and other pipelines, both on the Reservation and off. Although the project area is surrounded on all sides by Reservation lands, land ownership is not relevant to the assessment of cumulative impacts except as it is predictive of future impacts. Farming and grazing activities occur on the Reservation regardless of the density of oil and gas development, since undivided interests in the land surface, range permits, and agricultural leases are often held by different tribal members than those holding mineral rights, such that economic benefits of both agricultural and oil and gas activities currently co-exist.

Reclamation will occur for roadways unless they are formally transferred to the BIA or to the surface owner with the approval of the BIA. The Proposed Action would create an additional 0.13 mile (695.41 feet) of roads in the project area, adding incrementally to existing and future impacts to soil resources, dust deposition, and erosion processes.

Arrow is committed to using BMPs to mitigate the potential effects of erosion. BMPs would include implementing erosion and sedimentation control measures, such as installing culverts with energy dissipating devices at culvert outlets to avoid sedimentation in ditches, constructing water bars along side slopes, planting cover crops to stabilize soil following construction and before permanent seeding takes place. Additional information regarding BMPs can be found in Section 3.12, Mitigation and Monitoring.

The Proposed Action would result in some loss of vegetation and ecological diversity of native mixed-grass prairie habitat. In addition, vegetation resources across the project area could be affected by foreseeable future energy development and surface disturbance in the project area. Continued oil and gas development within the project area could result in the loss and further fragmentation of native mixed-grass prairie habitat. Incremental impacts to quality native prairie may occur in the future from vegetation clearing, soil disturbance, soil loss, compaction, and increased encroachment of unmanaged invasive weed species. Past, present, and reasonably foreseeable future activities within the general area have reduced, and would likely continue to reduce, the amount of available habitat for certain listed species known to use native mixed-grass prairie habitats. Such impacts could be partially offset by avoidance of previously undisturbed prairie habitats, as well as implementation of soil and vegetation mitigation measures and BMPs. Cumulative impacts to vegetation and other biological resources are therefore expected to be minor.

Significant archaeological resources are irreplaceable and often unique; any destruction or damage of such resources can be expected to diminish the archaeological record as a whole. However, no such damage or destruction of significant archaeological resources is anticipated as a result of the Proposed Action, as these resources would be avoided. Therefore, no cumulative impacts to the archaeological record would occur as a result of implementation of the proposal.

The Proposed Action would incrementally add to existing and future socioeconomic impacts in the general area. The Proposed Action includes development of an 11.31-mile pipeline, which would be an additional source of revenue for some residents of the Reservation. Increases in employment would be temporary during the construction, drilling, and completion phases of the proposed project. Therefore, little change in employment would be expected over the long term.

Current impacts from oil and gas-related activities are still fairly dispersed, and the required BMPs would limit potential impacts.

No significant negative impacts are expected to affect any critical element of the human and natural environment; impacts would generally be low and mostly temporary. A positive impact of the pipeline is that it will reduce pollutants being released into the air due to flaring and a decrease in tanker trucks.

Arrow has committed to implementing interim reclamation of the access roads and pipeline pad immediately following construction and completion. Implementation of both interim and permanent reclamation measures would decrease the magnitude of cumulative impacts.

4.0 CONSULTATION AND COORDINATION

The BIA must continue to make efforts to solicit the opinions and concerns of all stakeholders (Table 4-1). For the purpose of this EA, a stakeholder is considered any agency, municipality, or individual person to which the proposed action may affect either directly or indirectly in the form of public health, environmental, or socioeconomic issues. A scoping letter declaring the location of the proposed project areas and explaining the actions proposed at each site was sent in advance of this EA to allow stakeholders ample time to submit comments or requests for additional information. Additionally, a copy of this EA would be submitted to all cooperating federal agencies and also to those agencies with interests in or near the proposed actions that could be affected by those actions.

Table 4-1. Scoping Comments.

Organization	Name	Comment	Response
Barnes County Municipal Airport, Manager	Lindemann, Larry	No Comment	
Bureau of Indian Affairs	Bercier, Marilyn	No Comment	
Bureau of Land Management	Bagley, Lonny	No Comment	
Bureau of Land Management	Nash, Mike	No Comment	
Dunn County	Hauck, Reinhard	No Comment	
Dunn County	Kadrmas, Ray	No Comment	
Enerplus Resources (USA) Corporation	Thingelstad, Blane	No Comment	
EOG Resources, Inc.	Smith, Heather	No Comment	
Federal Aviation Administration	Obenauer, Steve	No Comment	
Federal Emergency Management Agency	David Kyner	FEMAs major concern is if the project is located in a Special Flood hazard Area.	See Section 3.3 Water Resources for more information
Fort Berthold Agency	Turcotte, Daryl	No Comment	
Fort Berthold Rural Water Director, Three Affiliated Tribes	Danks, Marvin	No Comment	
Garrison Project Office Corps of Engineers, Omaha District		No Comment	
Indian Affairs Commission	Davis, Scott	No Comment	
Killdeer, Weydahl Field	Hoffman, Warren	No Comment	
McKenzie County	Cayko, Richard	No Comment	
McKenzie County	Olson, Frances	No Comment	
McKenzie Electric Cooperative	Thorson, Gary	No Comment	
McLean County Board of Commissioners	Hudson-Schenfisch, Julie	No Comment	
McLean Electric Cooperative, Inc.	Rudolph, Reginald	No Comment	
Mercer County, County Courthouse		No Comment	

Organization	Name	Comment	Response
Midcontinent Cable Company	Boyd, Bill	No Comment	
Minot Air Force Base	Chief Missile Engineer	No Comment	
Montana Dakota Utilities	Dixon, Doug	No Comment	
Mountrail Board of County Commissioners, Chairman	Hynek, David	No Comment	
National Parks Service	Chevance, Nick	No Comment	
New Town Municipal Airport	Johnson, Harley	No Comment	
NoDak Electric Cooperative, Inc.	Berg, George	No Comment	
North Dakota Department of Health	Glatt, David	Impacts will be minor and can be controlled by proper construction methods. This pipeline travels through areas that may contain a naturally occurring mineral called erionite.	See Section 3.2 for more information. In regards to erionite, using maps on the ND DOH website, it appears that the ROW will avoid the known naturally occurring deposits. Arrow has been made aware of the possibility of this mineral occurring in the project area. If the mineral is disturbed during construction, the ND DOH recommends industry standard dust suppression techniques.
North Dakota Department of Transportation	Peterson, Walter	No Comment	

Organization	Name	Comment	Response
North Dakota Game and Fish Department	McKenna, Mike	Recommend construction be avoided were possible in native prairie and wooded draws. Disturbed areas should be reclaimed to pre-project conditions. Steps should be taken to protect wetlands that can not be avoided, existing drainage patterns be maintained, and above ground appurtenances not be placed in wetland areas.	See Wildlife, Wetlands, and Vegetation sections
North Dakota Parks and Recreation	Prchal, Doug	No Comment	
Northern Border Pipeline Company	Land Department	No Comment	
Parshall-Hankins Field Airport	Kuehn, John	No Comment	
Reservation Telephone Cooperative	Jarski, Tim	RTC has fiber optic and copper cables adjacent to this project in the following areas: T148N R94W S 14, 15, 18, 23 – 25, & 36, T148N R95W S 1 & 12, and T149N R94W S 33.	Before any digging begins, a one-call will be scheduled.
Sisseton-Wahpeton Sioux Tribe, Chairman	Selvage, Michael	No Comment	
Southwest Water Authority	Massad, Mary	No Comment	
Spirit Lake Sioux Tribe	Pearson, Myra	No Comment	
Standing Rock Sioux Tribe, Chairman	Murphy, Charles	No Comment	
State Historical Society of North Dakota	Paaverud, Merl	No Comment	
THPO, Three Affiliated Tribes	Crows Breast, Elgin	No Comment	
Three Affiliated Tribes	Benson, Barry	No Comment	
Three Affiliated Tribes	Brugh, V. Judy	No Comment	
Three Affiliated Tribes	Fox, Fred	No Comment	

Organization	Name	Comment	Response
Three Affiliated Tribes	NAGRPA Office	No Comment	
Three Affiliated Tribes	Natural Resources Dept.	No Comment	
Three Affiliated Tribes	Packineau, Mervin	No Comment	
Three Affiliated Tribes	Poitra, Fred	No Comment	
Three Affiliated Tribes	Strahs, Arnold D.	No Comment	
Three Affiliated Tribes	Whitecalfe, Frank	No Comment	
Three Affiliated Tribes	Williams, Damon	No Comment	
Three Affiliated Tribes	Wolf, Malcolm	No Comment	
Three Affiliated Tribes, Chairman	Hall, Tex	No Comment	
Turtle Mountain Band of Chippewa	Ferris, Kade M.	No Comment	
U.S. Army Corps of Engineers	Cimarosti, Dan	Enclosed Section 10 Application incase a permit is required. Also information on nationwide Permits 12 & 14 were provided.	No Section 10 Applications or NWP 12/14 will be needed for this project.
U.S. Army Corps of Engineers	Laux, Eric	*Brad Thompson:* The project is not on USACE. The U. S. EPA, U.S. Fish & Wildlife Service, and ND SHPO should be consulted.	The U.S. EPA, U.S. Fish & Wildlife Service, and ND SHPO have been notified of this project.
U.S. Army Corps of Engineers	Sorensen, Charles	No Comment	
U.S. Bureau of Reclamation	Nelson, Richard	*Kelly McPhillips:* Sections of this pipeline run very near or intersect with rural water pipelines.	Before any digging begins, a one-call will be scheduled.
U.S. Department of Agriculture	Sweeney, Paul	*Jerome Schaar:* The NRCS recommends all wetland areas be avoided.	See Section 3.5 Wetlands for more information.
U.S. Environmental Protection Agency	Dhieux, Joyce	No Comment	
U.S. Environmental Protection Agency	Hefferman, Dan	No Comment	

Organization	Name	Comment	Response
U.S. Environmental Protection Agency	Svoboda, Larry	No Comment	
Ward County Board of Commissioners	Erickson, Carroll	No Comment	
West Plains Electric Cooperative, Inc.	Schelkoph, David	No Comment	
Western Area Power Administration	Paulson, Gerald	No Comment	
Williams Productions RMT Co.	Head, Jennifer	No Comment	
Xcel Energy	Manager	No Comment	
Zenergy Operating Company, LLC	Bryan, Kelley	No Comment	

5.0 LIST OF PREPARERS

An interdisciplinary team contributed to this document according to guidance provided in Part 1502.6 of Council on Environmental Quality regulations. This document was drafted by SWCA Environmental Consultants under the direction of the BIA. Information was compiled from various sources within SWCA Environmental Consultants.

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- Levi Binstock, Environmental Specialist
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- Joshua Ruffo, Biologist
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- Chris McLaughlin, Biologist
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- Mike Cook, Ecologist
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- Nelson Klitzka, Archaeologist
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- Chandler Herson, Archaeologist
  Conducted cultural resource surveys.
- Nicholas Smith, Archaeologist
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- Stephanie Lechert, Archaeologist
  Assisted writing cultural report.
- Rick Wadleigh, NEPA Specialist
  Reviewed document for content and adequacy.

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7.0 ACRONYMS

°F	degrees Fahrenheit
APE	Area of Potential Effect
AQI	Air Quality Index
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
EA	environmental assessment
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
H_2S	hydrogen sulfide
HAP	hazardous air pollutant
PHASE 3 SW	Phase 3 Southwest
MBTA	Migratory Bird Treaty Act
MHA Nation	Three Affiliated Tribes of the Mandan, Hidatsa, and Arikara Nation
NAAQS	National Ambient Air Quality Standards
N_2O	nitrous oxide
NDDA	North Dakota Department of Agriculture
NDDH	North Dakota Department of Health
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O_3	ozone
PM	particulate matter
ROW	right-of-way
SO_2	sulfur dioxide
THPO	Tribal Historic Preservation Officer
TRNP	Theodore Roosevelt National Park
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

APPENDIX A

Threatened and Endangered Species in Dunn and McKenzie Counties, North Dakota

SPECIES ACCOUNTS AND EFFECTS DETERMINATIONS

ENDANGERED SPECIES ACT

Black-footed Ferret (*Mustela nigripes*)
Affects Determination: No Effect

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the U.S. Fish and Wildlife Service (USFWS) as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2010a). 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 are not found in the project area. In addition, this species has not been observed in the wild for more than 20 years. The proposed project will have **no effect** on this species.

Gray Wolf (*Canis lupus*)
Affects Determination: No Effect

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

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

Whooping Crane (*Grus americana*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

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

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

Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed near the project area. However, project precautionary measures would be implemented if a whooping crane is sighted in or near the project area. Arrow would cease all construction activities and notify the USFWS of the sighting, should a crane be spotted within 1 mile of the project area. As a result, the proposed project **may affect, but is not likely to adversely affect** the endangered whooping crane.

Piping plover (*Charadrius melodus*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2010d). 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, 2010d). 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, 2010d).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea is a minimum of approximately 9 river miles away from the proposed pipeline. It is unlikely that migrating plovers would visit the project area during their migration. Therefore, the proposed project **may affect, but is not likely to adversely affect** piping plovers.

Designated Critical Habitat of Piping Plover
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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 areas near the proposed project, along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (UFWS 2002).

It unlikely that the project will modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams. Therefore, the proposed project **may affect, but is not likely to adversely affect** designated critical habitat of the piping plover.

Interior Least Tern (*Sterna antillarum*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

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

Census data indicate over 8,000 least terns in the interior population. In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone rivers upstream of Lake Sakakawea (USFWS 1990a,

2010e). Approximately 100 pairs breed in North Dakota (USFWS 2010e). Details of their migration are not known, but their winter range is reported to include the Gulf of Mexico and Caribbean Islands (USFWS 1990a, 2010e).

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 2010e).

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 2010e).

Suitable shoreline habitat for breeding and nesting plovers does not occur in the project area, and Lake Sakakawea lies a minimum of 9 river miles away from the proposed pipeline. It is unlikely that terns would visit the upland habitats present in the project area. Therefore, the proposed project **may affect, but is not likely to adversely affect** endangered least terns.

Pallid Sturgeon (*Scaphirhynchus albus*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

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

Suitable habitat for pallid sturgeon does not occur in the project area, and Lake Sakakawea lies a minimum of 9 river miles away from the proposed pipeline. However, the Little Missouri River which drains a portion the project area is a perennial tributary to Lake Sakakawea. Potential pollution and sedimentation occurring within the project area are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the construction, production, or reclamation of the proposed project area is not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the proposed project **may affect, but is not likely to adversely affect** pallid sturgeon.

Dakota Skipper (*Hesperia dacotae*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

Sprague's Pipit (*Anthus spragueii*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine bird that is native to the North American grasslands. It is a ground nester that breeds and winters on open grasslands and feeds mostly on insects and spiders and some seeds. The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota, and South Dakota as well as south-central Canada (USFWS 2010f). Wintering occurs in the southern states of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico. While the proposed home sites are located in areas with some native prairie grassland, the habitat quality would be poor the since the home sites occur near highways and near other homes and human activity. The proposed project **may affect, but is not likely to adversely affect** this species.

MIGRATORY BIRD TREATY ACT / THE BALD AND GOLDEN EAGLE PROTECTION ACT

Bald Eagle (*Haliaeetus leucocephalus*)

Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

Suitable nesting or foraging habitat for bald eagles includes old growth trees relatively close (usually less than 1.24 miles [Hagen et al. 2005]) to perennial waterbodies. The project area does not contain old growth trees and the project area is 3.5 miles from Lake Sakakawea and 2.5 miles from the Little Missouri River. One juvenile eagle was observed flying over the project area during the field survey. No nests were observed within 0.5 mile line of sight during the field surveys. Therefore, no adverse effects are anticipated. However, the possibility of more transient, flying bald eagle individuals traversing the project area does exist.

Golden Eagle (*Aquila chrysaetos*)

Status: Not Listed; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

No eagles or nests were observed during the field surveys; however, golden eagles may occur within or near the project area. The closest known golden eagle nest occurs within 1.6 miles of the proposed pipeline, in T148N R94W Section 14. The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Often, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the project area during the field survey. Therefore, the project is unlikely to cause any adverse effects to golden eagles.

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APPENDIX B

Bureau of Indian Affairs Concurrence Letter

SWCA®
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Bismarck Office
116 North 4th St, Ste 200
Bismarck, ND 58501
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701.258.5298
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April 1, 2011

Dear Interested Party:

The Bureau of Indian Affairs (BIA) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) for a proposed oil, natural gas, and water pipeline construction project (10-inch, 12-inch, and 6-inch-diameters respectively) and associated temporary access roads. The proposed action includes approval by the BIA for the land use and construction of an approximately 11.29-mile pipeline and approximately 3,594 feet of temporary access road, located on lands held in trust by the BIA within the Fort Berthold Indian Reservation (FBIR), by Arrow Pipeline, LLC (Arrow). Approximately 2.81 miles of proposed pipeline and 242 feet of temporary access road would be constructed on fee land. All wetlands and water bodies potentially impacted by the project on trust and fee land will be avoided by a reduction in the construction right-of-way (ROW) width sufficient to avoid impact or through the use of trenchless methodologies.

The proposed pipeline would be constructed within a 100-foot-wide construction ROW, except in areas containing forested upland or shrub land habitat, in which case the construction ROW would be reduced to a maximum width of 50 feet. The proposed pipeline would be buried at an average depth of approximately 6.0 feet. After the pipeline is constructed, Arrow will maintain a 50-foot-wide permanent ROW along the entire length of the proposed pipeline. In total, construction of the proposed pipeline is estimated to impact approximately 136.95 acres within the proposed construction ROW, where approximately 102.87 acres will be impacted on trust land and 34.08 acres impacted on fee land.

Construction of the proposed access roads would utilize a 66-foot-wide construction ROW within a 100-foot-wide temporary ROW. All access roads used exclusively for the construction of the proposed pipeline will be removed and reclaimed as soon as practicable after construction is complete. In total, construction of temporary access roads would impact approximately 5.81 acres within the 66-foot-wide construction ROW, including 2.15 acres on trust land and approximately 3.66 acres on fee land.

The proposed pipeline would begin at a point in the North-East (NE) 1/4 Section 36, Township (T) 148 North (North), Range (R) 94 West (W) and travel in a north-northwesterly direction through the following sections in Dunn and McKenzie counties:

- T148N, R94W, Sections 36*, 25*, 24*, 23, 22*, 21, 20, 19, 18, 15, 14, 7
- T148N, R95W, Sections 12 and 1*

** Proposed alignment crosses fee land in portion of section.*

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- T149N, R94W, Sections 33

Arrow recognizes the need for this pipeline to facilitate the demand of capturing and transporting oil and natural gas from wells on the FBIR to refining services and subsequently to market.

** Proposed alignment crosses fee land in portion of section.*

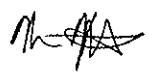
Onsite visits were conducted between September 7 and November 9, 2010, during which the proposed pipeline alignment was evaluated and biological and cultural resource surveys were conducted. A ROW review was conducted with the BIA on November 16, 2010, to approve the proposed pipeline alignment.

To ensure that social, economic, and environmental impacts are accurately analyzed, we solicit your views and comments on the proposed action, pursuant to Section 102(2)(D)(IV) of NEPA, as amended. We are interested in developments proposed or underway that should be considered in connection with the proposed project. We also ask your assistance in identifying any property or resources that you own, manage, oversee, or otherwise value that might be adversely impacted. Please send your replies and requests for additional project information to:

SWCA Environmental Consultants
Nelson Klitzka, Environmental Specialist
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501
(701) 258-6622
nklitzka@swca.com

Comments should be submitted before May 1, 2011, so that they may be addressed in the final document. Questions for the BIA can be directed to Marilyn Bercier, Regional Environmental Scientist, or Mark Herman, Environmental Engineer, at (605) 226-7656.

Sincerely,



Nelson Klitzka
Project Manager
SWCA Environmental Consultants

APPENDIX C

USFWS Scoping Letter

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April 20, 2011

Jeffrey K. Towner
U.S. Fish and Wildlife Service
3425 Miriam Avenue
Bismarck, ND 58501

RE: Request for Concurrence Letter

Dear Mr. Towner,

The Bureau of Indian Affairs (BIA) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) for a proposed oil, natural gas, and water pipeline construction project (10-inch, 12-inch, and 6-inch-diameters, respectively) and associated temporary access roads. The proposed action includes approval by the BIA for the land use and construction of an approximately 11.29-mile pipeline and approximately 3,594 feet of temporary access road, located on lands held in trust by the BIA within the Fort Berthold Indian Reservation (FBIR), by Arrow Pipeline, LLC (Arrow). Approximately 2.81 miles of proposed pipeline and 242 feet of temporary access road would be constructed on fee land. All wetlands and water bodies potentially impacted by the project on trust and fee land will be avoided by a reduction in the construction right-of-way (ROW) width sufficient to avoid impact or through the use of trenchless methodologies.

The proposed pipeline would be constructed within a 100-foot-wide construction ROW, except in areas containing forested upland or shrub land habitat, in which case the construction ROW would be reduced to a maximum width of 50 feet. The proposed pipeline would be buried at an average depth of approximately 6.0 feet. After the pipeline is constructed, Arrow will maintain a 50-foot-wide permanent ROW along the entire length of the proposed pipeline. In total, construction of the proposed pipeline is estimated to impact approximately 136.95 acres within the proposed construction ROW, where approximately 102.87 acres will be impacted on trust land and 34.08 acres impacted on fee land.

Construction of the proposed access roads would utilize a 66-foot-wide construction ROW within a 100-foot-wide temporary ROW. All access roads used exclusively for the construction of the proposed pipeline will be removed and reclaimed as soon as practicable after construction is complete. In total, construction of temporary access roads would impact approximately 5.81 acres within the 66-foot-wide construction ROW, including 2.15 acres on trust land and approximately 3.66 acres on fee land.

The proposed pipeline would begin at a point in the northeast (NE) 1/4 Section 36, Township (T) 148 North (North), Range (R) 94 West (W) and travel in a north-northwesterly direction through the following sections in Dunn and McKenzie counties (Figure 1):

- T148N, R94W, Sections 36*, 25*, 24*, 23, 22*, 21, 20, 19, 18, 15, 14, 7
- T148N, R95W, Sections 12 and 1*
- T149N, R94W, Sections 33

Arrow recognizes the need for this pipeline to facilitate the demand of capturing and transporting oil and natural gas from wells on the FBIR to refining services and subsequently to market.

Onsite visits were conducted between September 7 and November 9, 2010, during which the proposed pipeline alignment was evaluated and biological and cultural resource surveys were conducted. A ROW review was conducted with the BIA on November 16, 2010, to approve the proposed pipeline alignment

Wildlife and Habitat Observations

SWCA Environmental Consultants (SWCA) biologists conducted wetland/waterbody and wildlife surveys, including threatened and endangered species habitat assessments, on various dates between September 7 and November 9, 2010. The habitat types identified during the field surveys included mixed grass prairie, forested upland, shrubland, and cultivated hayland. Northern mixed grass prairie can include wetlands, native grassland and grass-shrub habitats, with riparian and floodplain forests along major drainages. Hayland is land used in agriculture to produce forage for livestock with the intent of harvesting and letting cure before feeding. It can consist of native vegetation, but most often is comprised of introduced grasses and legumes.

Hayland in this survey consisted of a vegetative community dominated by alfalfa (*Medicago sativa*) and a cool season introduced grass mix. All other species listed were found within the mixed grass prairie, forested upland, or shrubland habitat.

Species observed within forested upland and shrubland habitat include green ash (*Fraxinus pennsylvanica*), eastern red cedar (*Juniperus virginiana*), bur oak (*Quercus macrocarpa*), American elm (*Ulmus americana*), juneberry (*Amelanchier alnifloia*), downy hawthorn (*Crataegus mollis*), creeping juniper (*Juniperus horizontalis*), American plum (*Prunus americana*), common chokecherry (*Prunus virginiana*), American red raspberry (*Rubus idaeus*), silver buffaloberry (*Shepherdia argentea*), western snowberry (*Symphoricarpos occidentalis*), and western poison ivy (*Toxicodendron rydbergii*).

Native upland grasses identified on the survey include western wheatgrass (*Agropyron smithii*), big bluestem (*Andropogon gerardii*), red three awn (*Aristida purpurea*), sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), bearded wheatgrass (*Elymus trachycaulus subsecundus*), green needlegrass (*Nassella viridula*), scribner dichanthelium (*Panicum scribnerianum*), little bluestem (*Schizachyrium scoparium*), tall dropseed (*Sporobolus asper*), and porcupine grass (*Hesperostipa spartea*). Non native grasses observed during the survey include; crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), and Kentucky bluegrass (*Poa pratensis*).

Upland forbs identified within the project area include western yarrow (*Achillea millefolium*), meadow anemone (*Anemone canadensis*), green sagewort (*Artemisia campestris*), silver sagebrush (*Artemisia cana*), fringed sage (*Artemisia frigida*), white sagebrush (*Artemisia ludoviciana*), purple coneflower (*Echinacea angustifolia*), curlycup gumweed (*Grindella*

squarrosa), dotted gayfeather (*Liatris puncata*), rush skeletonplant (*Lygodesmia juncea*), yellow sweetclover (*Melilotus officinalis*), silverleaf scurfpea (*Psoralea argophylla*), prairie coneflower (*Ratibida columnifera*), prairie rose (*Rosa Arkansas*), black eyed Susan (*Rudbeckia hirta*), Missouri goldenrod (*Solidago missouriensis*), and goatsbeard (*Trapopogon dubius*).

Wetland vegetation identified within the project area include sedges (*Carex* spp. *and Eleocharis palustris*), foxtail barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), fowl bluegrass (*Poa palustris*), smartweed (*Polygonum amphibium*), dock (*Rumex* sp.), prairie cordgrass (*Spartina pectinata*), and cattail (*Typha* spp.).

Wildlife observed during the field survey includes coyote (*Canis latrans*), prairie dog (*Cynomys ludovicianus*), deer (*Odocoileus* spp.), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), northern harrier (*Circus cyaneus*), merlin (*Falco columbarius*), sandhill crane (*Grus canadensis*), juvenile bald eagle (*Haliaeetus leucocephalus*), western meadowlark (*Sturnella neglecta*), and sharp-tailed grouse (*Tympanuchus phasianellus*). SWCA ecologists observed no eagle nests within the project area.

Project Area Hydrology

The Project Area is located within the Lake Sakakawea and Lower Little Missouri River watersheds (Hydrologic Unit Code [HUC] 10110101 and 10110205, respectively), and within the Upper Bear Den Creek (HUC 101101012001), Upper Moccasin Creek (HUC 101102050604), Dry Creek (HUC 101102050506), and Lower Moccasin Creek (HUC 101102050605) sub-watersheds (Figure 2).

Best management practices (BMPs) will be implemented for all ground-disturbing activities, as required by the Clean Water Act (CWA). With the implementation of all the provisions of the CWA National Pollution Discharge Elimination System (NPDES), including federal requirements for implementation of adequate Spill Prevention, Control and Countermeasures during construction, no impacts to water resources are anticipated.

Threatened and Endangered Species Occurrence and Habitat

Several wildlife species that may exist or have been known to exist in Dunn and McKenzie counties are listed as threatened or endangered under the Endangered Species Act (16 United States Code [USC] 1531 et seq.) (ESA). According to the U.S. Fish and Wildlife Service (USFWS), listed species in Dunn and McKenzie counties, North Dakota, include the gray wolf, black-footed ferret, whooping crane, piping plover and its Designated Critical Habitat, interior least tern, pallid sturgeon, as well as two federal candidate species, the Dakota skipper and Sprague's pipit. The listed species and their federal status are provided in Table 1. SWCA did not observe any of these species during their field surveys, although potential suitable habitat of the Dakota skipper, Sprague's pipit, whooping crane, and gray wolf was observed within or near the project area.

Potential Effects

Indirect effects of the Project on listed species could result from human disturbance and increases in vehicular traffic during construction of the pipeline, as well as indirectly from habitat degradation, sedimentation, or accidental release of hazardous materials from the construction of the pipeline.

SWCA has evaluated the status, life history, and potential effects of the proposal on each of these listed species. The potential effects of the Project on these species is described in detail in Attachment 1, and summarized in Table 1.

Table 1. Summary of Potential Effects to Threatened and Endangered Species.

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Black-footed Ferret (*Mustela nigripes)*	Endangered	Species is presumed extirpated from North Dakota.	None	No Effect
Gray Wolf (*Canis lupus)*	Endangered	Nearest known gray wolf populations exist in Minnesota, Canada, Montana, and Wyoming. Western North Dakota sightings in the late twentieth century are speculated to be solitary, transient, young adult males seeking to establish territory.	None	No Effect
Whooping Crane (*Grus americana)*	Endangered	Birds may occasionally stopover during migration due to the presence of suitable foraging habitat near the project areas.	Construction activity will cease and the BIA and USFWS will be notified if whooping cranes are sighted within 1-mile of the project area.	May Affect, Is Not Likely to Adversely Affect
Piping Plover (*Charadrius melodus)*	Threatened	Birds are unlikely to be present due to lack of suitable foraging or nesting habitat.	See migratory bird protective measures.	May Affect, Is Not Likely to Adversely Affect
Designated Critical Habitat for Piping Plover	Designated Critical Habitat	Critical Habitat occurs within the watershed of the Project Area, on the shoreline and islands of Lake Sakakawea, at an approximate minimum of 3.5 miles from the proposed pipeline.	Arrow will implement all best management practices (BMPs), erosion control measure, and spill prevention practices required by the Clean Water Act.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Interior Least Tern (*Sterna antillarum*)	Endangered	The nearest suitable nesting and foraging habitat occurs on the shoreline and islands of Lake Sakakawea, at an approximate minimum of 3.5 miles from the proposed pipeline. Migrating interior least terns may transition through the Project Area.	See migratory bird protective measures. See Designated Critical Habitat protective measures for piping plover.	May Affect, Is Not Likely to Adversely Affect
Pallid Sturgeon (*Scaphirhynchus albus*)	Threatened	Lake Sakakawea, at a minimum, is approximately 9 river miles from proposed pipeline.	Arrow, LLC will implement all BMPs and erosion control measures as required by the BIA and the Clean Water Act. Wetlands and waterbodies, including Moccasin Creek, would be avoided via surveyed alternatives or through the use of trenchless methods. Therefore no impact to wetlands or waterbodies is likely to result from construction activities.	May Affect, Is Not Likely to Adversely Affect
Dakota Skipper (*Hesperia dacotae*)	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	• The proposed pipeline ROW would be reclaimed as soon as possible after completion. • Temporary access roads will be removed upon project completion. • Impacted areas will be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Sprague's Pipit (*Anthus spragueii)*	Candidate	Suitable habitat was noted within the project area. However, no adverse impact is anticipated as a result of construction activities.	• The proposed pipeline ROW would be reclaimed as soon as possible after completion. • Temporary access roads will be removed upon project completion. • Impacted areas will be returned to pre-construction contours.	May Affect, Is Not Likely to Adversely Affect
Other Federally Protected Species				
Bald eagle (*Haliaeetus leucocephalus)*	Bald and Golden Eagle Protection Act (BGEPA).	Raptor habitat survey was conducted. No evidence of bald eagle foraging or nesting habitat occurs in the Project Area although one juvenile bald eagle was observed near the project area.	A 0.5-mile line of sight survey was conducted during the initial field survey and no suitable nesting habitat or nests were observed within the project area. No additional bald eagle surveys will be conducted.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Golden eagle (*Aquila chrysaetos*)	BGEPA	Raptor habitat survey was conducted. No eagle nests were observed in the Project Area. Nesting habitat was present and golden eagles may occasionally visit or forage within or around the Project Area.	A 0.5-mile line of sight survey was conducted during the initial field survey. Suitable nesting and foraging habitat exists within the project area, however no nests were observed. The closest known golden eagle nest occurrence is approximately 1.6 miles west of the proposed project area. The nest was listed as unoccupied during the assumed last survey dated 04/12/2006. The nest is located at 47.635306°, -102.743279°, west of State Highway 22. No additional golden eagle surveys will be conducted.	No Adverse Effects Anticipated

Species	ESA Status	Habitat Suitability or Known Occurrence	Operator-Committed Measures	Effects Determination
Migratory Birds	Migratory Bird Treaty Act (MBTA)	Suitable habitat for nesting migratory grassland birds occurs in the Project Area.	Arrow will reduce their construction ROW to 50 feet through forested upland and shrubland habitat recorded by SWCA. • If Arrow clears the ROW of vegetation through either blading or mowing before February 1, weather permitting, then no additional avian surveys will be conducted assuming the ROW is kept clear of vegetation until reclamation begins. • If construction is to occur during bird breeding season (February 1 – July 15) and vegetation has not been removed to deter nesting then an avian survey will be conducted of the pipeline ROW no greater than 5 days before the commencement of construction activities. If no nesting birds are located within the ROW during the avian survey Arrow will clear the ROW of vegetation until reclamation commences. • If active nests are located during the supplemental avian survey Arrow will consult with the BIA and USFWS to determine acceptable options.	No Adverse Effects Anticipated

In addition to the ESA and the BGEPA (16 USC 668–668d, 54 Sta. 250) the MBTA protects nesting migratory bird species. Through the implementation of the migratory bird protective measures and other specific measures identified in Table 1, and Owner-Committed Measures discussed in

this letter, the proposed Project is unlikely to adversely affect bald or golden eagles or nesting migratory birds.

Owner-Committed Best Management Practices, Mitigation, and Safety Measures

Arrow, LLC has committed to implementing the following measures for all construction and operations on the Reservation, including the proposed Project, if applicable.

Construction and Design Measures

- If required by the Clean Water Act National Pollution Discharge Elimination System (NPDES), implement approved Stormwater Pollution Prevention Plan and BMPs for the construction of pipeline and associated temporary access roads to reduce the potential for sediment transport.
- Conduct interim reclamation of pipeline as soon as possible after construction.
- Grind trees and other woody material removed from the pipeline corridor and add to the topsoil.
- Design temporary access roads to minimize visual impacts.
- Remove temporary access roads and reclaim ROW as soon as practicable.
- Use existing roads to the extent possible, upgrading as needed.
- Minimize topsoil removal and stockpile stripped topsoil and protect it from erosion until reclamation activities commence.
- During reclamation, redistribute and reseed the topsoil on the disturbed areas, and protect and maintain reclaimed areas until the sites are fully stabilized.
- Minimize disturbance to trees and woody shrubs.
- Follow the contour (form and line) of the landscape.
- Re-contour disturbed areas to approximate the original contours of the landscape.
- Develop a final reclamation plan that allows disturbed areas to be quickly absorbed into the natural landscape.
- Require construction crews to carry fire extinguishers in their vehicles and/or equipment; and be trained in the proper use of fire extinguishers.
- Contract with the local fire district to provide fire protection.
- Plan transportation to reduce vehicle density.
- Post speed limits on roads.
- Avoid construction and vehicle use during wet conditions that could result in excessive rutting.

Bald and Golden Eagle and Migratory Bird Protective Measures

- SWCA biologists conducted a 0.5-mile line of sight survey from the project area for bald and golden eagle nests. No nests were observed.
- The nearest known golden eagle nest occurs approximately 1.6 miles west of the project area.
- Arrow will conduct all construction outside of the migratory bird breeding season (between February 1 and July 15); or, if construction occurs during bird breeding season, Arrow will either:
    - Mow, maintain, or completely remove vegetation within the Project construction area (temporary access roads and pipeline ROW) prior to and during the breeding season, weather permitting, to deter migratory birds from nesting in the Project Area until construction is underway; or
    - Conduct an avian survey of the project area no greater than five days before construction begins, and if nests are discovered, notify BIA and USFWS.
- The construction ROW will be reduced to a maximum of 50 feet through all forested upland and shrubland habitat.

ESA Protective Measures

- Piping Plover and its Designated Critical Habitat, Interior Least Tern, and Pallid Sturgeon: Erosion control mechanisms will be deployed to reduce the potential for sediment transport into drainages and subsequently Lake Sakakawea. The disturbed area will be reclaimed per the BIA's requirements as soon as practicable after construction is complete. Several ephemeral drainages that possess the potential for significant flow during spring melt will require the use of a 24-hour open/cut methodology. These locations will be trenched and the pipe placed within a 24 hour period further reducing the potential for excessive sediment transport.
- Whooping Crane: If a whooping crane is sighted within 1 mile of the proposed Project Area, work will be stopped and the USFWS will be notified. In coordination with the USFWS, work may resume after the bird(s) leaves the area.
- No wetlands, intermittent, or perennial waterbodies are likely to be impacted. Qualified wetland specialist will mark the boundary of all field verified wetlands, intermittent, and perennial waterbodies, within the construction ROW, no more than 5 days prior to the commencement of construction activities.

With the implementation of the above standard BMPs, general design measures, and species-specific measures, no riparian areas or wetlands would be directly or indirectly affected by the proposed pipeline.

No effects to gray wolf or black-footed ferret are anticipated because of the low likelihood of their occurrence in the proposed project area and other factors discussed in Attachment 1. With

implementation of the migratory bird protective measures and other specific measures identified in Table 1 and Owner-Committed Measures discussed in this letter, the proposed Project **may affect but is not likely to adversely affect** the whooping crane, piping plover and its Designated Critical Habitat, the interior least tern, pallid sturgeon, Sprauge's pipit, and the Dakota skipper.

We are requesting a concurrence letter be sent before May 15, 2011, so that it may be addressed in the final EA. Please send the concurrence letter to the addresses below.

SWCA Environmental Consultants
Nelson Klitzka, Project Manager
116 North 4th Street, Suite 200
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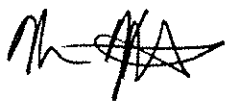
(701) 258-6622
nklitzka@swca.com

Bureau of Indian Affairs
Marilyn Bercier, Regional Environmental Scientist
115 4th Avenue SE
Aberdeen, South Dakota 57401
(605) 226-7656
Marilyn.Bercier@bia.gov

Sincerely,



Nelson Klitzka
Project Manager
nklitzka@swca.com

Enclosures: Attachment 1

ATTACHMENT 1 – SPECIES ACCOUNTS AND EFFECTS DETERMINATIONS

ENDANGERED SPECIES ACT

Black-footed Ferret (*Mustela nigripes*)

Affects Determination: No Effect

Black-footed ferrets are nocturnal, solitary carnivores of the weasel family that have been largely extirpated from the wild primarily due to range-wide decimation of the prairie dog (*Cynomys* sp.) ecosystem (Kotliar et al. 1999). They have been listed by the USFWS as endangered since 1967, and have been the object of extensive re-introduction programs (USFWS 2010a). 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 are not found in the Project Area. In addition, this species has not been observed in the wild for more than 20 years. The proposed Project will have **no effect** on this species.

Gray Wolf (*Canis lupus*)

Affects Determination: No Effect

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

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

Whooping Crane (*Grus americana*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

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

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

Suitable whooping crane foraging habitat (i.e., cultivated cropland) was observed near the Project area. However, project precautionary measures would be implemented if a whooping crane is sighted in or near the Project Area. Arrow would cease all construction activities and notify the Service of the sighting, should a crane be spotted within 1-mile of the Project Area. As a result, the proposed Project **may affect, but is not likely to adversely affect** the endangered whooping crane.

Piping plover (*Charadrius melodus*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

Plovers in the Great Plains make their nests on open, sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on beaches, sand bars, and dredged material islands of major river systems (USFWS 2002, 2010d). 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, 2010d). 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, 2010d).

Suitable shoreline habitats for breeding and nesting plovers does not occur in the Project Area, and Lake Sakakawea lies a minimum of approximately 9 river miles away from the proposed pipeline. It is unlikely that migrating plovers would visit the Project during their migration. Therefore, the proposed Project **may affect, but is not likely to adversely affect** piping plovers.

Designated Critical Habitat of Piping Plover
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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 areas near the proposed Project, along the shoreline of Lake Sakakawea in McKenzie County, North Dakota (UFWS 2002).

It unlikely that the project will modify, alter, disturb, or affect the shoreline of Lake Sakakawea or any of its tributary streams therefore it **may affect, but is not likely to adversely affect** designated critical habitat of the piping plover would occur.

Interior Least Tern (*Sterna antillarum*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

The interior population of least terns breeds in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems, where they nest in small colonies. From late April to August, terns nest in a shallow hole scraped in an open sandy area, gravel patch, or exposed flat and bare sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. The adults

continue to care for chicks after they hatch. Least terns in North Dakota will often be found sharing sandbars with the piping plover, a threatened species (USFWS 2010e).

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

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 2010e).

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 2010e).

Suitable shoreline habitats for breeding and nesting plovers does not occur in the Project Area, and Lake Sakakawea lies a minimum of 9 river miles away from the proposed pipeline. It is unlikely that terns would visit the upland habitats present in the Project Area. Therefore, the proposed Project **may affect, is not likely to adversely affect** endangered least terns.

Pallid Sturgeon (*Scaphirhynchus albus*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

The pallid sturgeon population which is found near the Project Area occurs from the Missouri River below Fort Peck Dam to the headwaters of Lake Sakakawea and the lower Yellowstone River up the confluence of the Tongue River, Montana (USFWS 2007a). This population consists of approximately 136 wild adult pallid sturgeon (USFWS 2007a). Hatchery reared sturgeon have also been stocked since 1998. The pallid sturgeon has been found to utilize the 25 km of riverine habitat that would be inundated by Lake Sakakawea at full pool (Bramblett 1996 per USFWS

2007a). Larval pallid sturgeons have also been found to drift into Lake Sakakawea. While the majority of pallid sturgeons are found in the headwaters of Lake Sakakawea, North Dakota Game and Fish have caught and released pallid sturgeon in nets set in 80 to 90 feet of water between the New Town and Van Hook area. Based on this information, pallid sturgeon could be found throughout Lake Sakakawea (personal communication, email from Steve Krentz, Pallid Sturgeon Project Lead, U.S. Fish and Wildlife Service, to Mike Cook, Aquatic Ecologist, SWCA Environmental Consultants, September 3, 2010).

Suitable habitats for pallid sturgeon does not occur in the Project Area, and Lake Sakakawea lies a minimum of 9 river miles away from the proposed pipeline. However, the Little Missouri River which drains a portion the Project Area, is a perennial tributary to Lake Sakakawea. Potential pollution and sedimentation occurring within the Project Area are concerns for downstream populations of endangered pallid sturgeon. Activities associated with the construction, production, or reclamation of the proposed Project Area is not anticipated to adversely affect water quality and subsequently the pallid sturgeon. Therefore, the proposed Project **may affect, is not likely to adversely affect** pallid sturgeon.

Dakota Skipper (*Hesperia dacotae*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

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

Sprague's Pipit (*Anthus spragueii*)
Affect Determination: May Affect, Is Not Likely to Adversely Affect

The Sprague's pipit is a small passerine bird that is native to the North American grasslands. It is a ground nester that breeds and winters on open grasslands and feeds mostly on insects and spiders and some seeds. The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota, and South Dakota as well as south-central Canada (USFWS 2010f). Wintering occurs in the southern states of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico. While the proposed home sites are located in areas with some native prairie grassland, the habitat quality would be poor

the since the home sites occur near highways and near other homes and human activity. The proposed Project **may affect, is not likely to adversely affect** this species.

MIGRATORY BIRD TREATY ACT / THE BALD AND GOLDEN EAGLE PROTECTION ACT

Bald Eagle (*Haliaeetus leucocephalus*)

Status: Delisted in 2007; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

Suitable nesting or foraging habitat for bald eagles includes old growth trees relatively close (usually less than 1.24 miles [Hagen et al. 2005]) to perennial waterbodies. The Project Area does not contain old growth trees and the Project Area is 3.5 miles from Lake Sakakawea and 2.5 miles from the Little Missouri River. One juvenile eagle was observed flying over the project area during the field survey. No nests were observed within 0.5 mile line of sight during the field surveys. Therefore, no adverse effects are anticipated. However, the possibility of more transient, flying bald eagle individuals traversing the Project Area does exist.

Golden Eagle (*Aquila chrysaetos*)

Status: Not Listed; protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act

Effects of Project: No adverse effects anticipated

No eagles or nests were observed during the field surveys; however, golden eagles may occur within or near the Project Area. The closest known golden eagle nest occurs within 1.6 miles of the proposed pipeline, in T148N R94W Section 14. The golden eagle prefers habitat characterized by open prairie, plains, and forested areas. Often, golden eagles can be found in proximity to badland cliffs which provide suitable nesting habitat. However, no primary or secondary indication of golden eagle presence, including nests, was observed within or near the Project Area during the field survey. Therefore, the Project is unlikely to cause any adverse effects to golden eagles.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

SEP -1 2011

Mr. Michael J. Cook, M.S.
Natural Resources Lead
SWCA Environmental Consultants – Bismarck
116 North 4th Street, Suite 200
Bismarck, North Dakota 58501

Re: Arrow Pipeline, LLC, Phase 3SW
Gathering Pipeline
Proposed Oil, Gas, and Water Pipeline
Fort Berthold Indian Reservation,
Dunn and McKenzie Counties, ND

Dear Mr. Cook:

The U.S. Fish and Wildlife Service (Service) has reviewed the proposed oil, natural gas, and water pipeline construction project (10-inch, 12-inch, and 6-inch diameters, respectively) and associated temporary access roads within the Fort Berthold Indian Reservation by Arrow Pipeline, LLC (Arrow) described in letters dated April 20 and July 18, 2011, and in an e-mail dated August 30, 2011. The proposed pipeline would be approximately 11.29 miles long, and the temporary access road would be approximately 3,594 feet. The proposed pipeline would travel in a generally northwesterly direction through the following sections in Dunn and McKenzie Counties:

- T. 148 N., R. 94 W., Sec. 36, 25, 24, 23, 22, 21, 20, 19, 18, 15, 14, 7
- T. 148 N., R. 95 W., Sec. 12, 1
- T. 149 N., R. 94 W., Sec. 33

We offer the following comments under the authority of and in accordance with the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.).

In an e-mail dated October 13, 2009, the Bureau of Indian Affairs (BIA) designated SWCA to represent the BIA for informal Section 7 consultation under the ESA. Therefore, the U.S. Fish and Wildlife Service (Service) is responding to you as the designated non-Federal representative for the purposes of ESA.

The Service concurs with SWCA's determination of "may affect, is not likely to adversely affect" for the whooping crane, piping plover, least tern and pallid sturgeon and piping plover critical habitat. This concurrence is predicated on Arrow's commitment to directionally bore under Moccasin Creek and to place two additional block valves on either side of the Moccasin Creek crossing in the SW ¼ of S. 24, T. 148 N., R. 94 W. You indicated that boring under Moccasin Creek will not disturb the bed or bank and thus will not increase the risk of erosion of the bed and bank under high-water conditions. If a spill should occur, the block valves should reduce the amount of discharge into the creek, and thus the amount that could potentially impact listed species or piping plover critical habitat. Additionally, the Service's concurrence is predicated on Arrow's commitment to cease construction activity within 1 mile of that part of the pipeline if a whooping crane is sighted during construction.

The Service acknowledges your determination of "no effect" for the black-footed ferret and the gray wolf.

The Service acknowledges the steps Arrow is taking to reduce the impacts on the Dakota skipper and Sprague's pipit including; to reclaim the ROW as soon as possible after construction, to remove temporary access roads as soon as possible after construction, and to restore impacted areas to their preconstruction contours.

Thank you for the opportunity to comment on this project. If additional information is required, please contact Carol Aron of my staff, or contact me directly at (701) 250-4481 or at the letterhead address.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

cc: Bureau of Indian Affairs
(Attn: Marilyn Bercier)

Notice of Availability and Appeal Rights

Arrow Pipeline: **Phase 3 Southwest Pipeline**

The Bureau of Indian Affairs (BIA) is planning to issue administrative approvals related to an Environmental Assessment to Authorize Land Use for a proposed pipeline connecting producing wells on the Reservation to the approved Dakota-3 Bearstail #32-29H. The proposed pipeline would begin at a point in the NE¼ NE¼ Section 36, Township 148 North, Range 94 West, and travel in a northwesterly direction through the following sections in Dunn County on the Fort Berthold Reservation as shown on the attached map. Construction by Arrow Pipeline, LLC is expected to begin in 2011.

An environmental assessment (EA) determined that proposed activities will not cause significant impacts to the human environment. An environmental impact statement is not required. Contact Earl Silk, Superintendent at 701-627-4707 for more information and/or copies of the EA and the Finding of No Significant Impact (FONSI).

The FONSI is only a finding on environmental impacts – it is not a decision to proceed with an action and *cannot* be appealed. BIA's decision to proceed with administrative actions *can* be appealed until October 2, 2011, by contacting:

United States Department of the Interior
Office of Hearings and Appeals
Interior Board of Indian Appeals
801 N. Quincy Street, Suite 300, Arlington, Va 22203.

Procedural details are available from the BIA Fort Berthold Agency at 701-627-4707.

Project locations