NAVIGATOR HEARTLAND GREENWAY PIPELINE SYSTEM: APPLICATION SUBMITTED UNDER SDCL CHAPTER 49-41B

Submitted to: The South Dakota Public Utilities Commission

September 2022

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LIST OF EXHIBITS

LIST OF ACRONYMS

API	American Petroleum Institute
Applicant	Navigator Heartland Greenway, LLC
ARMS	Archeological Research Management System
ATWS	additional temporary workspace
BCC	Birds of Conservation Concern
BMP	best management practice
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CWA	*Clean Water Act*
ECG	Environmental Construction Guidance
ECD	erosion control device
EPA	U.S. Environmental Protection Agency
ESA	*Endangered Species Act*
GIS	Geographic Information System
HCA	high consequence area
HDD	horizontal directional drilling
HGCS	HG Carbon Storage LLC
HGPS	Heartland Greenway Pipeline System
ILI	in-line inspection
IPaC	Information for Planning and Consultation
IR	inadvertent return
L/R	launcher and receiver
MLV	mainline valve
MMT	million metric tons
MOP	maximum operating pressure
MP	milepost
NCO2V	Navigator CO2 Ventures LLC
NCS	Navigator Carbon Services LLC
NLCD	National Land Cover Database
NLEB	northern long-eared bat
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

OCC	Operations Control Center
PEM	palustrine emergent
PFO	palustrine forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
psig	pounds per square inch gauge
PSS	palustrine scrub shrub
PUC	Public Utilities Commission
ROW	right-of-way
SCADA	Supervisory Control and Data Acquisition
SDCL	South Dakota Codified Law
SDDANR	South Dakota Department of Agriculture & Natural Resources
SDGFP	South Dakota Game, Fish, and Parks
SDGS	South Dakota Geological Survey
SHPO	State Historic Preservation Office
SMYS	specified minimum yield strength
SSA	sole source aquifer
Terracon	Terracon Consultants, Inc.
TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WHPA	wellhead protection area

ADMINISTRATIVE RULE APPLICATION CHECKLIST

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20:10:22:01	Definitions	No information requested by the rule to be included within the application
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20:10:22:03	Prefiling conference	No information requested by the rule to be included within the application
20:10:22:04	General format of application for the permit	No information requested by the rule to be included within the application
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Citation	Description	Section
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Citation	Description	Section
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EXECUTIVE SUMMARY

Navigator Heartland Greenway, LLC (Applicant), is proposing to construct the Navigator Heartland Greenway Pipeline System (HGPS). HGPS is the midstream transportation portion of a new interstate carbon capture, transportation, use and sequestration system being developed by Applicant's parent company, Navigator CO2 Ventures LLC (NCO2V), across parts of the Midwest and collectively referred to herein as the "Project." The Project is being developed by NCO2V, with the Applicant being a wholly owned subsidiary of NCO2V and the company designing, constructing, and operating the interstate HGPS. Applicant's affiliate companies are developing the other portions of Heartland Greenway, with Navigator Carbon Services LLC (NCS) developing carbon capture and compression systems and HG Carbon Storage LLC (HGCS) developing the sequestration facilities. Applicant will receive into HGPS captured carbon dioxide (CO_2) emissions compressed into a dense phase at capture facilities, which emissions are currently being emitted into the atmosphere, from emission sources located along the proposed route of HGPS, and safely transport the compressed CO_2 through HGPS to either (1) a permanent and secure underground sequestration site operated by HGCS and/or (2) a terminal for distribution to industrial users of CO_2.

The HGPS is approximately 1,300 miles of a network of pipelines connecting 21 carbon dioxide capture facilities to be installed at ethanol and fertilizer plants throughout South Dakota, Nebraska, Minnesota, Iowa, and Illinois that will transport captured carbon dioxide for permanent and secure underground sequestration in Illinois and/or to off-take facilities for commercial/industrial use.

In South Dakota, the HGPS consists of approximately 111.9 miles of new 6-inch and 8-inch outside diameter pipeline in parts of Brookings, Moody, Minnehaha, Lincoln, and Turner counties that connect three ethanol plants to the Project. Emissions will be captured at Valero's Aurora plant and POET's Chancellor and Hudson plants each with respective pipeline segments: the South Dakota portion of the Aurora to Hartley segment (63.6 miles of 8-inch), the POET Chancellor Lateral (22.6 miles of 6-inch) and the POET Hudson Lateral (25.7-miles of 6-inch). One Launcher/Receiver facility will be constructed as described in Section 1.3.

1.0 PROJECT DESCRIPTION

1.1 Project Purpose

The Heartland Greenway Pipeline System (HGPS) is a new interstate carbon capture and transportation system connecting 21 emitting facilities via approximately 1,300 miles of pipeline through the states of South Dakota, Minnesota, Nebraska, Iowa, and Illinois (referred to herein as the "Project"). The purpose of the Project is to offer safe and reliable transportation of captured carbon dioxide (CO_2) that would otherwise be emitted to sequestration and other carbon management purposes. In South Dakota the HGPS connects to the Valero Aurora Plant, POET Chancellor Plant and POET Hudson plants.

1.2 Demand for the Project

Navigator CO2 Ventures LLC (NCO2V) conducted public open seasons in 2021 whereby it solicited commitments from any emitters in the project's footprint that desired to be connected to the HGPS for capture and sequestration services on their CO_2 emissions, and

Navigator continues to solicit any CO_2 emitters in the project's footprint to provide services on the common carrier pipeline. To date, the Applicant, NCS, and HGCS have entered into agreements with multiple industrial producers along the HGPS footprint that produce and emit carbon dioxide, three of which are ethanol plants in South Dakota. These agreements are for capture, transportation, and/or long-term permanent storage of the captured CO_2, and additionally allow the customers access to additional delivery points to be offered on the HGPS as such delivery points are established, for example a delivery point to offloading facilities for distribution to industrial users of CO_2 for use in their processes. The initial design capacity of the HGPS, which is not expected to be fully utilized by the 21 facilities at the outset, is for the capability of capturing and transporting up to 10 million metric tons (MMT) of carbon dioxide per year and can be expanded to its full potential capacity of up to 15 MMT of carbon dioxide per year by adding booster stations along the initial system and laterals to connect any new customer locations. Additionally, Applicant will reserve approximately 10 percent of total initial HGPS capacity for "walk-up" shippers that do not have long-term contracts for firm capacity and that meet the terms of its tariff. Applicant has an agreement with one of its customers to connect to an additional 10 facilities in a later phase of development and Applicant anticipates entering into agreements with additional CO_2-emitting facilities for future development phases.

The Heartland Greenway System will facilitate significant CO_2 emissions reductions that will allow industry and governments in the project footprint to meet their carbon reduction goals to improve overall health and safety of the public and environment. Increased atmospheric carbon dioxide is responsible for about two-thirds of the energy imbalance that is causing Earth's temperature to rise, which has direct and cascading effects on many things including weather, plants and agriculture, disease, water, and ecosystems (National Oceanic and Atmospheric Administration [NOAA], 2022). Initiatives around climate change and decarbonization have been discussed for decades at global levels down to local governments and institutions, noting immediate and large-scale progress toward carbon neutrality is needed. Many countries, regions, industries, and institutions have announced decarbonization initiatives. The first binding global agreement was established in 2015. More recently in 2021, the United States announced the Net Zero World Initiative to reach net zero by 2050 and the 2030 Greenhouse Gas Pollution Reduction target to achieve a 50-52% reduction from 2005 levels; to be accomplished by accelerating transitions to net zero, resilient, and inclusive energy systems. The ethanol sector pledged to reduce Greenhouse Gas (GHG) emissions 70% by 2030 and achieve net zero ethanol by 2050. Researchers have concluded that of the decarbonization options available to ethanol producers, carbon capture is ranked as the most impactful tool to reduce emissions (Emery, 2022), such that ethanol can't reach net zero without broad adoption of this technology (Growth Energy, 2021). Thus projects like the Heartland Greenway Project are critical to meeting these goals and are measurable in South Dakota and the ethanol industry.

Benefits from the capture and permanent storage of CO_2 can be easily understood utilizing the Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator by showing equivalent offsets. Table 1.2-1 below shows the project CO_2 emission offsets based on the current project scope in South Dakota, the total current project scope, and the amount at full capacity in comparison to South Dakota statistics.

Table 1.2-1
Project CO_2 Offset Equivalents

Scope	Capture	Cars	Homes	Forest Acres	Barrels Oil
South Dakota	0.90 MMT	193K	113K	1.1M	2.1M
Initial Project Design	10 MMT	2.1M	1.3M	11.8M	23.1 M
Ultimate Expanded Design	15 MMT	3.2M	1.9M	17.8M	34.7 M
Source: U.S EPA Greenhouse Gas Equivalencies Calculator					

1.3 Project Overview

The following section includes information and design specifics of the pipeline.

Pipeline Facilities

In South Dakota, Applicant proposes to install approximately 111.9 miles of new liquid carbon dioxide pipeline in three segments, the Aurora to Hartley lateral, 63.6 miles of 8-inch diameter pipeline; the POET Chancellor lateral, 22.6 miles of 6-inch diameter pipeline; and the POET Hudson lateral, 25.7 miles of 6-inch diameter pipeline. The overall HGPS and South Dakota overview map is depicted in Exhibit A1. Further details regarding the proposed pipeline in South Dakota are included in Section 2.1 – Project Siting below.

Aboveground Facilities

Carbon capture equipment will be installed at each customer's emitting facility by either the customer or NCS, on the customer's property, and will include dehydration equipment to remove water, and cooling and compression equipment that effectively compresses the CO_2 gas to convert it to a dense phase to allow for increased transportation efficiency and volume. The carbon capture facilities are not part of the HGPS CO_2 pipeline for which a permit is being requested in this proceeding. There will be continuous monitoring of the CO_2 stream prior to entering Applicant's pipeline transportation system to ensure that the quality of the CO_2 meets or exceeds the necessary composition quality to ensure safe and efficient transport of the product within and along the HGPS to the destination location(s). Booster stations will be placed at appropriate locations to ensure internal pipeline pressures are maintained to keep the CO_2 in a dense phase throughout the system. There are no booster stations located in South Dakota.

Launcher/receiver sites (L/R) will be installed at the junction of pipeline segments along the HGPS. In South Dakota there will be one in Lincoln County at the junction of the POET Hudson and Chancellor Laterals. This will be an approximate 2 to 4 acre fenced in facility containing pigging facilities for in-line inspection of the HGPS for maintenance and integrity purposes. Additionally, mainline valves (MLVs), each approximately 30-feet wide by 70-feet long, will be placed along the route in accordance with or exceedance of Pipeline and Hazardous Materials Safety Administration (PHMSA) regulations for proper and safe operation and control of the system.

1.4 Project Ownership

The proposed HGPS will be owned and operated by Applicant; the Chief Operating Officer is:

David Giles
President and Chief Operating Officer/ Navigator Heartland Greenway, LLC
13333 California St., Suite 202
Omaha, NE 68154

1.5 Name of Participants

The legal entities participating in the Project are identified in the Executive Summary. The following Project contact information includes those participating at the time of filing, and those individuals authorized to receive communications relating to the application.

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1.6 Project Cost

The Project, including the approximately 1,300-mile HGPS, capture facilities and sequestration site is expected to cost approximately $3.2 billion, with the 111.9 miles of pipeline within South Dakota costing approximately $142 million.

1.7 Project Schedule

Applicant anticipates starting construction within South Dakota in 2024 after applicable permits and approvals have been issued and materials are received for the facilities to be

placed in-service in the first quarter of 2025. Restoration activities will continue as necessary in 2025 to ensure proper restoration of the disturbed areas.

1.8 Other Required Permits and Approvals

In addition to the siting permit under the Energy Conversion and Transmission Facility Act, Table 1.8-1 lists applicable federal and state permits currently identified for the construction of the Project within South Dakota. Correspondence is ongoing with the agencies identified below.

Table 1.8-1
Anticipated Permits for South Dakota Segment of the Heartland Greenway Pipeline System

Agency	Permit/Consultation/ Notification	Agency Action	Estimated Application Date
Federal			
U.S. Army Corps of Engineers, Omaha District – South Dakota Regulatory Office	Sections 404/401 Clean Water Act Nationwide Permit 58 with PCN	Authorization of discharge of fill material into waters of the U.S., including wetlands	Submit Pre-Construction Notification December 2022
	Section 106 Archaeological Resources Protection Act	Section 106 consultation through the Nationwide Permit 58 process	December 2022
U.S. Fish and Wildlife Service, South Dakota Ecological Services Field Office	Endangered Species Act Section 7 Consultation	Consider lead agency findings of impacts on federally listed; provide Biological Opinion if the Project is likely to adversely affect federally listed or proposed species or their habitats	Submit Biological Application February 2023
Farm Service Agency	Conservation Reserve Program	Authorization of crossing areas enrolled in the Conservation Reserve Program	Second quarter of 2023
Pipeline Hazardous Materials Safety Administration (PHSMA)	Operator ID	Issue Operator Identification Number	Received November 2021
	Notification Type F – Construction or Rehabilitation of Gas or Liquid Facilities	Filed February 2022	
State			
South Dakota Department of Agriculture and Natural Resources	NPDES (General Permit SDR100000) Authorizing Stormwater Discharges Associated with Construction Activities under the South Dakota Surface Water Discharge System	Consider issuance of General Permit for hydrostatic test water discharge to waters of the U.S., construction dewatering to waters of the state	June 2023
	NPDES (General Permit SDR070000) Authorizing Temporary Discharges Activities under the South Dakota Surface Water Discharge System	Covers non-stormwater construction dewatering, hydrostatic testing discharges.	Prior to Construction for trench dewatering at least 15 days prior to each hydrostatic discharge

Table 1.8-1
Anticipated Permits for South Dakota Segment of the Heartland Greenway Pipeline System

Agency	Permit/Consultation/ Notification	Agency Action	Estimated Application Date
	Permit to Appropriate Water	Consider issuance of water withdrawal permit for temporary use	June 2023
South Dakota Game, Fish, and Parks	State Listed Threatened and Endangered Species	Consultation on natural resources	November 2022, September 2022
South Dakota State Historical Society, State Historic Preservation Office	Section 106 of National Historic Preservation Act	Review and comment on activities regarding jurisdictional cultural resources	December 2022
Local			
County Road Departments	Crossing Permits	Issuance of permits for crossing of county roads	Fourth quarter of 2023/First quarter of 2024
County and Local Authorities	Floodplain, Conditional Use, Weed Control, Dust Control, Noise Control, and Building permits where required	Review under county approval process	Third and fourth quarter of 2023 through first quarter of 2024

2.0 PROJECT SITING AND ROUTE

2.1 Project Siting

In South Dakota, the Applicant proposes to install approximately 111.9 miles of new liquid carbon dioxide pipeline in three segments, the Aurora to Hartley lateral, the POET Chancellor lateral, and the POET Hudson lateral. The Aurora to Hartley lateral originates in South Dakota in Brookings County approximately 0.3 miles west of Aurora and continues generally south through Moody, and Minnehaha counties, exits South Dakota and enters Lyon County Iowa approximately 8 miles east of Sioux Falls, South Dakota. The POET Chancellor lateral originates in Turner County South Dakota approximately 1.5 miles east of Chancellor, continues east into Lincoln County going east and northeast, and exits South Dakota and enters Iowa approximately 6 miles east of Harrisburg, South Dakota. The POET Hudson lateral originates in Lincoln County approximately 2.5 miles southwest of Hudson, and continues generally northwest and north through Lincoln County, terminating at an interconnection point with the proposed POET Chancellor lateral approximately 3 miles south of Harrisburg, South Dakota. A summary of the Project facilities in South Dakota is outlined in Table 2.1-1. Detailed maps of the Project area within South Dakota are provided in Exhibit A.

Table 2.1-1
Summary of the Project Facilities in South Dakota

Pipeline Crossing Length (miles)	Counties	Milepost Start	Milepost End
Aurora to Hartley			
63.6	Brookings	0.00	1-7.9
	Moody	1-7.9	1-34.8

	Minnehaha	1-34.8	1-63.6
POET Chancellor			
22.6	Turner	0.0	1.9
	Lincoln	1.9	22.6
POET Hudson			
25.7	Lincoln	0.0	25.7
Total 111.9			

2.2 Route Selection and Alternatives

Applicant's key objective in determining the proposed route of the HGPS, including the South Dakota section, is minimizing the collective impact from HGPS along its route. The Applicant did not use a process in which it first expressly identified a set of distinct or largely distinct potential routes for the pipeline in South Dakota and then analyzed the competing routes based on a set of criteria to select the optimal route. Instead, Applicant utilized a Geographic Information System (GIS) program, Pivvot, to identify multiple paths from the designated starting points to designated ending points, and evaluate them based on multiple publicly available, purchased and licensed data sets, to identify a preferred baseline route. This GIS program provided suitable baseline pipeline routes between two points utilizing and weighting multiple publicly available, purchased and licensed data sets that provide information on engineering, environmental, physical, geotechnical, and land use and ownership, and other geographic and demographic features. Features that were considered in the route development process include, but are not limited to, existing linear infrastructure (i.e. railroads, pipelines, and electric power lines, roads); infrastructure and structures (e.g. buildings, wells, levees,); environmental (i.e. wetlands, waterbodies, protected habitats, floodplains), land use (e.g. land cover, conservation easements, land cover, state and national parks, national forests, and wildlife management areas; other federal and state lands; other recreation lands and areas; easements); geological (e.g. slope, topography, depth bedrock, karst, fault lines/areas, landslide potential, peak ground acceleration; mines and mining activity), soils (series, soils categories, prime farmlands, hydric soils, and corrosivity) cultural (cemeteries, national register of historic places); other (e.g. brownfield, superfund, and hazardous waste sites and landfills). Each of the data sets used in the GIS program was weighted, based on whether it represents characteristics desirable for a pipeline route or undesirable characteristics to be avoided. The GIS program also took into account the objective to minimize the overall length of the route, consistent with consideration of the other criteria and constraints (*i.e.* features to be avoided as described above).

Following generation of these routes, Applicant's team of subject matter experts from multiple disciplines performed a micro routing analysis accounting for environmental factors, constructability, and plume modeling, and was further refined utilizing 2021 aerial imagery and lidar information commissioned by Applicant and accomplished via flyovers along a wide corridor over the tentative routes. Setback distances from inhabited structures, gathering places, and population centers based on initial plume modeling were

established for micro routing efforts, and areas of known cultural resources, including federal and state registered locations, were avoided. The locations of previously recorded sites were obtained from the SD State Historic Preservation Office (SHPO); eligible sites were avoided, potentially eligible sites were avoided or were/will be revisited during cultural resource surveys to gather additional information to inform the Applicant of any additional routing considerations warranted. Cultural resources are further discussed in Section 6.9. Additional route refinement is ongoing utilizing information gathered at public informational meetings/open houses, discussions with and information provided by landowners, and on-the-ground civil, environmental, and cultural surveys.

2.3 Proposed Route

The currently proposed route minimizes the collective impact and maintains the health and safety of the public and environment while meeting the objectives of the Project. Additional route modifications will continue through permitting, and the land acquisition processes to further reduce environmental impacts and account for unique landowner and/or parcel considerations. Applicant is committed to working with individual landowners along the route to reach fair and equitable terms and agreements believes this route aids in accomplishing that goal. The proposed route is illustrated within the Project maps in Exhibit A.

Navigator intends to use eminent domain only as necessary where good faith efforts to acquire easements on a negotiated basis are unsuccessful. Use of an alternative route would not reduce the potential need to exercise eminent domain. While Navigator intends to acquire as much ROW as reasonably practicable on a negotiated basis, it is not practical to route a pipeline of this length so that it impacts only landowners who are willing to grant easements voluntarily.

3.0 DESIGN AND ENGINEERING

3.1 Technical Specifications and Design Capacity

The design, construction, operation, and maintenance of the Project is regulated by PHMSA, pursuant to federal laws and regulations, primarily the U.S. Department of Transportation (USDOT) 49 Code of Federal Regulations (CFR) Part 195. In addition, Applicant has filed all forms required by PHMSA in advance of constructing the CO_2. These regulations, along with industry standards, specify pipeline material and qualifications; minimum design and operating requirements; and inspection and testing requirements. These regulations specify minimum design and operating requirements; inspections and testing; protection from internal, external, and atmospheric corrosion; and other controls to ensure adequate protection for the public and environment and prevent pipeline incidents. Applicant is committed to designing, building, and operating a safe, reliable, state of the art system. In doing so Applicant will meet and often exceed these regulations; Exhibit D provides a summary of measures in CFR Part 195 that Applicant is proactively exceeding.

Pipeline

The pipeline will have a maximum operating pressure (MOP) of 2,200 pounds per square inch gauge (psig), in accordance with PHMSA regulations, with a normal operational range between 1,300 and 2,100 psig. Applicant will utilize conservative design safety factors

and will pressure test the pipeline system at pressures exceeding the MOP, prior to placing the system in-service. The metallurgical and dimensional properties of the steel will be determined in accordance with PHMSA requirements and will account for all pressure ranges, temperature ranges, and risk for both ductile and brittle fracture. Such properties include selection of the wall thickness, yield strength, ductility, and toughness that exceed PHMSA regulations and current industry standards, including American Petroleum Institute (API)-5L PSL2.

The specific design safety factors and steel properties include, but are not limited to, high-yield carbon steel with added toughness parameters, maximum operating pressures of 72% specified minimum yield strength (SMYS), isolation valves located at a maximum interval of 20 miles in non-high consequence areas (HCAs) and 7.5 miles in HCAs, external coating to prevent external corrosion, redundant leak detection systems, crack arrestors to mitigate fracture propagation, increased depth of cover to mitigate risk of third party damage, CO_2 plume dispersion modeling and buffer concentration for initial route alignment, and inlet monitoring devices for CO_2 quality assurance.

A process flow diagram for the South Dakota segment of the Project can be found within Exhibit B.

Launcher and Receiver Facilities

All pipeline segments will allow the passage of internal inspection devices, which are capable of detecting internal and external anomalies in the pipe such as corrosion, dents, and scratches.; Internal inspections are conducted using in-line inspection (ILI) tools. L/R facilities are designed to launch and receive these internal inspection devices. Approximately 2 to 4 acres will be necessary for L/R facilities at interconnect points for the pipelines. These are located on and extend adjacent to the pipeline right-of-way (ROW), will be fenced on permanent easements or land purchased or leased from landowners. Only one of these facilities is proposed in South Dakota at the interconnection of the POET Chancellor and Hudson laterals in Lincoln County.

Mainline Valves

The Applicant plans to construct MLVs capable of remote operation so that in the unlikely event of an emergency, these valves can be remotely activated from the control center, to isolate sections of the pipeline and minimize potential discharge. These MLV sites will be approximately 30-feet wide by 70-feet long located within the permanent easement of the HGPS. The spacing intervals between the MLVs along the pipeline ROW will be in accordance with CFR 49 part 195 as well as CO_2 dispersion modeling accounting for HCAs, including populated areas, environmentally sensitive and unusually sensitive areas such as topographic and environmental considerations. Spacing will not exceed 20 miles in non-HCA areas and 7.5 miles in HCA areas. Ultimate spacing and location of the MLVs is dependent on final routing and will be determined after completion of necessary surveys and landowner negotiations.

4.0 CONSTRUCTION

Construction, installation, and operation of the Project will be executed in a manner that complies with all applicable laws and regulations, including environmental protection statutes and regulations along the Project route. Applicant commits to constructing in

accordance with all permit conditions and only in areas where required permits or approvals have been obtained.

Construction of the new pipeline in South Dakota will require a typical construction ROW width of 100 feet in uplands and agricultural areas and 75 feet through sensitive areas including most waterbodies, wetlands, and forested areas. Following construction, a 50-foot-wide permanent easement will be retained along the HGPS for operation and maintenance of the system. These configurations are depicted on the typical drawings included in Exhibit E.

The pipeline will be installed using different techniques (conventional, bore, or horizontal directional drilling [HDD]) depending on site-specific conditions and factors along the route. The primary method of installation of the pipeline will be conventional installation via open trench at a depth of at least five feet in soil and with a separation of at least two feet between the pipeline and existing infrastructure such as district drainage and existing utilities and at least one foot from existing or planned private drain tile. As an additional proactive measure to prevent damage by third parties, which are a significant threat to pipeline integrity, Applicant will install warning tape approximately 2 feet above the pipeline, below the plow line. Bore and HDD methods will be used when surface disturbance from trenching is not desired or feasible such as when crossing roads, railroads, and large waterbodies or other sensitive resources or areas. When trenchless installation methods are used, the pipeline will typically be installed at a depth of ten feet for a bore and twenty-five to fifty feet or deeper for an HDD and will be not be shallower than the five-foot depth. Additional pipeline protective measures will include an abrasion resistant overcoat, which is applied on top of the fusion-bonded epoxy on pipe to be installed via bore or HDD, to further protect pipeline integrity by adding a reinforced coating layer to protect against physical encounters in the subsurface trenchless installation. Specialized construction techniques are discussed in further detail in Section 6.6 – Aquatic Wildlife and Ecosystems.

Where necessary, Applicant will utilize additional temporary workspace (ATWS) outside of the construction ROW to facilitate specialized construction procedures, such as bores and HDDs; railroad, road, wetland, waterbody, and foreign utility line crossings; tie-ins with existing pipeline facilities; and areas with steep side slopes. The general location and layout of ATWSs proposed to facilitate specialized construction procedures are depicted on typical drawings provided in Exhibit E; ATWS will typically be 50 feet wide by 150 feet long.

During construction of the pipeline, the contractor will require off ROW areas for the storage of pipe and equipment necessary for the construction of the Project facilities. These contractor/staging yards will be located near the Project at locations with convenient and safe access to the Project areas. Efforts will be made to select contractor yards that have been previously disturbed by human activity, do not contain sensitive resources (e.g. wetlands, protected species, etc.) and do not have an ongoing land use that will preclude Project usage. Applicant expects that siting of these yards will be done by the selected contractor and Applicant. Contractor and Applicant selection and ordering of major materials (i.e. pipeline) is anticipated to take place after receipt of necessary permits; therefore, information regarding the contractor/staging yards is not available and discussions of these yards is not included in the application. However, as is common

industry practice, these areas will also be restored to preconstruction conditions or as otherwise directed by the landowner.

Applicant will utilize existing public and private roads to access the pipeline ROW and aboveground facilities to the extent practicable. Existing roads utilized will include paved, gravel, or field roads, and other conveyances. Some roads will require modification or improvement to facilitate safe access for construction equipment and personnel which can include grading, widening adding gravel. The Project may require construction of new temporary and permanent roads to provide access to the HGPS, including above ground facilities, both during construction and for future pipeline maintenance activities. Access roads have not yet been thoroughly defined. Applicant will seek and enter into road use agreements with respective landowners and obtain necessary permits from units of government as warranted.

All disturbed areas, except for the L/R site and valve sites, will be restored to pre-existing conditions as practicable and allowed to revert to preconstruction land uses. Specific measures will be implemented during construction to enhance and expedite the restoration of disturbed lands to pre-construction condition. Such measures will include topsoil management, soil-segregation, erosion control practices, decompaction and timely restoration and are generally discussed in Section 6 below. Specifics of these measures are provided in the Environmental Construction Guidance (ECG) provided in Exhibit E.

5.0 OPERATIONS AND MAINTENANCE

Applicant is committed to building and operating the Project to meet and exceed regulatory and safety requirements while minimizing the collective impact on the environment, landowners, and the public during construction and ongoing operations.

The pipeline location will be visibly marked in accordance with federal regulations, which includes signage at road and highway crossings, commercially navigable waterways, and other locations to alert the public to the presence of an underground line. Posted signage will include owner contact and emergency information. Applicant will also participate in the State and Federal 811 One-Call system for damage prevention and public awareness.

To ensure safe operation of the line, Applicant will install numerous remote controlled MLVs to allow for prompt response and isolation of line segments in the unlikely event of an emergency. Every valve site and pump station will be connected to an Operations Control Center (OCC) by modern communication facilities; redundant communication and power systems will be installed to ensure constant connectivity and flow of information, thereby enhancing safe operation. In accordance with PHMSA requirements, the OCC will be continuously manned and monitored (24-hours/day, 365 days/year) by at least 2 individuals at all times. Cathodic-protection systems will be installed to prevent corrosion and preserve the integrity of the pipeline.

Applicant will develop and install a comprehensive leak detection system that consists of both non-continuous and continuous monitoring. The non-continuous components of the leak detection system will consist of aerial patrol (minimum 2 times per month) and in-line inspection tool pigging operations to check for corrosion (initial baseline at installation and subsequently at 3 to 5-year inspection intervals). The continuous components of the leak detection system include compensated mass balance, real time transient model, negative

pressure wave, fiber optic sensing cables, and strategically placed CO_2 monitoring devices. Additional details will be provided in Applicant's testimony to be filed in this proceeding. The Operation Manual for the Project is being developed and will be finalized prior to operation; however, many components of how the system will be operated are already known.

During operations, the pipeline will be subjected to a variety of inspections to verify its continued integrity and compliance with all standards. The system will be examined at regular intervals using internal-inspection technology. To prevent internal corrosion, all captured CO_2 will have to meet strict specifications that are continuously tested for at the capture facilities prior to entering the pipeline system. Controls and safety equipment will be tested and calibrated on a routine basis. It is planned that the Project will be patrolled and inspected via aerial surveillance every 10 days, weather permitting, but at least every 3 weeks (minimum 2 times per month) and not less than 26 times per year, to detect abnormal conditions and dangerous activities (e.g., unauthorized excavation) along the routes of the lines.

Applicant will use an advanced Supervisory Control and Data Acquisition (SCADA) system that continuously monitors pressure, temperature, and flow of the CO_2. Information collected by the monitoring devices will be constantly communicated (24 hours/day, 365 days/year) to the OCC. The system is designed and will be installed with back-up power and communication abilities to ensure connectivity is constant in the event an interruption in the primary source is experienced. Utilizing modern pipeline monitoring and control technology, the OCC can safely operate the pipeline system by maintaining the established operating parameters and will be capable of remotely isolating pipeline segments when alerted to abnormal operating conditions or if safety parameters are exceeded. The Computational Pipeline Monitoring System, a subsystem of SCADA, analyzes deviations of flow through the pipeline, improving the ability to identify leaks and other abnormal operating conditions, and is one of several leak-detection capabilities. In addition to the ability to control the system remotely, local automated controls and manual overrides can control and operate the pipeline should remote communications fail.

Trained OCC personnel will follow strict procedures to direct actions during normal and abnormal operations to prevent the risk of a release. Applicant is also developing a robust Integrity Management Program, in compliance with PHMSA regulations, that will continually assess the pipeline for potential risks to the system utilizing all available information, identify preventative and mitigative measures to address the risks, specify criteria for remedial actions to address possible integrity concerns raised by the analysis, and implement procedures, as necessary. Such systems and procedures, in addition to detailed operation and maintenance programs, routine inspections, regular employee training, detailed coordination with emergency management and response outfits, and comprehensive public awareness and education efforts, combine to optimize safe operation and minimize the risk of a release. Applicant employees and/or qualified contractors located along the Project in South Dakota and other respective states will be strategically hired and based so that they are able to provide a prompt response for pipeline operations, maintenance, and repairs.

5.1 Decommissioning

If/when decommissioning is necessary it will be done pursuant to applicable federal and state laws at the time of decommissioning.

6.0 ENVIRONMENTAL IMPACTS

6.1 Topography

Topographic maps of the Project area are included in Exhibit A3. The following is an overview of the geological setting and preliminary analysis of the potential hazards. Desktop studies have identified a potential for karst geology beneath portions of the proposed POET Chancellor Lateral and POET Hudson Lateral.

6.2 Geology

6.2.1 Geological Features

The state of South Dakota is generally equally divided east and west by the Missouri River, with the western half of the state having greater topography than the eastern half of the state. The Project is located in the eastern half of the state where elevations can range from 1,000 feet to 2,000 feet. The Project is located within the Central Lowland physiographic province (U.S. Geological Survey [USGS], 2022a). Further, the Project crosses the Dissected Till Plains Section in Brookings, Lincoln, Minnehaha, and Moody counties and the Western Lake Section in Lincoln and Turner counties. These sections are generally characterized by flat to gently rolling hills formed in glacial till deposits dissected by many streams.

The Project is located in the Central Lowland physiographic province and lies within the glaciated portion of South Dakota (USGS, 2022a). Surficial deposits within this region are composed primarily of alluvium, eolian deposits, lacustrine sediments, moraine (till), and outwash (USGS, 2005). Alluvium consists of clay and silt, with lesser amounts of sand and gravel deposited by recent streams and is typically black or dark-brown and rich in organic matter. Eolian deposits form via the sorting of clay, silt, and sand-sized particulates from surficial sediments. Lacustrine sediments accumulate in areas containing ponded glacial meltwater and are often found in association with outwash deposits. Lacustrine sediments range in grain size from clay to fine sand and range in color from green to gray to black to white to possibly pink. Moraine is a relatively flat to gently rolling surface formed of debris (till) released from beneath a glacier. Till consists of non-stratified, unsorted debris that has been transported and deposited directly by glacial ice. Outwash is sand and gravel, with minor silt and clay, deposited by meltwater streams (South Dakota Geological Survey [SDGS], 2004a).

The bedrock geology is composed of Cretaceous and Precambrian aged rocks that formed in marine environments (Paleontology Portal, 2022). These deposits include (from oldest to youngest) Sioux Quartzite, Carlile Shale, Niobrara Formation, undifferentiated Cretaceous rocks, and Pierre Shale (USGS, 2005; SDGS, 2004a).

Table 6.2-1
Geologic Formations Crossed by the Project

Geologic Rock Formation	Pipeline / Milepost	Geologic Age	Primary Lithology	Secondary Lithology
Sioux Quartzite	Aurora to Hartley 0.00 – 9.08 37.51 – 50.00 50.69 – 53.93 58.38 – 63.68 POET Chancellor 0.00 – 1.68 7.64 – 7.94	Lower Proterozoic	Quartzite	Metaconglomerate, Slate
Carlile Shale	POET Chancellor 3.15 – 6.47 8.36 – 12.04 14.93 – 15.88 16.47 – 18.34 20.79 – 22.55 POET Hudson 0.00 – 13.53 15.27 – 17.31 18.77 – 19.46 22.12 – 23.51	Upper Cretaceous	Shale	Sandstone, Carbonate, Marlstone
Niobrara Formation	Aurora to Hartley 17.41 – 18.38 22.54 – 23.17 POET Chancellor 12.04 – 14.93 15.88 – 16.47 18.34 – 20.79 POET Hudson 13.53 – 15.27 17.31 – 18.77 19.46 – 22.12 23.51 – 25.70	Upper Cretaceous	Chalk, Marlstone, Shale	Sand, Bentonite
Cretaceous, undifferentiated	Aurora to Hartley 18.59 – 22.76 23.39 – 37.99 50.48 – 51.16 54.41 – 58.86 POET Chancellor 1.68 – 3.15 6.47 – 7.64 7.94 – 8.36	Upper to Lower Cretaceous	Shale, Chert, Chalk	Fine-detrital, Sandstone
Pierre Shale	Aurora to Hartley 9.08 – 17.41	Upper Cretaceous	Bentonite, Shale	Carbonate, Sandstone, Conglomerate

Source: USGS,2005; SDGS, 2004a

Sioux Quartzite

Approximately 30.11 miles of the Aurora to Hartley lateral and 1.98 miles of the POET Chancellor lateral are located within Sioux Qaurtzite. Sioux Quartzite is described as being

composed of conglomerate and mudstone layers, pink and reddish to tan in color, fine to coarse grained, and siliceous (USGS, 2005; SDGS, 2004a).

Carlile Shale

Approximately 11.57 miles of the POET Chancellor lateral and 17.66 miles of the POET Hudson lateral are located within Carlile Shale. Carlile Shale is composed of dark gray to black, silty to sandy shale with several zones of septarian, fossiliferous, carbonate concretions (USGS, 2005; SDGS, 2004a).

Niobrara Formation

Approximately 1.60 miles of the Aurora to Hartley lateral, 5.94 miles of the POET Chancellor lateral, and 8.03 miles of the POET Hudson lateral are located within the Niobrara Formation. Niobrara Formation is composed of white to dark gray argillaceous chalk, marl, and shale and contains thin, laterally continuous bentonite beds, shale, minor sand, and small concretions (USGS, 2005; SDGS, 2004a).

Cretaceous, Undifferentiated

Approximately 23.64 mile of the Aurora to Hartley lateral and 3.07 miles of the POET Chancellor lateral are located within the undifferentiated cretaceous formation. Undifferentiated Cretaceous rock is composed of spiculite, shale, chalk, silty clay, and quartz-rich sandstone (USGS, 2005; SDGS, 2004a).

Pierre Shale

Approximately 8.32 miles of the Aurora to Hartley lateral is located within the Pierre Shale formation. Pierre Shale contains minor sandstone, conglomerate, and abundant carbonate and ferruginous concentrations (USGS, 2005; SDGS, 2004a).

Bedrock in the Project area crops out along the Missouri River bluffs, along many rivers and creeks, and other areas where the glacial sediment has been removed by erosion. Sioux Quartzite crops out in Minnehaha and Turner counties. Niobrara Formation crops out in Lincoln County. Undifferentiated Late Cretaceous sediment crops out in Minnehaha and Turner counties (SDGS, 2004a). A total of approximately 2.75 miles of the Project route has a depth of bedrock less than 5 feet, while the majority of the Project area has a depth to bedrock greater than 5 feet. See Exhibit A4 for the soil map units soil series unit and the characteristics, including shallow bedrock, of each of the soil map units within the Project area.

6.2.2 Seismicity and Subsidence

Natural and Induced Seismicity

Seismic hazards include earthquakes, surface faulting, and soil liquefaction. According to the USGS Seismic Hazards maps for the U.S., the Project is situated in an area of low seismic probability. Based on historical seismic activity in the area, the USGS (2015) estimates that the 500-year earthquake (an earthquake with a 10 percent probability of occurring within any 50-year interval) would result in peak ground accelerations of one percent gravity (g) to two percent g. Damage to buildings and other structures is not likely to occur at ground accelerations of less than 10 percent g (United Nations Office for the Coordination of Human Affairs, 2021). Further, there are no faults identified within 100

miles of the Project area (SDGS, 2004b; USGS, 2022b; Crone and Wheeler, 2000). Therefore, it is not anticipated that seismic activity will impact the HGPS.

Soil Liquefaction

Soil liquefaction is a condition that typically occurs when loose, saturated soil is subjected to vibration or shockwaves, typically from a seismic event. During liquefaction, pore water inhibits grain-to-grain contact, and the strength of the soil is greatly reduced such that soil may act like a viscous liquid with the ability to move and flow. Soil liquefaction can lead to landslides and extreme deformation of building foundations and buried pipelines. The low probability of a seismic event occurring within the Project area makes the occurrence of soil liquefaction unlikely.

Subsidence and Karst Terrain

Karst terrain results from the dissolution of highly soluble bedrock such as limestone and dolomite. Land subsidence is the sinking of the Earth's surface, either gradually or sudden, due to the subsurface movements of materials such as water or soil. Areas with karst terrain are more susceptible to subsidence events (Galloway et al., 2005). Karst occurs in approximately 15.58 miles of the Project ROW (Weary and Doctor, 2014). Milepost (MP) ranges where potential karst is present in the Project area are presented in Table 6.2-1. Karst in the Project area is described as carbonate rocks buried under greater than 50 feet of glacially derived insoluble sediments in a humid climate (Weary and Doctor, 2014).

Landslides

Landslides occur when unconsolidated soils and sediments located on steep slopes become saturated, usually from a flooding event. Several factors contribute to triggering landslides, including human induced and natural vibrations, but the most significant triggers are heavy rains, clay soil, and steep slopes (USGS, 1982). Only one geologic formation is known to be susceptible to landslides in the Project area, Pierre Shale. Approximately 8.32 miles of the Project area is located in Pierre Shale (Table 6.2-1). The region is characterized as flat and level, gently rolling, and hummocky in some areas (Bryce, et. al., 1996). The areas of moderate and high incidence of landslides or slope instability are confined mostly to the valley walls of the Missouri River and to its principal tributaries. The Project lies in an area of low incidence of landslide (USGS, 1982).

Areas that are most susceptible to landslides are those with steep slopes; however, the presence of vegetative cover, existing contours, and natural drainages reduce the potential for landslides by minimizing erosion and supporting the increased weight of land that occurs on steep slopes. Therefore, the probability of slips or landslide events increases by clearing vegetation and grading contours in areas with steep slopes. In addition, areas requiring side slope construction may be more susceptible to slips or landslide events, as additional space will be needed to provide for safe and efficient construction of the pipeline, resulting in further clearing of vegetation and grading of contours.

To minimize or avoid the risk of landslides, the Applicant will utilize additional erosion and sediment control devices, in accordance with its ECG, during construction in areas with steep slopes. Temporary erosion control devices (ECDs), such as interceptor diversions and sediment filter devices (e.g., filter socks and silt fence) will be installed following initial ground disturbance. Some areas may require that the controls be installed

prior to or directly after clearing, based on the techniques utilized at that site. These areas will be evaluated accordingly prior to construction. Additionally, the Applicant will install sediment barriers (e.g., silt fence) at the base of slopes adjacent to road crossings, waterbody crossings, wetlands, and other areas, as appropriate, to prevent siltation into waterbodies and wetlands downslope of the construction area (e.g., swales and side slopes).

The risk of slips or landslide events is further exaggerated by the presence of water, which promotes erosion and increases the weight of soils; therefore, the Applicant will implement typical mitigation procedures and control measures to prevent water from accumulating in areas with steep slopes, including shoring, benching, installation of jute netting or erosion control blankets, slope and trench breakers, subsurface gravel or cobble drains, French drains, and installation of culverts and drainage ditches to divert water away from the construction corridor. A depiction of typical benching techniques and other drainage control measures is provided in Exhibit E.

Following the completion of construction activities, disturbed areas will be restored and graded to pre-construction contours as closely as possible. In order to minimize the potential for future slip or landslide events during operation of the Project facilities, the Applicant may install permanent ECDs in addition to performing regular restoration and revegetation activities. Permanent ECDs will be installed in accordance with revegetation measures outlined in the ECG and specific landowner requests. Temporary ECDs will be maintained until the Project area has been successfully revegetated. Following successful revegetation of construction areas, they will be removed. The effectiveness of revegetation and permanent ECDs will be monitored by the Applicant's operating personnel during the long-term operation and maintenance of the Project facilities. Additionally, HGPS will be constructed to meet or exceed federal, state, and local standards to withstand impacts from landslides or slips (Exhibit D). Therefore, construction and operation of the Project facilities are not anticipated to impact or be impacted by significant landslide or slip events.

Table 6.2-2
Geologic Hazards in the Project Area

Hazard	Pipeline	Milepost Range	Hazard Risk
Karst	Aurora to Hartley	17.41 – 18.38 22.54 – 23.17	Low
	POET Chancellor Lateral	12.04 – 14.93 15.88 – 16.47 18.34 – 20.79	Low
	POET Hudson Lateral	13.53 – 15.27 17.31 – 18.77 19.46 – 22.12 23.51 – 25.70	Low
Landslides (Pierre Shale)	Aurora to Hartley	9.08 – 17.41	Low incidence

6.2.3 Economic Deposits

Fuel production value in the U.S. in 2021 originated from a combination of Portland cement, gold, lime, construction sand and gravel, and crushed stone (USGS, 2022c). According to the most recent USGS Mineral Statistical Summary for South Dakota's values for nonfuel mineral commodity production, a combination of nonfuel minerals,

including cement and lime, accounted for approximately 41 percent, gold accounted for approximately 32 percent, construction sand and gravel accounted for approximately 14 percent, and crushed stone accounted for approximately 13 percent (USGS, 2018b).

Construction aggregate mining sites are located in Brookings, Lincoln, Minnehaha, Moody, and Turner counties (South Dakota Department of Agriculture & Natural Resources [SDDANR], 2022a). The SDDANR Sand, Gravel, and Construction Aggregate Mining Interactive Map identified four construction aggregate sites within 0.25 mile of the Project area, one of which will be crossed by the Project. All four of the sites are considered reclaimed, therefore the Project is not anticipated to preclude future access to mineral resources at these sites. Based on review of the SDDANR Oil and Gas Resources mapper, there are no oil and gas wells within 0.25 mile of the Project (SDDANR, 2022b). Therefore, it is not anticipated that the Project will impact mineral resources.

6.2.4 Geological Project Constraints and Mitigation

As stated above, shallow bedrock was identified within the Project area. However, the Project is located within an area of low seismic probability and low incidence of landslide. If shallow bedrock or boulders are encountered during construction that cannot be economically excavated from the ROW by an excavator or rock trencher, blasting may need to be utilized to assist in ditch excavation. In the unlikely event blasting is necessary; the Applicant has developed best management practices (BMPs) to minimize potential impacts due to blasting, included in the Project ECG (Exhibit E).

Applicant has retained Terracon Consultants, Inc. (Terracon), a leading provider of geotechnical engineering services, to complete a Geohazard Assessment Study. The results of the study will identify appropriate mitigation measures to be incorporated into the final design. The following categories are included in the assessment:

- Topography (including LiDAR data, where available)
- Geology (i.e. mines, slopes, landslides, slough, karst, etc.)
- Earthquake/Seismic Hazards along the Project
- Mass Wasting (movement of rock and soil down slope under the influence of gravity)
- Flooding and High Groundwater areas along the Project
- Stream Channel Migration and Avulsion Hazards
- Surface Erosion
- Subsurface Erosion & Sinkhole Development
- Karstic formations and proximity to coal mines
- Soil types (soil bearing pressure) and liquefaction risk
- Frost Lines and water table depths
- Recommendation of Hazard avoidance and mitigation along the Project
- Any other geological hazard in the vicinity of the Project

The following is an overview of the geological setting and preliminary analysis of the potential hazards. Desktop studies have identified a potential for karst geology beneath portions of the proposed POET Chancellor Lateral and POET Hudson Lateral.

6.3 Soils, Erosion, and Sedimentation

The discussion below provides general information about the nature and properties of the soils crossed by the Project. Maps depicting the limits of the soil map units within the Project area are provided in Exhibit A4. Exhibit C, Table C-1 includes total crossing distance of each soil series unit and the characteristics of each of the soil map units within the Project area. Table 6.3-1 below provides a summary of the major soil characteristics impacted by the Project. Characteristics include prime farmland, hydric properties, compaction potential, erosion, restrictive soil layers, shallow bedrock, and revegetation properties. All of these soil characteristics are described below.

Table 6.3-1
Summary of Major Soil Characteristics Impacted by Project (miles)

Lateral	Prime Farmland / Statewide Importance [b]	Hydric Soils [b]	Soil Rutting Hazard [b, c]	Compaction Potential [d]	Erosion Potential [b]		Steep Slopes [b, g]	Shallow Bedrock [b, h]	Revegetation Potential [i]
					Water Erodibility Potential [e]	Wind Erodibility Potential [f]			
Aurora to Hartley Lateral	58.32	6.80	62.96	6.39	28.68	0.00	6.83	2.75	3.69
POET Chancellor Lateral	21.32	2.99	22.50	3.21	3.67	0.00	1.06	0.00	0.83
POET Hudson Lateral	23.47	1.35	25.67	1.35	11.53	0.00	5.69	0.00	0.15
Project Totals	**103.11**	**11.14**	**111.13**	**10.95**	**43.88**	**0.00**	**13.58**	**2.75**	**4.67**

[a] Miles presented represent miles crossed by Project centerlines.
[b] As designated by the Natural Resources Conservation Service.
[c] Includes soils that have a high soil rutting hazard.
[d] Includes soils that have a high compaction potential.
[e] Includes soils that have a high erodibility potential due to water.
[f] Includes soils that have a high erodibility potential due to wind.
[g] Includes soils with slopes greater than 8 percent.
[h] Includes soils with unconsolidated rock 60 inches or less from the surface.
[i] Includes soils with a low revegetation potential.

Prime Farmland and Farmland of Statewide Importance

The U.S. Department of Agriculture (USDA) defines prime farmland as "land best suited to food, feed, forage, fiber, and oilseed crops" (Natural Resources Conservation Service [NRCS], 2017). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops or are available for these uses. Urbanized land and open water are excluded from prime farmland. Prime farmland typically contains few to no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., artificial drainage). In addition, the USDA defines farmland of statewide importance as farmland for the "production of food, feed, fiber, forage, and oil seed crops…those that are nearly prime farmland and that produce high yields of economic important crops when treated and managed according to acceptable farming methods" (NRCS, 2017).

Approximately 81 percent (90.61 miles) of the soils crossed by the pipelines are considered to be prime farmland, and approximately 11 percent (12.5 miles) of the route is identified as farmland of statewide importance (NRCS, 2022). During construction activities, the topsoil layer from cultivated prime farmland areas associated with the pipeline will be stripped to a maximum depth of approximately 12 inches and segregated from the subsoil. If parent material is encountered, it will also be segregated from the topsoil and sub soil spoil piles. The trench will be backfilled in the opposite order it was excavated such that the parent material, if present, will be returned to its natural profile height within the trench first followed by subsoil before topsoil ensuring preservation of topsoil within the construction area. Decompaction ripping or tilling will occur as warranted to return the soils to as near pre-construction conditions as practical. Following the completion of construction, areas of prime farmland disturbed by the installation of the pipelines that are not encumbered by a MLV or L/R site will be allowed to revert to pre-construction uses; therefore, construction activities in these areas will not adversely impact prime farmland.

Hydric Soils and Compaction Potential

Hydric soils are defined as "soils that are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (U.S. Army Corps of Engineers [USACE], 1987). Soils that are artificially drained or protected from flooding (e.g., by levees) are still considered hydric if the soil, in its undisturbed state, would meet the definition of hydric soil. Generally, hydric soils are those that are poorly drained or very poorly drained. Due to extended periods of saturation, hydric soils can be prone to compaction and rutting. The Project area may experience an increase in frequency of rain events during the spring and fall months. The increased rainfall could result in areas of increased saturation and an increase in the potential for compaction and rutting to occur during construction.

Approximately 10 percent (11.14 miles) of the soils crossed by the pipelines are considered to be hydric and approximately 99 percent (111.13 miles) of the soils crossed by the pipelines are considered to have a high soil rutting hazard (NRCS, 2022). Due to the number of hydric soils and soils with a high soil rutting hazard within the Project area, soil compaction and rutting will likely result from the operation of heavy equipment along the Project ROW, ATWS, and access roads. The extent of soil compaction will depend on the degree the soils are saturated, with the most severe compaction occurring where heavy equipment is operated on highly saturated soils. The Applicant will minimize these impacts by implementing mitigation measures such as topsoil segregation to avoid mixing topsoil with subsoil, use of timber mats and/or low ground-weight bearing equipment, limiting construction in wet weather conditions to that which typical farm operations would occur under to avoid excessive rutting or compaction. Additionally, wetland crossing techniques have been outlined in the ECG (Exhibit E).

Erosion

Erosion is a continuing process that can be accelerated by human disturbances. Factors that can influence the degree of erosion include soil texture, structure, length and percent of slope, vegetative cover, as well as rainfall or wind intensity. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Wind erosion processes are less

affected by slope angles. Characterization of erosion potential includes both water and wind as agents of erosion.

Soils that are classified as having high erosion potential can be highly erodible but do not always exhibit this condition because of the multitude of parameters that require evaluation. Typically, field determinations of the length of the slope class crossed are needed before a soil can be definitively identified as having high erosion potential. For example, a soil map unit may have a slope class of 2 to 5 percent. If most of the map unit crossed actually has a slope of 2 percent, the soils would most likely not have high erosion potential. However, if most of the map unit being crossed had actual slopes of 5 percent, the soils would most likely be considered as having high erosion potential.

Soils with high erosion potential within the Project area were identified based on NRCS designations of land capability class and subclass. Soils with a land capability class and subclass of Ve through VIIIe are considered to be highly erodible. Soils with a land capability class and subclass of IIIe through IVe are considered to be moderately erodible. The remaining land capability classes and subclasses are considered to have low erodibility. Exhibit C, Table C-1 identifies the erosion potentials of each map unit within the Project area. The majority of the soils within the Project area have moderate to low erosion potential (NRCS, 2022). Approximately 39 percent (43.88 miles) of the soils crossed by the pipelines are considered highly erodible due to water and no soils crossed by the pipelines are considered highly erodible due to wind.

Further information is presented below for erosion and sedimentation construction impacts and mitigation measures implemented by the Applicant.

Steep slopes are defined as soils that have slopes greater than 8 percent. Approximately 12 percent (13.58 miles) of the soils crossed by the pipelines cross are characterized by steep slopes (slopes greater than 8 percent) and are indicated as such in Exhibit C, Table C-1. Although some of the soil series found within the Project area can have slopes of up to 33 percent, based on review of topographic maps, the majority of the slopes within the Project area are less than 8 percent.

Restrictive Soil Layers/Shallow Bedrock

Introducing stones or rocks to surface soil layers may reduce the capacity of the soil to retain moisture, resulting in a reduction of soil productivity. Additionally, areas with shallow depth to bedrock (less than 5 feet) are identified as areas that have potential to introduce rock to topsoil. Stony/rocky soils contain rock fragments greater than 3 inches or comprise more than 5 percent (weight basis) of any layer within the soil profile. Approximately 2.75 miles of the Project route has a depth of bedrock less than 5 feet, while the majority of the Project area has a depth to bedrock greater than 5 feet (NRCS, 2022). See Exhibit C, Table C-1 for the soil map units soil series unit and the characteristics, including shallow bedrock, of each of the soil map units within the Project area.

Navigator will remove any large excess stone and rock from surface soils within the Project area so that rock contents within the soils will be no higher than similar soils in adjacent locations, unless otherwise requested by a landowner. In order to prevent damage to the pipeline protective coating, all excavated materials will be thoroughly examined, and rocks greater than 3 inches in diameter will be removed prior to backfilling of the trench.

Revegetation

The major factors considered when determining the revegetation potential of a soil include the prime farmland and hydric soil classifications, soil rutting hazard, compaction potential, wind and water erosion potentials, and the presence of steep slopes. Soils with low revegetation potential typically have high compaction and/or erosion potentials, slopes greater than eight percent, are generally not classified as prime farmland, and/or are usually hydric in nature. The majority of soils impacted by the Project have moderate to high revegetation potential (NRCS, 2022). Approximately 4 percent (4.67 miles) of soils crossed by the pipelines are considered to have a low revegetation potential. Detailed information regarding revegetation potential for each map unit crossed by the Project is provided in Exhibit C, Table C-1.

Successful restoration and revegetation of the Project workspaces are important for landowner relations, managing noxious or invasive weeds, maintaining productivity and protecting the underlying soil from potential damage. Fertility, erosion, and compaction are the factors that would limit the re-growth of vegetation, but these can be mitigated through the application of soil enhancers, proper erosion controls (erosion control fabric, tackifiers, mulch), preceded by proper decompaction. Restoration and revegetation growth specifications will follow the ECG (Exhibit E).

Erosion and Sedimentation

The majority of the soils within the Project area have moderate to low erosion potential (NRCS, 2022). Some areas crossed by the Project are characterized by steep slopes (slopes greater than 8 percent) and are indicated as such in Exhibit C, Table C-1. Clearing, grading, and equipment movement has the potential to accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands. Soil loss due to erosion could also reduce soil fertility and impair revegetation. To minimize or avoid potential erosion impacts, The Applicant will utilize erosion and sedimentation control devices as provided in the Project-specific ECG (Exhibit E) and as to be outlined in the project Stormwater Pollution and Prevention Plan that will be developed for approval in the *Clean Water Act* (CWA) 402 construction stormwater permitting process with the SDDANR. Additional Project plans currently in development include the Agricultural Construction Mitigation Plan and Weed Control Plan, which will be developed in coordination with the NRCS, SDDANR, and county weed managers.

Third party independent environmental and Agricultural Inspectors will be retained during construction, by the Applicant, to oversee and report on construction compliance in accordance with all project commitments, permits, and plans. The effectiveness of revegetation and permanent erosion control devices will be monitored by Applicant's operating personnel during the long-term operation and maintenance of the Project facilities.

6.4 Hydrology

The following sections include information on the hydrology of the Project area including drainage patterns, water uses, and water discharges and illustrated in Exhibit A5.

6.4.1 Drainage Patterns

The pipeline is a below ground facility and therefore is not expected to interrupt drainage patterns within the Project area. The above ground capture facilities are being installed at developed industrial facilities, and the MLVs represent individually minor footprints of 30-feet wide by 70-feet long (less than 0.05 acres each) and are not expected to have an impact on drainage patterns. The approximately 2 to 4-acre L/R site is currently sited in an essentially flat, upland field and will be constructed as to no interfere with drainage patterns. Applicant will work with the landowners and drainage districts to ensure impacts to drainage are avoided and minimized.

6.4.2 Groundwater

Aquifers

An aquifer is any rock or sediment with spaces that hold water, and through which significant quantities of water move. The water contained in these underground spaces is called groundwater. Aquifer distribution in South Dakota is complex. In some areas, multiple aquifers are present at different depths. In eastern South Dakota, most wells are placed in aquifers located in glacial drift deposits. Glacial drift underlies most of the state east of the Missouri River. Alluvium is found along major streams (Chadima, 1994). Alluvial deposits (alluvium) generally are adjacent to streams in the flood plain. Well-sorted unconsolidated material can store large quantities of ground water. The coarse materials of sand and gravel readily yield water wells (USGS, 2003).

The Project crosses portions of five counties and several aquifer systems consisting primarily of outwash and alluvium, and unconsolidated sand, gravel, and silt. The aquifers crossed by the Project are of two categories: glacial or bedrock. Major aquifers are described as those aquifers covering a large area and supplying a large amount of groundwater. Minor aquifers are described as those aquifers which cover a small area and supply a large amount of groundwater or cover a larger area supplying a small amount of groundwater. The major glacial and bedrock aquifers which underly the Project area are presented below in Table 6.4-1.

Table 6.4-1
Major Aquifers Underlain by the Project

Aquifer	Pipeline
Glacial Aquifer	
Big Sioux	Aurora to Hartley POET Chancellor
Bedrock Aquifer	
Dakota	Aurora to Hartley POET Chancellor POET Hudson
Sioux Quartzite	Aurora to Hartley

The largest major glacial aquifer crossed by the Project, the Big Sioux aquifer, is primarily located in eastern South Dakota, but also reaches into northwest Iowa and southwest Minnesota (USGS, 2019). It is composed of well-sorted, very permeable glacial outwash sand and gravel, and ranges in depth from near surface to 150 feet below the surface (Hamilton, 1989). The thickness of the Big Sioux aquifer ranges from 4 feet to 54 feet.

The Big Sioux aquifer is typically unconfined or overlain by till or alluvium and underlain by till or Sioux Quartzite (Hanson, 1986; Niehus, 1994). Recharge of the Big Sioux aquifer is by infiltration of precipitation through the overlying topsoil and slow seepage from lake deposits and underlying aquifers. Discharge is from irrigation, domestic, municipal, and stock wells, evapotranspiration, and groundwater leakage into the Big Sioux River or other aquifers (Hanson, 1986; Niehus, 1994). Water quality from the Big Sioux aquifer is fresh to slightly saline (concentrations of dissolved solids in the range of 1,000 to 3,000 milligrams per liter) (Hamilton, 1989).

The major bedrock aquifers crossed by the Project include the Dakota aquifer and the Sioux Quartzite aquifer. The Dakota aquifer is primarily located in in northwestern Iowa and southwestern Minnesota, but also extends into South Dakota. This aquifer is composed of a fine to coarse-grained sandstone with interbedded shale, with the top reported to be 800 to 1,000 feet below land surface (Niehus, 1994; Hanson, 1986). The Dakota aquifer is classified as an artesian aquifer because it contains strata that successfully retains most of the water, and thus aids in yielding a flow and is serviceably impervious (Bredehoeft et al, 1983). This aquifer is overlain by Graneros Shale, the Lower Vermillion-Missouri aquifer, or the Missouri aquifer and underlain by Sioux Quartzite; several sandstones, shales, and dolostones of Cambrian, Ordovician, or Devonian age; or Sioux Quartzite wash. Recharge to the Dakota aquifer is from underlying formations in the western part of South Dakota, especially the Madison Formation, and may also receive some recharge from the overlying Missouri aquifer. Discharge from this aquifer is through withdrawals for irrigation, municipal, domestic, and stock wells, and probably by discharge to the overlying Lower Vermillion-Missouri and Missouri aquifers, and the underlying Sioux Quartzite (Niehus, 1994).

The Sioux Quartzite aquifer is composed of an uncemented, coarse, well-rounded, well-sorted, pink, quartzose sand. The aquifer overlies the Sioux Quartzite geologic formation at most locations, however, the aquifer is interbedded in the Cretaceous bedrock where the Project crosses the aquifer in Moody County (Hanson, 1986; Lindgren and Niehus, 1992). Depth to the top of this aquifer ranges from at or near land surface to 510 feet below land surface, often with large changes in depth in a short distance (Hanson, 1986). It is overlaid by till, Pierre Shale, and several other aquifers including the Big Sioux aquifer (Hanson, 1986; Hamilton, 1989). Recharge to the Sioux Quartzite aquifer is from infiltration of precipitation and also probably from the Split Rock Creek in Palisades State Park in South Dakota (Hanson, 1986; Lindgren and Niehus, 1992). Discharge from the Sioux Quartzite aquifer is to adjacent aquifers including the Big Sioux aquifer, and to stock, domestic, and municipal wells (Hanson, 1986; Lindgren and Niehus, 1992).

Sole Source Aquifers

A sole source aquifer (SSA) is an aquifer designated by the U.S. Environmental Protection Agency (EPA) as the "sole or principal source" of drinking water for a given service area. This designation is given to aquifers that supply 50 percent or more of the drinking water for an area and for which there are no reasonably available alternative sources should the aquifer become contaminated. According to the EPA, the Project is not underlain by any SSAs. The nearest SSA to the Project area is the Mille Lacs aquifer, which is located approximately 195 miles northeast of the Project in Minnesota (EPA, 2022).

Water Wells

Water wells located within the vicinity of the Project were identified through a review of the SDDANR Water Well Completion Reports (SDDANR, 2022c). Table 6.4-2 provides a list of all water wells within 400 feet of the Project centerlines along with the approximate MP, distance, and status/use.

Table 6.4-2
Water Wells within 400 feet of the HGPS Centerline

County	Approximate MP	Well Number	Well Owner	Depth (feet)	Distance and Direction from Project Centerline	Use or Status
Aurora to Hartley Lateral						
Moody	17.38	IU	Marvin Hasvold	12	352 feet SW	Plugged
Moody	31.45	IU	Mrs. Harold Solsaa	88	181 feet W	Plugged
Minnehaha	36.33	IU	Evelyn Sieps	39	277 feet W	Plugged
POET Chancellor Lateral						
No water wells were identified within 400 feet of the POET Chancellor Lateral centerline.						
POET Hudson Lateral						
Lincoln	18.92	IU	Paul Iverson	180	19 feet W [a]	Geothermal

Sources: SDDANR, 2022c
IU - Information Unavailable
[a] Distance is based on coordinates provided by the SDDANR. According to the well completion report, 5 holes were drilled.

Water needs and sources are in the process of being assessed for the Project. If groundwater is proposed for use, the Applicant will seek all necessary permits and authorizations prior to use.

6.4.3 Groundwater Impacts and Mitigation

In order to minimize or avoid potential impacts on groundwater resources, including public and private water supply wells, standard and specialized construction techniques will be utilized. Construction activities have the potential to temporarily affect the overland water flow and recharge of shallow aquifers. Clearing vegetation, trench excavation and dewatering, and soil compaction could hinder the infiltration of water into the ground and have an adverse effect on local vegetation and wetland hydrology; however, these minor impacts will be very localized and temporary; a permanent impact on groundwater is not anticipated. Potential impacts on groundwater resources and the mitigation measures that will be employed are discussed below.

Clearing

Clearing and grading is a process necessary for the establishment of the construction ROW. This process typically involves the removal of vegetation which serves as a filter during

water infiltration and recharge of shallow aquifers. Vegetation will only be cleared where necessary and will be allowed to regenerate once construction is complete.

Trench Excavation and Dewatering

As the pipeline trench is excavated, there is potential for minor disturbance of the water table along the construction ROW. Should dewatering of the pipeline trench be necessary, impacts are expected to be negligible, as these minor disturbances would be highly localized and temporary. In an effort to further minimize disturbances, the Applicant will limit the amount of time trenches and bore pits remain open. This will allow local water tables to return to original elevations as quickly as practical.

Horizontal Directional Drilling

Waterbodies that will be crossed via HDD are provided in Table 6.6-1. The potential exists for drilling mud associated with the HDD crossings to be released and migrate to the surface through a fracture in underlying rock or substrate. An inadvertent release of drilling fluids during HDD activities could temporarily impact groundwater by increasing the concentration of dissolved solids within the groundwater. However, an inadvertent release would permanently impact groundwater quality within the Project area, as the dissolved solids would be removed from the groundwater through natural filtration processes. Applicant will implement the measures outlined in the Project ECG provided in Exhibit E.

Soil Mixing and Compaction

Subsurface hydrology and water table elevations can be affected by excavation activities if proper soil segregation techniques are not implemented. Additionally, water tables may be altered in areas where soil compaction occurs along ROWs, staging yards, access roads, and ATWSs due to the presence and movements of heavy machinery. Soil mixing and soil compaction typically reduce the absorptive or retentive abilities of soils in aquifer recharge areas, and thus, shallow aquifers that rely on precipitation seeping into the ground can be negatively affected. In order to minimize or avoid these potential impacts in wetland areas and within agricultural land, the Applicant will utilize topsoil and subsoil segregation techniques, which will return soil horizons to near pre-construction conditions. Topsoil segregation would be conducted over the trench line in all areas classified as agricultural land that are crossed by the Project. Soil compaction will be highly localized within the construction corridor, mitigated during restoration activities, and significant impacts on surrounding groundwater resources or groundwater quality are not anticipated.

Fuel Handling and Storage

An inadvertent spill of fuels, lubricants, or solvents could result in groundwater contamination. Spill related impacts will be avoided or greatly reduced by prohibiting fuel storage and refueling activities within 100 feet of wetlands and waterbodies, 200 feet of private wells, and 400 feet of community or municipal wells; implementing proper storage, containment, and handling procedures; and by requiring immediate cleanup should a spill or leak occur. In the event of a spill, the Applicant will implement its Spill Prevention and Response Procedures Plan outlined in the Project ECG (Exhibit E). This plan describes measures that will be implemented to prevent or control inadvertent spills of hazardous materials and groundwater contamination.

6.4.4 Water Uses

Water uses identified within the Project area are discussed below and illustrated in Exhibit A5, including rural water districts, wellhead and source water protection areas, and the National Hydrography Dataset, respectively. In addition, Exhibit A2 includes wetlands identified within the Project area. Wetlands are discussed throughout Section 6.6 − Aquatic Wildlife and Ecosystems. Additional state identified water uses are discussed in greater detail within Section 6.6 − Aquatic Wildlife and Ecosystems, Section 6.10 − Water Quality, and outlined in the waterbodies crossing table in Exhibit C, Table C-2.

Rural Water Systems

The South Dakota Association of Rural Water Systems supports water uses including clean drinking water and water for local agriculture and industries. These water uses are managed throughout the state by districts based on region. The Project crosses a total of six rural water systems within South Dakota including Big Sioux Community Water System, Minnehaha Community Water Corporation, Lincoln County Rural Water System, and South Lincoln Rural Water System (South Dakota Rural Waters Systems, 2022). Additionally, the Project crosses the Lewis & Clark regional water system, which overlaps the rural water systems crossed by the Project. Table 6.4-1 below lists the rural water systems crossed and the approximate miles that are crossed by the Project. The Applicant will collaborate with the rural water systems regarding crossing their respective lines.

Table 6.4-3
South Dakota Rural Water Systems Crossed by the Project

Name	Approximate Miles Crossed
Aurora to Hartley	
Big Sioux	31.35
Minnehaha	28.85
Lewis & Clark [a]	28.67
POET Chancellor Lateral	
Lincoln	3.74
South Lincoln	18.81
Lewis & Clark [a]	22.56
POET Hudson Lateral	
Lincoln	25.69
Lewis & Clark [a]	25.69

Source: South Dakota Rural Water Systems, 2022
[a] Lewis & Clark is identified as a Regional Water System and overlaps the Minnehaha, South Lincoln and Lincoln systems along the project.

Wellhead and Source Water Protection Areas

Wellhead protection areas (WHPAs) define the boundaries in which the land area contributes water to a well. Approximately 78% of all public water supplies in South Dakota utilize groundwater as the main source for drinking water (SDDANR, 2022d). These WHPAs are in place to protect the quality of local drinking water.

All five counties in South Dakota crossed by the Project have wellhead protection zoning ordinances (SDDANR, 2022c). Based on WHPA maps, the Aurora to Hartley lateral crosses 0.08 miles Zone B wellhead protection and source water areas within Brookings County and crosses 6.13 miles of shallow aquifer boundaries in Minnehaha County (East

Dakota Water Development District, 2021). Minnehaha County defines the entire shallow aquifer as water source protection, and as such, individual WHPAs are not defined (East Dakota Water Development District, 2021). Zone B represents a secondary impact zone that is identified as shallow or surficial aquifer boundaries used by individual domestic users and valuable to future development (East Dakota Water Development District, 2021). Additionally, the POET Chancellor lateral crosses an Aquifer Protection Area in Lincoln County and an Aquifer Protection Overlay District in Turner County (Lincoln County, 2005; Turner County, 2015). The Applicant will work with municipal and rural water system districts to manage well or source water protection conflicts that they are made aware of. Further, the Applicant will implement practices and BMPs outlined in the ECG to minimize impacts to WHPAs, as encouraged by county zoning ordinances.

6.4.5 Discharge Waters

Two types of discharges will occur during Project construction: hydrostatic testing and trench dewatering. This section discusses the process for each type and mitigation measures to avoid adverse impacts to hydrology in the Project area.

Hydrostatic testing will be conducted to verify the integrity of the newly installed pipeline and will be conducted in accordance with the requirements of USDOT pipeline safety regulations (49 CFR Part 195), the Applicant testing specifications, and applicable permits, including surface water or groundwater withdrawal if applicable and National Pollutant Discharge Elimination System permits for hydrostatic test waters.

Exact locations of the hydrostatic test water withdrawal and discharge sites will be coordinated with the selected contractor. The Applicant groundwater and/or purchased municipal surface waters for hydrostatic testing purposes and discharge will occur though an energy dissipating device ideally located within well-vegetated upland area along the Project ROW.

Water is anticipated to infiltrate into the ground within close proximity to the selected discharge location, and no significant water quality impacts are anticipated as a result of the discharge. Since discharge water is anticipated to be absorbed into the soil, impacts to adjacent private property owners are not anticipated. The Applicant will use earthen berms, hay bales or silt fence to help direct and maintain water on existing landowners' property. Since the hydrostatic test is for new pipe, suspended solids, oil, grease, and other pollutants are not anticipated.

The Applicant will develop a hydrostatic test plan, following completion of design, and in coordination with the selected contractor. Permits and landowner permissions will be obtained as needed prior to water use or discharge activities.

Trench dewatering activities may be needed when groundwater and/or precipitation (or sheet flow from precipitation) enters the excavated trench or bore pit. Dewatering activities will take place using pumps and/or well pointing. To avoid erosion and sedimentation water is discharged into vegetated uplands and/or into a filter bag or other dewatering device so that water may percolate back into the ground and avoids impacts to sensitive features including wetland and waterbodies. Additional information is provided in the ECG (Exhibit E). Permits and landowner permissions will be obtained as needed prior to water use or discharge activities.

6.4.6 Deep Well Injection

The Applicant does not anticipate utilization of deep well injection in South Dakota for the Project.

6.5 Terrestrial Wildlife and Ecosystems

The Project area crosses the Prairie Parkland (Temperate) Province ecoregion, which is characterized by gentle rolling plains, with steep valley bluffs. Elevations within this ecoregion can range from 1,000 to 2,000 feet, with some areas being relatively flat and others having high hills or bluffs. Vegetation is a mixture of mostly bluestem (*Andropogon* sp.) dominated tall grass prairie, and stands of deciduous forest. The forested areas are likely a mixture of eastern cottonwood (*Populus deltoides*), elm (*Ulmus* sp.), oak (*Quercus* sp.), and hickory (*Cary* sp.) tree species (USDA, 2022).

Wildlife species common to the Prairie Parkland (Temperate) Province include mink (*Mustela vison),* North American river otter (*Lontra canadensis*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), belted kingfisher (*Ceryle alcyon*), and mourning dove (*Zenaida macroura*) (USDA, 2022).

6.5.1 Vegetation

Vegetation community types occurring along the Project route were identified utilizing the National Land Cover Database (NLCD). The Project route crosses six terrestrial vegetation community types in South Dakota including pastureland/rangeland, native grassland, haylands, row-crop agriculture, residences and farmsteads, and ROW corridors (Table 6.5-1). The predominant vegetation communities crossed are row crop agriculture and haylands.

Vegetation communities generally describe land use types classified in Section 6.8 − Land Use. However, some land uses were grouped to describe their vegetation (e.g., rural residential with residential). Therefore, the acres disturbed for vegetation communities will be slightly different than the corresponding land use types provided in Section 6.8 − Land Use.

Table 6.5-1
Vegetative Communities Crossed by the Project

Counties Crossed (North to South)	Vegetation Communities (miles)							
	Cultivated Crops	Deciduous Forest	Developed	Emergent Herbaceous Wetlands	Grassland / Herbaceous	Open Water	Pasture / Hay-areas of Grasses, legumes, or grass	Grand Total [a]
Aurora to Hartley								
Brookings	6.11	0.04	0.20	0.33	0.00	0.00	1.29	7.96
Moody	22.96	0.04	0.59	0.25	0.00	0.05	2.93	26.82
Minnehaha	26.48	0.09	1.03	0.09	0.21	0.03	0.97	28.89
POET Chancellor Lateral								
Lincoln	18.20	0.01	0.45	0.17	0.32	0.05	1.42	20.61
Turner	1.45	0.02	0.10	0.00	0.02	0.00	0.36	1.95

Table 6.5-1
Vegetative Communities Crossed by the Project

Counties Crossed (North to South)	Vegetation Communities (miles)							
	Cultivated Crops	Deciduous Forest	Developed	Emergent Herbaceous Wetlands	Grassland / Herbaceous	Open Water	Pasture / Hay-areas of Grasses, legumes, or grass	Grand Total [a]
POET Hudson Lateral								
Lincoln	23.63	0.00	0.58	0.14	0.07	0.00	1.28	25.69
State Total	**98.82**	**0.20**	**2.93**	**0.98**	**0.62**	**0.13**	**8.25**	**111.92**

[a] Numbers have been rounded for presentation purposes; therefore, the total may not equal the sum of the addends.

Pasture/Hay

The pasture vegetative community includes lands that may have been plowed at some time in the past and replanted to non-native pasture grasses. The primary land use is grazing by livestock. This plant community has a high to moderate percent canopy cover of non-native grasses. Native grasses and forbs may be present but are not dominant and have low canopy cover. The Pasture community is composed of mixed grass and tall grass prairie community types. The primary non-native grasses include smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). Other common species along the route are creeping wildrye (*Elymus repens*), switchgrass (*Panicum virgatum*), common dandelion (*Taraxacum officinale*), tall fescue (*Festuca arundinacea*), Japanese bristlegrass (*Setaria faberi*), and creeping bentgrass (*Agrostis stolonifera*). Native species that are common along the route are reed canarygrass (*Phalaris arundinacea*), Canada wildrye (*Elymus canadensis*), and common nettle (*Urtica dioica*).

The hay plant community is land that has been cropped for hay forage production. It is a species-poor plant community generally consisting of one to five species of non-native forage grasses and forbs. Hay is found throughout the Project area. Dominant species include alfalfa (*Medicago sativa*), smooth brome, and Kentucky bluegrass.

Grassland/Herbaceous

The native grassland vegetative community includes grassland dominated by native mixed grass and tall grass species. Non-native plant species may be present but in low quantities. This land use includes undisturbed grasslands that may have been plowed at some time in the past. It also includes restored grasslands dominated by native grass species. The primary land use for native grasslands in the Project area is grazing by wildlife habitat. The primary native species are switchgrass, reed canarygrass, and Canada wildrye. The non-native Kentucky bluegrass is also present.

Cultivated Crops

This community type is characterized by annual herbaceous vegetation planted for the production of human consumption, animal feed, biofuel, or other specific purposes. Row-crop agriculture accounts for the majority (88 percent) of the Project route. Along the

South Dakota Project route the primary row-crops are corn (*Zea mays*) and soybeans (*Glycine max*).

Developed

This vegetation community describes the rural residences and farmsteads, and suburban residential land uses (as classified in Section 6.8 − Land Use). These land uses may include farmsteads and outbuildings (including abandoned farmsteads), farm windbreaks and shelterbelts, and suburban residential yards. These areas are generally small in size and account for a small portion of the Project area. These areas have often been planted with a mixture of non-native grasses and forbs used for agricultural uses such as forage production. The most common tree species in windbreaks are green ash (*Fraxinus pennsylvanica*), American elm (*ulmus americana*), and boxelder maple (*Acer negundo*). Scrub shrub layer plants were also observed, but do not dominate land cover and are sparsely populated. Common scrub shrub layer species include common snowberry (*Symphoricarpos albus*), black cherry (*Prunus serotina*), buckthorn (*Rhamnus cathartica*), and narrowleaf cottonwood (*Populus angustifolia*).

Emergent Herbaceous Wetlands

Common wetland vegetation includes eastern cottonwood, black willow (*Salix nigra*), buckthorn, narrowleaf cottonwood, reed canarygrass, prairie cordgrass, narrowleaf cattail (*Typha angustifolia*), Kentucky bluegrass, common nettle, creeping bentgrass, smooth brome, blunt spikerush (*Eleocharis obtuse*), foxtail barley (*Hordeum jubatum*), broadleaf cattail (*Typha latifolia*), creeping wildrye, giant ragweed (*Ambrosia trifida*), common dandelion, black bent (*Agrostis gigantea*), pale smartweed (*Persicaria lapathifolia*) , Canadian wood nettle (*Laportea canadensis*), and switchgrass.

Noxious Weeds

Some introduced plants are aggressive, invasive species that can alter plant community composition, impact rangeland and cropland productivity, and decrease wildlife habitat quality. When a plant species is known to cause environmental and economic impacts, it is listed as a federal, state, and/or county noxious weed. A 'noxious weed' is defined as a plant of foreign origin that can directly or indirectly injure agriculture (crops, pasture, and rangeland), waterways (including navigation), wildlife, or public health. The Federal Noxious Weed list, determined by rule of the USDA under the *Federal Noxious Weed Act of 1974* (Title 7, Chapter 61), is a combination of aquatic/wetland, parasitic, and terrestrial plant species that are of foreign origin and not widely prevalent within the United States.

The South Dakota state noxious weed list is found in South Dakota Administrative Rule 12:62:03:01.06. There are currently seven noxious weeds on the state list. Under South Dakota Codified Law 38-22, it is a landowner's legal responsibility to manage noxious weeds on their lands. Local county governments have the responsibility for the implementation and enforcement of weed management. In addition to state listed noxious weeds, South Dakota counties have noxious weed lists for species that are locally problematic. Table 6.5-2 lists the state and county listed noxious weeds in South Dakota and Table 6.5-3 lists reported acreages of state listed noxious weed infestations by county.

Table 6.5-2
South Dakota State and County Noxious Weeds

Latin Name	Common Name	State	County				
			Brookings	Lincoln	Minnehaha	Moody	Turner
Artemisia absinthium	Absinth wormwood	X					
Cardaria draba	Hoary cress	X					
Carduus acanthoides	Plumeless thistle		X	X	X	X	X
Carduus nutans	Musk thistle		X	X	X	X	X
Centaurea stoebe	Spotted knapweed			X		X	X
Cirsium arvense	Canada thistle	X					
Cirsium vulgare	Bull thistle		X			X	X
Euphorbia esula	Leafy spurge	X					
Lythrum salicaria.	Purple loosestrife	X					
Sonchus arvensis	Perennial sowthistle	X					
Tamarix spp.	Salt cedar	X					

Source: SDDANR, 2022e

Table 6.5-3
Reported Infestations (2020) of Statewide Noxious Weeds in Counties Crossed by the Project

County	Acres Infested						
	Absinth wormwood	Leafy spurge	Canada thistle	Perennial sow thistle	Hoary cress	Purple loosestrife	Salt cedar
Brookings	101 - 500	5,001 – 10,000	>50,001	1,001 – 5,000	None reported	<100	None reported
Lincoln	<100	1,001 – 5,000	5,001 – 10,000	<100	<100	<100	<100
Minnehaha	101 - 500	1,001 – 5,000	<5,000	101 - 500	<100	<100	None reported
Moody	501 – 1,000	1,001 – 5,000	<5,000	101 - 500	None reported	None reported	None reported
Turner	5,001 – 10,000	>10,001	10,001 – 20,000	5,001 – 10,000	501 – 1,000	<100	None reported

Source: SDDANR, 2022e

As presented in Table 6.5-3, noxious weeds have the potential to be present along the Project route. Applicant is developing Weed Management plans in coordination with the SD Department of Agricultural and Natural Resource Weed and Pest Control Commission and each county's weed department crossed in South Dakota. Baseline BMPs and weed control measures are outlined in the ECG (Exhibit E).

6.5.2 Impacts to Vegetation and Mitigation Measures

Both temporary and permanent impacts to vegetation may occur as a result of the Project. Row-crop agriculture and haylands will be temporarily disturbed and removed from production during construction. However, agricultural production will resume during the growing season following completion of the pipeline construction. The Applicant will

restore row-crop agriculture and haylands to preconstruction conditions as soon as practicable following construction in accordance with the ECG (Exhibit E) and landowner agreements. Landowners will be compensated for crop losses, short term reduced yields, and other damages resulting from the pipeline construction.

The proposed Project area includes limited areas of residences and farmsteads. The 50-foot pipeline permanent ROW will be kept clear of trees, to allow for pipeline inspection and maintenance. Windbreaks will not be replanted within the permanent pipeline ROW, because of the requirements for aerial patrols. Further, any trees and/or shrubs along the permanent ROW that are cleared during construction will not be replanted. Landowners will be compensated for loss to landscaping and timber on areas impacted by the Project. Disturbed areas outside the permanent ROW will be revegetated with a recommended seed-mix and natural succession will allow the vegetation to revert to preconstruction conditions.

The proposed pipeline route crosses grasslands and pastureland/rangeland. This grass-dominated land cover controls water runoff and sediment from directly entering groundwater, nearby lakes, rivers ponds and streams while contributing to wildlife habitat and livestock forage. The Applicant will restore all grasslands as near to pre-construction conditions as practicable. There are no Wetland Reserve Program easements crossed by the Project. Where Conservation Reserve Program or Conservation Reserve Enhancement Program contracts are in place, The Applicant will work with affected Landowners in accordance with Farm Service Agency requirements for reclamation.

To minimize potential impacts, the Applicant will incorporate topsoil segregation during construction of the pipeline as discussed in Section 6.3 above. This practice preserves the seed bank within the topsoil and encourages revegetation of desirable species within the ROW.

The Applicant will monitor revegetation success along the pipeline ROW in accordance with applicable requirements. Reclamation and revegetation of grasslands and pastureland/rangeland may include de-compaction and/or applying soil enhancements as necessary to improve vegetative re-growth. Seed mixes will be developed based on data from pre-disturbance field surveys and with input landowners and from the local NRCS.

Noxious Weeds

Construction activities result in surface disturbance that may contribute to the spread of noxious weeds. Weed species are fast-growing and may displace desired species and inhibit the establishment of native grasses, forbs, and shrubs. Noxious weeds have the potential to increase in disturbed areas along the ROW where construction occurs. After construction is completed, disturbed areas will be restored. Operation and maintenance traffic will typically be limited to the locations of the aboveground facilities. Cropland will be returned to production and agricultural weed management will resume. Upland areas will be reseeded with desirable seed-mixes.

The Applicant has met or will meet with and consult with the SDDANR, local NRCS offices and county weed managers on developing its Weed Management Plans for the Project. In order to mitigate the spread of any noxious weeds, the Applicant will implement

BMPs and weed control practices during construction and operation that may include and are not limited to:

- Treating known noxious weed infestations prior to ground disturbance.
- Use of nurse crops on stockpiled soil to prevent weed establishment
- Immediately reseeding following construction.
- Using weed-free seed in reclamation activities.
- Using weed-free erosion control materials.
- Integrated weed management post-restoration (monitoring, mowing, spot herbicide application, etc.)

Operation and maintenance activities should not exacerbate noxious weed conditions since disturbances will be infrequent and isolated.

6.5.3 Wildlife

The Project area provides foraging and sheltering habitat for many species of mammals, raptors, and songbirds such as whitetail deer (*Odocoileus virginianus*), thirteen-lined ground squirrel, white-footed mouse (*Peromyscus leucopus*), white-tailed jackrabbit (*Lepus townsendii*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), great-horned owl (*Bubo virginianus*), burrowing owl (*Speotyto cunicularia*), wild turkey (*Meleagris gallopavo*), mourning dove, loggerhead shrike (*Lanius ludovicianus*), black-capped chickadee (*Parus atricapillus*), eastern bluebird (*Sialia sialis*), and American robin (*Turdus migratorius*). In addition to foraging and sheltering habitat, the pastureland/rangeland, native grassland and hayland vegetation communities within the Project area may provide suitable habitat for ground nesting birds such as the ring-necked pheasant (*Phasianus colchicus*) and common nighthawk (*Chordeiles minor*).

Highly disturbed areas (i.e., residences and farmsteads and ROW corridors) are likely to have a greater abundance of species such as striped skunk (*Mephitis mephitis*), eastern fox squirrel (*Sciurus niger*), barn swallow (*Hirundo rustica*), house wren (*Troglodytes aedon*), and common grackle (*Quiscalus quiscula*).

Many of these agricultural areas also contain aquatic habitats such as wetlands or prairie potholes that provide foraging, sheltering, and nesting habitat for migratory species such as shorebirds and waterfowl. These habitat types and wildlife that may utilize these aquatic habitats within the Project area are discussed throughout Section 6.7 − Aquatic Wildlife and Ecosystems.

Birds of Conservation Concern

The Project within South Dakota is located within the North American Bird Conservation Initiative Bird Conservation Region 11 – Prairie Potholes (U.S. North American Bird Conservation Initiative, 2021). A number of bird species found in the Project area are designated by the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) online system as Birds of Conservation Concern (BCC) (USFWS, 2022a). These BCC species represent USFWS's highest conservation priorities based on an assessment of factors, including population abundance and trends, threats on breeding and nonbreeding grounds and size of breeding and nonbreeding ranges. Table 6.5-4 below details which BCCs have the potential to occur within the Project area.

Table 6.5-4
Birds of Conservation Concern

Bird of Conservation Concern	Breeding Period	Probable Presence
American Golden-plover	Breeds elsewhere	March - May, July
Bald Eagle [a]	Oct 15 to Aug 31	Year-round
Black Tern	May 15 to Aug 20	May - August
Black-billed Cuckoo	May 15 to Oct 20	May - October
Bobolink	May 15 to July 31	May - August
Eastern Whip-poor-will	May 1 to Aug 20	April - August
Franklin's Gull	May 1 to July 31	April - October
Golden Eagle [a]	Jan 1 to Aug 31	January – August, December
Golden-winged Warbler	May 1 to Jul 20	May - July
Henslow's Sparrow	May 1 to Aug 31	April - August
Hudsonian Godwit	Breeds elsewhere	April - May
Kentucky Warbler	April 20 to Aug 20	April - August
Lesser Yellowlegs	Breeds elsewhere	April – May, July - August
Long-eared Owl	March 1 to July 15	January, March – July, December
Marbled Godwit	May 1 to July 31	April - July
Red-headed Woodpecker	May 10 to Sep 20	March - October
Rusty Blackbird	Breeds elsewhere	January, March, November, December
Short-billed Dowitcher	Breeds elsewhere	May
Willet	April 20 to Aug 5	April - August
Wood Thrush	May 10 to Aug 31	April - September

[a] Not a Bird of Conservation Concern in the Project area but warrants attention because of the *Eagle Act*.

Important Bird Areas

The Project does not cross any Important Bird Areas in South Dakota, as designated by BirdLife International (National Audubon Society, 2022).

Big Game Species

South Dakota has over 5 million acres of hunting opportunity on public land as well as on private land leased for public hunting. Based on review of the South Dakota Game, Fish & Parks (SDGFP) Wildlife of South Dakota online mapper, big game species in the Project area in South Dakota include white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), and wild turkey (*Meleagris gallopavo*) (SDGFP, 2022a, 2022b).

White-tailed Deer

The white-tailed deer is considered a big game species in South Dakota. This species is highly adaptable and can be found in urban areas, coniferous forests, plains, prairies,

agricultural areas, and drier areas. This species is not protected under state or federal endangered species laws and a hunting season is allowed. The white-tailed deer can be found in suitable habitat across all of South Dakota and the Project area is identified as primary range for the species (SDGFP, 2022a, 2022b).

Mule Deer

The mule deer is considered a big game species in South Dakota. This species prefers open hills or open county and feeds on forbs and browse. This species is not protected under state or federal endangered species laws and a hunting season is allowed. The mule deer can be found in suitable habitat primarily in western South Dakota and occurrence in the Project area is rare (SDGFP, 2022a, 2022b).

Pronghorn

The pronghorn is considered a big game species in South Dakota. This species prefers short and mixed-grass prairies with rolling hills and feed on browse such as sagebrush and leafy forage. This species is not protected under state or federal endangered species laws and a hunting season is allowed. The pronghorn can be found in suitable habitat across western South Dakota and in more limited numbers in eastern South Dakota. Occurrence in the Project area is rare (SDGFP, 2022a, 2022b).

Wild Turkey

The wild turkey is considered a big game species in South Dakota. This species prefers hardwood and mixed conifer-hardwood forests with scattered open areas and can be found along riparian corridors. This species is not protected under state or federal endangered species laws and a hunting season is allowed. Wild turkey occurrence crossed by the Project ranges from occurrence few to locally fair to primary range (SDGFP, 2022a, 2022b).

Small Game Species

Small game are those species of birds and mammals other than big game, which are legally hunted in South Dakota during established hunting seasons. Mammalian small game species include ring-necked pheasant (*Phasianus colchicus*), greater prairie-chicken (*Tympanuchus cupido*), sharp-tailed grouse (*Tympanuchus phasianellus*), gray partridge (*Perdix perdix*), chukar partridge (*Alectoris chukar*), bobwhite quail (*Colinus virginanus*), American crow (*Corvus brachyrhynchus*), common snipe (*Gallinago gallinago*), mourning dove, ruffed grouse (*Bonasa umbellus*), greater sage grouse (*Centrocercus urophasianus*), cottontail rabbits (Sylvilagus *spp*) and tree squirrels (*Sciurus spp*) (SDGFP, 2022a, 2022b). All of these species are potentially hunted in the Project area except the greater sage grouse and the ruffed grouse, which are both found only in far western South Dakota (SDGFP, 2022a).

The ring-necked pheasant is South Dakota's state bird and is a highly sought-after game species. Further, prairie grouse (greater prairie-chicken and sharp-tailed grouse) are important game birds in the state (SDGFP, 2022a, 2022b).

Ring-necked Pheasant

The ring-necked pheasant is a medium-sized game bird that can be found in grassland, cropland, wetlands, shelterbelts, foot plots, and weedy areas. This species is not protected

under state or federal endangered species laws and a hunting season is allowed. Ring-necked pheasant occurrence is few to locally fair and fair to locally good in the Project area (SDGFP, 2022a, 2022b).

Greater Prairie-Chicken

The greater prairie-chicken is a chicken-sized game bird that can be found in a diversity of grass ecosystems. This species is not protected under state or federal endangered species laws and a hunting season is allowed. The highest densities of this species can be found in central South Dakota. Occurrence in the Project area is rare (SDGFP, 2022a, 2022b).

Sharp-tailed Grouse

The sharp-tailed grouse is a medium sized grouse which requires a diversity of grass ecosystem structural conditions depending on breeding, foraging, or nesting activities. This species is not protected under state or federal endangered species laws and a hunting season is allowed. While occurrence in the Project area is rare, the Aurora to Hartley lateral would cross two areas of Tier 3 sharp-tailed grouse habitat prioritizations areas from MP 9.2 to 10.3 and MP 11.9 to 12.0 (SDGFP, 2022a, 2022c). Tier 3 areas are considered a lower quality habitat and generally represent areas with more landscape level habitat improvement opportunities such as grassland restorations, reduction of developed areas, and removal of encroaching trees in grasslands.

6.5.4 Impacts to Wildlife and Mitigation Measures

Construction of the pipeline will be short-term and may result in temporary impacts to wildlife. Given the large percentage of agricultural development along the Project ROW, existing species that may utilize the Project area are used to seasonal vegetation impacts. Displacement of species may occur during increased human presence for the construction period. The Applicant will consult with the appropriate regulatory agencies to establish the appropriate protective measures to avoid or mitigate wildlife seasonal, timing or migration concerns. The Project area will be returned to pre-construction land uses and contours as practical after pipeline construction except for the few cumulative acres of aboveground facilities scattered along the route. There is very little forested habitat along the project ROW, and where impacts occur, they are typically associated with residences and shelterbelts; many of which are comprised of fast-growing non-native tree species.

To ensure mobility and mitigate any impacts to the migration of terrestrial fauna across areas of active work, trench plugs may be installed at visible wildlife game trails, as identified by an EI or wildlife agency, and livestock watering trails as identified by the landowner that intersect the trench line when livestock cannot reasonably be separated from the construction area. Gaps would then be left in spoil and topsoil stockpiles at all trench plugs to permit unimpeded movement of wildlife and livestock. Suitable ramps may be installed from the bottom of trench to the top with a minimum of 5-foot-wide open path across the trench plug. A corresponding gap in the welded pipe string would also be left at each trench plug.

The pastureland/rangeland, haylands, and native grasslands located within the Project area may provide suitable habitat for ground nesting species. Typically, bird nesting season is April 15 - August 15. The current Project schedule estimates that construction within South

Dakota will commence in 2024 after applicable permits and approvals have been issued and materials are ordered; restoration activities will continue through the first part of 2025 after the anticipated in-service date when spring conditions are more conducive to restoration activities than winter months. Few forested areas are crossed by the Project due to the predominance of agricultural practices within the region, therefore impacts to tree nesting species are anticipated to be negligible. Project clearing activities could occur during the primary bird nesting season. Consultation with USFWS regarding migratory birds and potential impacts to BCCs is ongoing.

Construction during hunting seasons may result in some space use conflicts with hunters, with hunters being restricted from construction areas and perhaps avoiding larger areas surrounding the work sites. Walk-in access areas are found throughout the State of South Dakota, allowing public hunting access on private lands. The program is managed by the SDGFP. Walk-in access areas available to hunters vary from year to year, as available funds and contracts with landowners vary. Construction of the Project may limit access to these walk-in areas and private lands. However, these impacts will be short-term lasting only as long as construction requires, or the season remains open. These impacts are considered small because of the area of impact in comparison to the acreage open for hunting, and the small numbers of hunters that likely use the area. Impacts to game species and hunting opportunities due to construction of the Project in South Dakota are not anticipated as the Project does not cross any Game Production Areas, South Dakota Parks and Recreation areas, School and Public Lands, Waterfowl Production Areas, National Forests and Grasslands, or Bureau of Land Management Lands (SDGFP, 2022c).

6.6 Aquatic Wildlife and Ecosystems

This section describes the aquatic habitats that are crossed by the Project; waterbodies and wetlands. Also described within this section are fisheries that may be recreationally or commercially important, and special status species that predominantly utilize aquatic habitats within the Project area.

6.6.1 Waterbodies

The Applicant has identified 63 waterbody crossings located within the Project footprint via field surveys where completed to date supplemented by desktop analysis of areas not yet surveyed. Applicant anticipates completing delineation surveys in 2022. The MP, waterbody name, state water classification, and flow regime for surface waters crossed or otherwise impacted by the Project can be found in Exhibit C, Table C-2. Typical drawings showing ROW configurations and crossing methods are provided in Exhibit E.

6.6.2 Wetlands

Wetlands are limited in extent to depression features (e.g., prairie potholes) and riparian areas. They are intermittently located along the Project ROW and have been identified based on field survey data collected May 2022 and desktop analysis for areas without access. Wetlands, as defined by the USACE, have hydrophytic vegetation, hydric soils, and hydrology present (USACE, 1987). The wetland areas provide important ecological functions such as maintaining water quality, stabilizing stream banks, providing flood control, providing wildlife habitat, and aesthetic values.

Palustrine forested (PFO) wetlands are characterized by woody vegetation greater than 20 feet in height with more than 30 percent canopy cover. Palustrine scrub-shrub (PSS) wetlands are similar to PFO wetlands in that they are characterized by greater than 30 percent canopy cover of woody vegetation; however, dominant vegetation in a PSS wetland is less than 20 feet in height. Finally, palustrine emergent (PEM) wetlands are characterized by dominance of rooted herbaceous (non woody) wetland plants Riverine wetlands include all wetlands and deepwater habitats within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent, emergent mosses, or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.5% (Cowardin et al., 1979). PEM wetlands are the dominant wetland type throughout the Project area.

Common wetland vegetation includes eastern cottonwood, black willow (*Salix nigra*), buckthorn, narrowleaf cottonwood, reed canarygrass, prairie cordgrass, narrowleaf cattail (*Typha angustifolia*), Kentucky bluegrass, common nettle, creeping bentgrass, smooth brome, blunt spikerush (*Eleocharis obtuse*), foxtail barley (*Hordeum jubatum*), broadleaf cattail (*Typha latifolia*), creeping wildrye, giant ragweed (*Ambrosia trifida*), common dandelion, black bent (*Agrostis gigantea*), pale smartweed (*Persicaria lapathifolia*) , Canadian wood nettle (*Laportea canadensis*), and switchgrass.

The Applicant has designed the Project to avoid permanent fill in wetlands. Temporary impacts to wetlands will be limited to the construction phase, although permanent conversion of some PFO and PSS to PEM will be necessary to conduct the required pipeline inspections and pipeline integrity. Table 6.6-1 below summarizes all wetlands within the Project area; this includes USACE jurisdictional wetlands and non-jurisdictional wetlands.

Table 6.6-1
Summary of Wetlands Crossed by the Project by County

County	PEM (miles)	PSS (miles)	PFO (miles)	Total (miles)
Aurora to Hartley				
Brookings	0.44	0.00	0.00	**0.44**
Moody	0.53	0.00	0.00	**0.53**
Minnehaha	0.28	0.07	0.02	**0.37**
POET Chancellor Lateral				
Lincoln	0.76	0.00	0.00	**0.76**
Turner	0.04	0.00	0.00	**0.04**
POET Hudson Lateral				
Lincoln	0.41	0.00	0.00	**0.41**
Project Total	**2.46**	**0.07**	**0.02**	**2.55**

6.6.3 Impacts to Wetlands and Waterbodies and Mitigation Measures

During initial routing and through the alternatives evaluation process, the Applicant has worked and is continuing to work to avoid and minimize impacts to waterbodies and wetlands. A majority of wetlands and large waterbodies within the Project area will be

crossed via HDD, therefore avoiding impacts to these wetlands. Smaller waterbodies within the Project area will be crossed via open cut.

Horizontal Directional Drill

The HDD crossing method is typically utilized at large or sensitive waterbody or wetland crossings. The HDD method allows for construction across a sensitive resource without the excavation of a trench, by drilling a hole significantly below conventional pipeline depth, and pulling the pipeline through the pre-drilled hole. To facilitate the proposed HDD installations, path clearing will be limited to what is necessary for access to a water source for mixing with bentonite for drilling mud and/or site/wireline placement (an electric guide wire coil, closed loop system, along the ground surface between the HDD entry point and exit point, where possible). This wireline is used to facilitate tracking of the location of down hole drilling equipment and to determine steering inputs during advancement of the pilot bore. Wireline guidance systems typically require two guide wires for each crossing. The guide wires are placed parallel to the centerline of an installation with variable spacing or offset on each side of the centerline depending on the depth of the particular HDD installation.

Following the completion of the pilot hole, reaming tools will be utilized to enlarge the hole to accommodate the pipeline diameter. The reaming tools will be attached to the drill string at the exit point and will then be rotated and drawn back to incrementally enlarge the pilot hole. During this process, drilling mud consisting of bentonite clay, water, and approved additives will be continuously pumped into the pilot hole to remove cuttings and maintain the integrity of the hole. When the hole has been sufficiently enlarged, a prefabricated segment of pipe will be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole towards the drill rig. In the event that a particular drill is unsuccessful the Applicant will implement the measures outlined in the Project ECG (Exhibit E). Drilling activities will primarily occur between 7:00 AM and 7:00 PM, unless conditions dictate otherwise. ATWS approximately 150 feet wide by 200 feet long will be required to facilitate HDD activities at the entry and exit holes of the HDD.

Proposed HDD locations for the Project, to the extent they have been identified, are provided in Table 6.6-2.

Table 6.6-2
Horizontal Directional Drill Locations [a]

County	MP	Waterbody Name/ Feature Name	HDD Length (feet)
Aurora to Hartley			
Brookings	3.31	Medary Creek	600
Moody	8.81	Creek	600
Moody	10.53	Big Sioux River	700
Moody	23.49	Big Sioux river	800
Moody	29.96	Creek	600
Minnehaha	46.26	West Pipestone Creek	700
Minnehaha	48.62	Split Rock Creek	1,300
POET Chancellor Lateral			

Lincoln	22.5	Big Sioux River	To Be Determined
[a] Additional HDD crossings are under consideration and will be finalized pending the completion of the 2022/2023 field season.			

Open-Cut

Construction methods utilized at waterbody crossings are highly dependent on the characteristics of the waterbody encountered. Most project waterbodies are smaller and will be crossed via the dry open-cut method. This method employs the same general construction procedures that were described above for mainline construction. The pipeline trench will be excavated immediately prior to pipe installation to limit the duration of construction within the waterbody to the minimum duration as practicable. Equipment will operate from the banks of the waterbody to the maximum extent practicable to excavate a trench. Flow will be maintained at all times. Excavated material from the trench will be placed on the bank above the ordinary high-water mark for use as backfill and temporary erosion control devices will be utilized to prevent the sediment from reentering the waterbody. The pipe segment will be prefabricated and weighted, as necessary, to provide negative buoyancy and placed below scour depth. Typical backfill cover requirements will be met, contours will be restored within the waterbody, and the banks will be stabilized via seeding and/or the installation of erosion control matting or riprap. Excess excavated materials will be distributed in an upland area in accordance with applicable regulations.

Where impacts are unavoidable, the Applicant will implement BMPs to minimize impacts to wetland or waterbody and facilitate post-construction restoration in accordance with application regulations and permits. These BMPs are discussed in Exhibit E and may include, but are not limited to, the following:

- Mark and define boundaries prior to initiating construction in the area.
- Use the minimum construction equipment necessary for pipeline installation.
- Install erosion control devices across the ROW at the water features
- Use low ground pressure equipment or equipment mats if standing water or saturated soil conditions are present, or if construction equipment will cause ruts or mixing of the topsoil and subsoil.
- Limit tree stump removal and grading within wetlands to the area directly over the pipeline, unless required for safe installation.
- Leave vegetative buffers within and on either side of the features during clearing and grading, thus minimizing the disturbance time within the feature as much as practical.
- Segregate topsoil the trench line and spoil storage area in unsaturated soils.
- Use trench plugs/breakers at water feature boundaries as necessary to restore hydrology.
- Restore pre-construction contours along the pipeline ROW, allowing wetlands to naturally revegetate.

6.6.4 Aquatic Wildlife

The majority of the wetlands crossed by the Project are PEM. These wetlands provide foraging, sheltering, and nesting habitat for a variety of migratory and resident shorebirds and waterfowl such as American avocet (*Recurvirostra americana*), killdeer (*Charadrius vociferous*), long-billed curlew (*Numenius americanus*), willet (*Tringa semipalmata*), lesser scaup (*Aythya affinis*), redhead (*Aythya americana*), and northern pintail (*Anas acuta*). Amphibians and reptiles that may utilize PEM wetlands include the western chorus frog (*Pseudacris triseriata*), wood frog (*Rana sylvatica*), and Blanding's turtle (*Emydoidea blandingii*).

Fisheries

According to the South Dakota *Water Quality Standards* (South Dakota Administrative Rule 74:51:01), South Dakota classifies fisheries in five beneficial use categories, including: coldwater permanent fish life propagation waters, coldwater marginal fish life propagation waters, warmwater permanent fish life propagation waters, warmwater semipermanent fish life propagation waters, and warmwater marginal fish life propagation waters.

South Dakota further categorizes these fishery beneficial use classifications as either high- or low-quality. High-quality fishery waters are those that have a beneficial use of coldwater permanent fish life propagation, coldwater marginal fish life propagation, or warmwater permanent fish life propagation. Low-quality fishery waters are those that have a beneficial use of warmwater semipermanent fish life propagation or warmwater marginal fish life propagation (SDDANR, 2022f).

The Project does not cross any waterbodies categorized as high-quality fisheries within South Dakota. A total of eight waterbodies crossed by the Project are categorized as low-quality and have warmwater fishery classifications. The warmwater fisheries waterbodies are summarized in Table 6.6-3 (South Dakota Administrative Rule 74:51:01, 2014).

Table 6.6-3
Low Quality Warmwater Fishery Waterbodies Crossed by the Project

Waterbody Name	County(ies)	Classification
Long Creek	Lincoln, Turner	Warmwater marginal fish life propagation waters
Big Sioux River	Brookings, Lincoln, Moody	Warmwater semipermanent fish life propagation waters
Fourmille Creek	Lincoln	Warmwater marginal fish life propagation waters
Beaver Creek	Lincoln	Warmwater marginal fish life propagation waters
Split Rock Creek	Minnehaha	Warmwater semipermanent fish life propagation waters
West Pipestone Creek	Minnehaha	Warmwater marginal fish life propagation waters
Unnamed Big Sioux Tributary	Brookings, Moody	Warmwater marginal fish life propagation waters
Medary Creek	Brookings	Warmwater marginal fish life propagation waters

One of the many objectives of the SDGFP is to ensure that fisheries and aquatic resources are available and safe for public uses. To maintain aquatic resource quality, the SDGFP has developed Fisheries Management Area Strategic Plans for the different regions of the

state. These plans aim to protect water quality, identify critical habitat, and improve fishing opportunities by better access and stocking. The Project falls within the East River Fisheries Management Area. The majority of the waterbodies stocked within this region are lakes and ponds. The Project does not cross any lakes or ponds listed as stocked by the SDGFP (SDGFP, 2022d). Representative game fish that occur within the Project area in South Dakota include a variety of species such as a variety of catfish (including *Ictalurus punctatus*, *Ameiurus melas* and *Ameiurus natalis*), northern pike (*Esox 43ucius*), walleye (*Sander vitreus*), rainbow trout (Oncorhynchus mykiss), paddlefish (Polyodon spathula), largemouth bass (*Micropterus salmoides*), and white bass (*Morone chrysops*) (SDGF, 2022a, 2011). Typical non-game species include common shiner (*Luxilus cornutus*), white sucker (*Catostomus commersonii*), and bigmouth buffalo (*Ictiobus cyprinellus*) (SDGFP, 2011).

Aquatic Invasive Species

The SDGFP identifies one waterbody, the Big Sioux River, as an aquatic invasive species infested water crossed by the Project within South Dakota (SDGFP, 2022c, 2022e). The portion of the Big Sioux River identified for infestation of aquatic invasives and crossed by the Project is located at MP 22.55 of the POET Chancellor lateral. Invasive fish species include the bighead carp (*Hypophthalmichthys nobilis*), grass carp (*Ctenopharyngodon Idella*), and silver carp (*Hypophthalmichthys molitrix*).

6.6.5 Impacts to Aquatic Wildlife and Mitigation Measures

The Applicant will utilize the construction methods described in Section 6.6.3 for crossing waterbodies along the Project route. Short-term impacts on fisheries associated with pipeline construction activities may be caused by increased sedimentation and turbidity, temperature changes due to removal of vegetation cover over streams, introduction of water pollutants, or entrainment of fish. However, no long-term effects on water temperature, dissolved oxygen, pH, benthic invertebrates, or fish communities are expected to occur as a result of the construction or operation of the Project. Anticipated measures designed to prevent soil runoff and siltation that could impact fisheries include installation of silt fence, slope breakers on steep slopes, plugs in trenches close to water crossings, energy dissipation devices, and sediment filters at the outlet of hoses during dewatering and discharge of hydrostatic test water. Once construction is complete, streambeds and banks will be restored to their pre-construction contours and conditions to the maximum extent practicable, which will aid in preventing erosion and minimize long-term impacts on fisheries.

Since the only feature identified as hosting invasive aquatics species, Big Sioux River, will be crossed HDD to impacts to or spreading of aquatic invasive species is not expected. In accordance with baseline best management practices all equipment will be washed before arriving on the Project site, which will prevent the spread of noxious species from other region to the project area.

6.7 Threatened and Endangered Species

This section reflects threatened and endangered species with the potential to occur within the Project area, as determined by the information and responses received from state and federal agencies. Early coordination and informal consultation with the USFWS and

SDGFP was initiated in October and November 2021. Species occurrence records and designated critical habitat for listed species were obtained and updated as the scope changed and the agency received new data. The terrestrial sensitive, threatened, and endangered species information will continue be updated throughout the pre-construction and construction period based on continued consultations.

The Project crosses portions of five South Dakota counties. Seven species federally listed as either threatened or endangered under the *Endangered Species Act* (ESA) have the potential to occur within the Project area according to the USFWS IpaC online system (USFWS, 2022a) and initial consultations with USFWS and SDGFP. Additionally, one candidate species, the monarch butterfly, was identified to possibly occur in the Project area. None of these federally listed species are listed by the State of South Dakota as threatened or endangered. Based on consultation with SDGFP one state listed species, the lined snake (*Tropidoclonion lineatum*), has the potential occur in the Project area. Federal and state listed species with the potential to occur int eh Project area are presented in Table 6.7-1 below.

Table 6.7-1
Federal and State Listed Threatened and Endangered Species Potentially Occurring within the Project Area

Common name	Scientific name	County	State Status*	Federal Status*	Habitat Description	Project Impact Assessment
Mammals						
Northern Long-eared Bat	*Myotis septentrionalis*	-	-	T	The range of the northern long-eared bat extends across much of eastern and north central United States from Maine to eastern Montana and adjacent Canada and south as far as parts of Louisiana and Alabama. Historical and current ranges encompass all of South Dakota, except for a few southwestern counties. Historically, the bat has been patchily distributed throughout its range but has been decidedly most common in the northeastern U.S. and Canada and less common in the southern and western parts of the range.	Suitable summer roosting habitat may be present within the Project area. However, all tree clearing will occur outside the pup season (June 1 through July 31). Tree clearing is not designated as "take" within the aforementioned timeframe under the 4(d) rule. Additionally, no suitable winter hibernation habitat occurs within the Project area. Acoustic surveys have and will take place at suitable habitat locations in SD.
Birds						
Bald Eagle	*Haliaeetus leucocephalus*	Brookings, Lincoln, Minnehaha, Moody, Turner	-	-	Bald eagles prefer large rivers and lakes or wetlands bordered with mature stands of trees, or a single large tree, such as cottonwood. Breeding habitat often includes some type of edge and relatively open canopy. The large nests are usually built within the top quarter of tall, living trees, with fewer nests in dead trees. Nests are relatively close to water, typically less than 2 km. Every year, about 300 bald eagles winter in South Dakota along the Missouri River or in the Black Hills	Suitable habitat for the bald eagle may be present at various locations within the Project area in South Dakota, especially near large rivers and streams such as the Big Sioux River. No bald eagle nests were observed within the Project area during surveys. In the event a bald eagle is observed prior to or during construction, the Applicant will coordinate with SDGFP. Additionally, the Applicant will adhere to the conservation measures established in the USFWS *National Bald Eagle Management Guidelines.*
Red Knot	*Calidris canutus*	-	-	E	Red knots are a long- distance migratory bird species that migrate annually between their breeding grounds on the Canadian tundra and various wintering grounds in South America and the Gulf of Mexico. During migration, this species relies on alkaline and saline lakes, riverine wetlands, sandbars, and manmade impoundments.	Suitable flyover habitat for the red knot may be present at various locations within the Project area. However, this species is only present during migration (March-May, July-September) and South Dakota does not host one of the designated key stopover areas for the red knot. This species is highly mobile and would likely avoid the construction area during flyover season.
Fish						
Topeka Shiner	*Notropis topeka*	Brokings, Lake, Lincoln, Minnehaha, Moody, Turner	-	E	Small to medium-sized high quality prairie streams, oxbows and off-channel pools; typically with sand, gravel or rubble substrate; generally streams are perennial but can be intermittent, as well. In South Dakota, known to inhabit West Pipestone Creek, Brookfield Creek, Big Sioux River, Medary Creek, Split Rock Creek, Beaver Creek and Four Mile Creek within project area.	Suitable habitat for the Topeka shiner may be present in the Project area. Navigator is coordinating with USFWS to implement appropriate avoidance and minimization measures for this species, such as trenchless crossings and/or time of year restrictions in streams containing suitable habitat.
Reptiles						

Table 6.7-1
Federal and State Listed Threatened and Endangered Species Potentially Occurring within the Project Area

Common name	Scientific name	County	State Status*	Federal Status*	Habitat Description	Project Impact Assessment
Lined Snake	*Tropidocl onion lineatum*	Lincoln, Minnehaha	E	-	The lined snake is found in open grasslands and sparsely wooded areas preferring moist habitat near springs, ponds, marshes, streams, and rivers. They are also found in urban areas. Distribution is restricted to the southeast corner of South Dakota along the Big Sioux River corridor.	Suitable habitat for the lined snake may be present in the Project area in the tributaries of the Big Sioux River. Surveys are anticipated to be completed for the lined snake in South Dakota in Fall 2022.
Insects						
Dakota Skipper	*Hesperia dacotae*	-	-	T	Dakota skippers inhabit remnants of tallgrass prairie and mixed-grass prairie in the north-central United States. In South Dakota, habitat may be either Type A habitat: low wet-mesic prairie dominated by bluestem grasses, with wood lily, bluebell bellflower, and mountain death camas almost always present; or Type B habitat: rolling terrain over gravelly glacial moraine deposits and is dominated by big bluestem, little bluestem, purple coneflower, and needle-and-thread or porcupine grasses	Based on habitat assessment surveys conducted in June 2022 along the Aurora route, there is no suitable habitat. Habitat surveys along the POET routes will be completed and Navigator will consult with the USFWS.
Poweshiek Skipperling	*Oarisma poweshiek*	-	-	E	Poweshiek skipperling habitat includes remnant prairie areas including prairie fens, grassy lake and stream margins, moist meadows, sedge meadows, and wet-to-dry prairie.	Suitable habitat for the Poweshiek skipperling may be present in the Project area. However, since the time of listing in 2014, there have been no sightings in South Dakota and there are no sites where the Poweshiek skipperling is currently considered to be present in South Dakota.
Monarch Butterfly	*Danaus plexippus*	-	-	C	Adult monarch butterflies require a diversity of blooming nectar resources for feeding during breeding (spring through fall) and migration. Monarchs also need milkweed (*Asclepias* spp.) embedded within this diverse nectaring habitat to use for both oviposition and larval feeding.	Suitable habitat for the monarch butterfly may be present in the Project area. Navigator is performing pollinator habitat surveys and will work with conservation agencies for appropriate restoration needs for the species.

* T = Threatened; E = Endangered; C = Candidate

Habitat assessment surveys began in May 2021 and are ongoing to determine and verify the presence of habitat suitable for listed species. Habitat types are based on plant species composition, public land data files, interpretation of aerial photos, differences in vegetative cover, and presence of existing facilities, structures, or paved roads. Surveys for raptor and bald eagle nests are performed during the habitat assessment surveys. Based on documented habitat requirements, the Project ROW has the potential to support seven protected species; northern long-eared bat, bald eagle, red knot, Topeka shiner, lined snake, and monarch butterfly. Pending final results of field surveys and input from resource agencies, appropriate mitigation and protection measures will be implemented to minimize potential impacts.

6.7.1 Impacts to Threatened and Endangered Species and Mitigation Measures

Species specific surveys are ongoing, and effect determinations will be made once surveys are completed in 2023 during specific windows as appropriate. The Applicant will continue consulting with USFWS and SDGFP to obtain concurrence with determinations and warranted avoidance and/or minimization measures, and any necessary permits.

Northern Long-eared Bat

Potentially suitable summer roosting habitat for the northern long-eared bat (NLEB) may be present along the proposed Project route. In consultation with the USFWS and SDGFP we completed probable presence/absence surveys on the Aurora line during the 2022 survey season and resulted in presumed absence based on no individuals being captured. Potentially suitable habitat locations are slated to be surveyed on the POET laterals in the 2023 survey season. Applicant will work with the respective agencies on appropriate avoidance, minimization and mitigation measures based on the results of those surveys.

Red Knot

Potentially suitable habitat for the red knot may be present along the proposed Project route; however, red knot are only present during migration (March-May and July-September). Impacts to potentially suitable habitat is largely avoided by HDD crossings of rivers and associated sand bars. With construction occurring along a very narrow path among larger areas of suitable habitat the species is expected to avoid the construction activities and not be negatively affected.

Bald Eagles

No bald eagle nests were identified within the survey corridor along the Aurora to Hartley lateral. Surveys along the POET Chancellor and POET Hudson lateral are scheduled to take place in September and October 2022. In the event a bald eagle nest is observed prior to or during construction, the applicant will coordinate with SDGFP and adhere to the conservation measures established in the USFWS National Bald Eagle Management Guidelines (USFWS, 2022b). Therefore, impacts on bald eagles are not anticipated as a result of the Project.

Topeka Shiner

Stream construction methods and BMPs implemented during waterbody crossings will minimize potential impacts to sensitive aquatic species, including the Topeka shiner. The Big Sioux River, and all other waterbodies with the potential to contain mussels, will be

crossed via HDD. – Waterbodies; therefore, impacts to the Topeka shiner within these waterbodies will be avoided. The Applicant will continue to coordinate with the USFWS regarding potential impacts to the Topeka shiner within the remaining suitable waterbodies that are not currently slated to be crossed via HDD and identify suitable construction and/or mitigation measures.

6.8 Land Use

The entirety of the land crossed by the proposed route is privately owned; the Project route does not cross any state federal or county lands. Exhibit A6 illustrates the land uses identified within the Project area.

The relevant land use categories identified in SD Administrative Rule 20:10:22:18 are included within the relevant NLCD category descriptions. Table 6.8-1 below shows these equivalent categories. Using the USGS NLCD, the land use categories along the proposed route are land used primarily for cultivated crops, deciduous forest, developed land, emergent herbaceous wetlands, grassland/herbaceous, open water, and pasture/hay (Table 6.8-2). This information is supported by field surveys performed to date.

Table 6.8-1
SD Land Use and NLCD Equivalent Categories

SD Land Use Classification	NLCD Land Use Categories
Lands used primarily for row and non-row crops in rotation	Cultivated Crops
Irrigated lands	Cultivated Crops
Pasturelands and rangelands	Pasture/Hay
Haylands	Pasture/Hay
Undisturbed native grasslands	Grassland/Herbaceous
Existing and potential extractive nonrenewable resources	N/A [a]
Other major industries	Developed Land, High Intensity [b]
Rural residences and farmsteads, family farms, and ranches	Developed Land, Low Intensity
Residential	Developed Land, Medium Intensity
Public, commercial, and institutional use	Developed Land, Medium Intensity
Municipal water supply and water sources for organized rural water systems	Open Water
Noise sensitive land uses	N/A [c]

[a] The NLCD does not characterize an equivalent category for existing and potential extractive nonrenewable resources. Impacts to this land use type are discussed further in Section 6.2.3 – Economic Deposits.
[b] The Project does not cross any land characterized as Developed Land, High Intensity by the NLCD; therefore, this land use category is not discussed further.
[c] The NLCD does not characterize an equivalent category for noise sensitive land uses. Impacts from noise as a result of the Project are discussed further in Section 7.8 – Noise.

6.8.1 Land Use Maps

A map of the land uses crossed by the Project is presented in Exhibit A6, and Table 6.8-2 provides a summary of the proposed disturbance by land use. The NLCD land use categories are defined below for the Project.

Open Water

Areas of open water, generally with less than 25% cover of vegetation or soil.

The Public Utilities Commission (PUC) land use *Municipal water supply and water sources for organized rural water systems* falls within this land use category. *Municipal water supply and water sources for organized rural water systems* include surface water reservoirs and groundwater wells that withdraw water for public water supplies.

Developed Land, Open Space

Areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation. Erosion control, or aesthetic purposes.

Developed Land, Low Intensity

Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% of total cover. These areas most commonly include single-family housing units.

The PUC land use category *Rural residences and farmsteads, family farms, and ranches* falls within this land use category. *Rural residences and farmsteads, family farms, and ranches* are individual farmsteads and outbuildings, as well as farmstead windbreaks and shelterbelts.

Developed Land, Medium Intensity

Areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.

The PUC land uses *Residential* and *Public, commercial, and institutional use* fall within the land use category. *Residential* includes suburban and urban residential areas. *Public, commercial, and institutional use* includes county roads, highways, and railroad ROWs, commercial developments, schools, and churches. This category includes roadway borrow ditches that may be vegetated.

Deciduous Forest

Areas dominated by trees generally greater than five meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

Grassland/Herbaceous

Areas dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling but can be utilized for grazing.

The PUC land use *Undisturbed native grassland* falls within this land use category. *Undisturbed native grasslands* are dominated by native grass species. Non-native plant species may be present but are in low densities. It also includes restored grasslands dominated by native grass species.

Pasture/Hay

Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.

The PUC land uses *Pasturelands and rangelands* and *Haylands* fall within this land use category. *Pasturelands and rangelands* include lands that may have been plowed at some time in the past and replanted to pasture grasses. There is a high to moderate component of non-native grasses. *Haylands* include lands that have grass and alfalfa crops with evidence to suggest hay production such as the presence of bales.

Cultivated Crops

Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of the total vegetation. This class also includes all land being actively tilled.

The PUC land uses *Lands used primarily for row and non-row crops in rotation* and *Irrigated lands* fall within this land use category. *Lands used primarily for row and non-row crops in rotation* are agricultural fields that may be tilled but not irrigated. Primary row crops include corn, soybeans, sunflowers, and cereal grains. *Irrigated lands* are agricultural fields irrigated with center pivots, furrows, or flood irrigation received from lateral ditches

Emergent Herbaceous Wetlands

Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

Table 6.8-2
Land Uses Crossed by the Heartland Greenway Pipeline System Centerline

Counties Crossed (North to South)	Land Use Disturbed (miles)									
	Cultivated Crops	Deciduous Forest	Developed, low intensity	Developed, Medium Intensity	Developed, Open Space	Emergent Herbaceous Wetlands	Grassland / Herbaceous	Open Water	Pasture / Hay-areas of Grasses, legumes, or grass	Project Total [a]
Aurora to Hartley										
Brookings	6.11	0.04	0.02	0.00	0.18	0.33	0.00	0.00	1.29	7.96
Moody	22.96	0.04	0.04	0.02	0.53	0.25	0.00	0.05	2.93	26.82
Minnehaha	26.48	0.09	0.07	0.04	0.92	0.09	0.21	0.03	0.97	28.89

Table 6.8-2
Land Uses Crossed by the Heartland Greenway Pipeline System Centerline

Counties Crossed (North to South)	Land Use Disturbed (miles)									
	Cultivated Crops	Deciduous Forest	Developed, low intensity	Developed, Medium Intensity	Developed, Open Space	Emergent Herbaceous Wetlands	Grassland / Herbaceous	Open Water	Pasture / Hay-areas of Grasses, legumes, or grass	Project Total [a]
POET Chancellor Lateral										
Lincoln	18.20	0.01	0.02	0.04	0.39	0.17	0.32	0.05	1.42	20.61
Turner	1.45	0.02	0.06	0.00	0.04	0.00	0.02	0.00	0.36	1.95
POET Hudson Lateral										
Lincoln	23.63	0.00	0.04	0.02	0.52	0.14	0.07	0.00	1.28	25.69
STATE TOTAL	**98.82**	**0.20**	**0.24**	**0.12**	**2.57**	**0.98**	**0.62**	**0.13**	**8.25**	**111.92**

[a] Numbers have been rounded for presentation purposes; therefore, the total may not equal the sum of the addends.

6.8.2 Displaced Homes

The Project will not displace any persons or homes.

6.8.3 Effects on Surrounding Land Use

Aside from the approximately 2 to 4-acre L/R site and fractions of an acre for each MLV, there will be no permanent effects on surrounding land uses as a result of the HGPS.

The Project does not cross any federal, state or local parks, recreation areas, or wildlife management areas within South Dakota. An analysis of natural or scenic areas within the Project corridor included designated scenic outlooks, viewing areas, recreational trail areas, preserves, and byways. No designated natural or scenic areas were identified along the route; therefore, impacts to any designated natural or scenic areas are not anticipated from Project construction and operation (Federal Highway Administration, 2022; National Park Service, 2022a, 2022b, 2022c; USFWS, 2022c).

6.8.4 Analysis on Land Use

The primary land use types impacted by the proposed Project are lands used for agriculture (95.7% of the Project). Predominant agricultural land uses within the Project area are cultivated crops and pasture/hay. These lands are used primarily for production of food, fiber, livestock and fuel crops. A secondary use for many of the land use types is hunting and recreation; this is discussed further within Section 7.6 – Recreation. Developed land (open space, low intensity, and medium intensity) accounts for 2.6% of the Project. Grassland/herbaceous land, deciduous forest, open water, and wetlands each account for less than one percent of the Project. Impacts on vegetation, waterbodies, and wetlands are discussed in sections 6.5.1 – Vegetation, 6.6.1 – Waterbodies, and 6.6.3 – Wetlands, respectively.

6.8.5 Impacts and Mitigation Measures

Construction activities will temporarily disturb the land uses within both the construction and permanent ROW. Following construction, these areas will be re-contoured to previous conditions, reseeded and/or returned to previous agricultural uses. Drainage systems such

as roadway ditches or drainage tile crossed and disturbed by the pipeline during construction will be restored in accordance with permits and landowner agreements.

The Applicant will take appropriate measures to protect land uses used for livestock production (pastureland/rangeland, undisturbed native prairie, row-crop agriculture) during construction. Applicant will coordinate with landowners to isolate livestock from the construction area or will provide temporary fencing and gates where required to protect livestock from construction-related hazards. Any fences and gates that were removed or impacted to facilitate construction will have temporary replacements during construction as warranted and will be rebuilt to original condition or better post-construction.

Direct impacts to the public, commercial, and institutional land use will be minimized through construction design measures. Most roadways will be bored underneath during construction eliminating direct disturbance to the roadway and vegetation. Potential traffic impacts are discussed further within Community Impact Section 7.7 – Transportation.

After construction, impacts to land uses along the pipeline will be negligible. Operations and maintenance activities may be needed but will be isolated and infrequent. As per the negotiated ROW agreements, no structures will be allowed within the permanent ROW, but overall land use will be allowed to revert to pre-construction conditions.

There are no aboveground facilities proposed for the Project within South Dakota; therefore, there will be no permanent impacts or changes to land use associated with the Project.

6.8.6 Local Land Use Controls

The Applicant will design, construct, operate, and maintain the pipeline and valve stations in compliance with applicable zoning and county permit requirements. The Applicant may request variances and/or special use permits, as necessary. The Applicant recognizes the existence of South Dakota Codified Law (SDCL) 49-41B-28, regarding local ordinances and their application to the project, and reserves the right to request the Commission to invoke its provisions during the proceedings in this application should the need present itself.

6.9 Cultural Resources

Cultural resources surveys for the Project began in May 2022 and are ongoing in accordance with Section 106 of the *National Historic Preservation Act* and the guidelines set forth by the South Dakota State Historical Society. The objective of these investigations was to identify and record the extent and temporal affiliation of archaeological resources within the respective survey areas and to assess their potential eligibility for inclusion in the National Register of Historic Places (NRHP).

In November of 2021, consultation was initiated with the South Dakota SHPO, and a scope of work was submitted that detailed the Level III intensive survey plan for the Project. The scope of work included a survey plan, provided a tiered survey approach for high and moderate probability areas as delineated through extensive background research, and the survey of any identified NRHP properties to comply with SDCL 1-19A-11.1. To provide additional information to the SHPO, GIS modeling based on environmental factors and known cultural resources was used to create a predictive model for locations of unidentified

cultural resources. Survey investigations were tailored to this model where possible in conjunction with landowner access permission.

Prior to initiating fieldwork, literature reviews were conducted for the proposed project route and reroutes. The initial review was undertaken in December 2021 through the Archaeological Resources Management System (ARMS). Subsequent reviews were conducted for the POET Hudson and POET Chancellor laterals in August 2022 utilizing ARMS.

No properties listed in the NRHP are located within a 1-mile radius of the Project centerline. The literature reviews identified 81 previous surveys, 32 archaeological sites, 73 historical structures and, 10 cemeteries within a 1-mile radius of the Project route. The 32 previously recorded archaeological sites consisted of 19 prehistoric sites, 10 historic-age Euro-American sites, and 3 sites with unknown cultural affiliation. Of the cultural resources identified, none of the previously recorded sites, historic-age structures, or cemeteries overlap the survey corridor. Only one of the recorded bridges is located within the survey corridor.

Archaeological investigations were conducted began in May 2022 and are ongoing. Fieldwork consists of pedestrian reconnaissance, shovel test excavation and test unit excavation. The artifacts collected during these surveys are washed, analyzed, and catalogued.

The ROW for the proposed Project traverses approximately 111.9 miles in South Dakota. Cultural resource surveys have concentrated on federal jurisdictional areas and high and medium probability areas. Approximately 17.9 miles (16.0 percent) of the survey corridor have been surveyed for cultural resources. The remaining 93.4 miles of the Project could not be surveyed due to lack of access or were located outside of high and medium priority areas. Additional cultural resource surveys for the unsurveyed jurisdictional areas and areas of high and medium probability are planned after harvest in 2022 and will follow the same strategy outlined in this summary.

As of July 2022, a total of 15 cultural resources consisting of 14 archaeological sites and 1 isolated find were documented within the ESA in South Dakota. Of these, 13 sites have been recommended as not eligible for inclusion in the NRHP. These sites, consisting of historic and prehistoric artifact scatters, that do not possess adequate data or integrity to meet NRHP criteria. One site, a historic railroad, is being recommended as eligible for inclusion in the NRHP, and one prehistoric site currently has an undetermined NRHP eligibility. Navigator intends to avoid both sites via HDD.

Reports detailing the results of the comprehensive field investigations will be prepared in accordance with the SHPO Guidelines, including all relevant archaeological site, architectural resource, cemetery, and historic property inventory forms. Background and context overviews; results of the archaeological, and architectural; and recommendations for additional investigations to determine NHRP eligibility and/or avoidance measures will be included. Should potentially eligible or eligible resources not be avoided, a work plan will be submitted for SHPO comment and approval prior to testing or mitigation measures. An Unanticipated Discovery Plan will also be submitted for SHPO approval.

6.10 Water Quality

The Applicant is permitting the Project through the USACE nationwide permit program for Section 404/10 of the CWA impacts. The nationwide permit program establishes general permits for projects with minimal adverse impacts to jurisdictional waters of the U.S. The SDDANR has previously issued Section 401 water quality certification for projects that qualify for nationwide permit coverage and outlined BMPs for work of this nature.

The CWA, Section 303(c), requires each state to review, establish, and revise water quality standards for all surface waters within the state. To comply with this requirement, the SDDANR has classified surface waters by beneficial uses, as provided in Exhibit C, Table C-2.

All streams in South Dakota are assigned the beneficial uses of irrigation waters, and of fish and wildlife propagation, recreation, and stock watering waters, unless otherwise stated in the South Dakota Administrative Rule Chapter 74:51:03. State toxic pollutant standards for human health and aquatic life are presented in Exhibit C, Table C-2. Site specific uses for waterbodies and their tributaries are available in South Dakota Administrative Rule Chapters 74:51:03:07, 74:51:03:18, 74:51:03:20, and 74:51:03:25.

Under Section 303(d) of the CWA, states are required to identify waterbodies that are not attaining their designated use(s) and develop total maximum daily loads (TMDLs), which represent the maximum amount of a given pollutant that the waterbody can assimilate and still meet its designated use(s). Regulatory programs for water quality standards include default narrative standards, non-degradation provisions, a TMDL regulatory process for impaired waters, and associated minimum water quality requirements for the designated uses of listed surface waterbodies within the state.

The Project will cross four 303(d) listed waterbodies, as shown in Table 6.10-1.

Table 6.10-1
EPA Listed 303(d) Listed Waterbodies

County	Pipeline/ Approximate Milepost	Waterbody Name	State Water Quality	Supports Use Designation	Source of Impairment	Priority[1]
Brookings	Aurora to Hartley 3.4	Medary Creek (SD-BS-R-MEDARY_01)	Warmwater Marginal Fish Life	Full Support	N/A	High
			Limited Contact Recreation	Nonsupport	*E.coli*	
			Fish and Wildlife Propagation, Recreation, and Stock Watering	Full Support	N/A	
			Irrigation waters	Full Support	N/A	
Moody	Aurora to Hartley		Domestic Water Supply	Full Support	N/A	Low

Table 6.10-1
EPA Listed 303(d) Listed Waterbodies

County	Pipeline/ Approximate Milepost	Waterbody Name	State Water Quality	Supports Use Designation	Source of Impairment	Priority[1]
	10.6 23.6	Big Sioux River (SD-BS-R-BIG_SIOUX_07)	Warmwater semipermanent fish life propagation waters	Nonsupport	Methylmercury /Total Suspended Solids	
			Limited Contact Recreation	Full Support	N/A	
			Fish and Wildlife Propagation, Recreation, and Stock Watering	Nonsupport	Methylmercury	
			Irrigation Waters	Full Support	N/A	
Minnehaha	Aurora to Hartley 48.7	Split Rock Creek (SD-BS-R-SPLIT_ROCK_02)	Warmwater semipermanent fish life propagation waters	Full Support	N/A	High
			Immersion recreation waters	Nonsupport	*E.coli*	
			Limited-contact recreation waters	Nonsupport	*E.coli*	
			Fish and Wildlife Propagation, Recreation, and Stock Watering	Full Support	N/A	
			Irrigation waters	Full Support	N/A	
	Aurora to Hartley 56.6	Beaver Creek (SD-BS-R-BEAVER_02)	Warmwater Marginal Fish Life	Full Support	N/A	Low
			Limited Contact Recreation	Nonsupport	*E.coli*	
			Fish and Wildlife Propagation, Recreation, and Stock Watering	Full Support	N/A	
			Irrigation waters	Full Support	N/A	
Lincoln	POET Chancellor Lateral 22.5	Big Sioux River (SD-BS-R-BIG_SIOUX_14)	Warmwater semipermanent fish life propagation waters	Nonsupport	Total Suspended Solids	High
			Immersion recreation waters	Nonsupport	*E.coli*/fecal coliform	
			Limited-contact recreation waters	Nonsupport	*E.coli*/fecal coliform	
			Fish and Wildlife Propagation, Recreation, and Stock Watering	Full Support	N/A	
			Irrigation waters	Full Support	N/A	

Source: SDDANR, 2022f; SDGFP, 2022c

The Big Sioux River, Beaver Creek, Medary Creek, and Split Rock Creek will be crossed via HDD; therefore, no impacts on these waterbodies are anticipated.

6.11 Air Quality

Air quality impacts from the Project are largely limited to air emissions during construction of the pipeline. The Applicant will comply with all federal and state air quality regulations that are applicable to the proposed facilities along the pipeline and will take necessary steps to ensure that they do not cause an exceedance of any air quality standard. Potential sources of air emissions have been identified and air quality permitting requirements for proposed facilities will be fully assessed to identify any air permits that will need to be obtained from SDDANR.

Potential sources of emissions along the proposed pipeline route can be classified as one of two types: mobile or fugitive. Potential emissions during construction include both mobile source and fugitive emissions. Mobile sources of emissions are the tailpipe emissions from employee commuter vehicles and construction equipment to be used during construction of the pipeline and other ancillary facilities. No permitting is required for mobile sources.

Fugitive sources of emissions include particulate emissions from paved and unpaved roadways and the particulate emissions from soil disturbance during construction activities. Fugitive particulate emissions from roadways consist of heavier particles and tend to settle out of the atmosphere by gravity within a few hundred yards. Therefore, these fugitive particulate emissions will be limited to the immediate vicinity of the Project; impacts to the surrounding region will be negligible.

The quantity of fugitive dust emissions from soil-disturbance activities will depend on the moisture content and texture of the soils that will be disturbed, the type of construction equipment utilized, and the frequency and duration of precipitation events. Fugitive dust emissions during construction will be restricted to the brief construction period along each segment of the Project route, with construction impacts diminishing once construction activities end and after disturbed areas are reclaimed. Dust impacts can be minimized by utilizing dust minimization techniques, such as minimizing exposed soil areas, reducing vehicle driving speeds, and watering the ROW as needed.

The L/R site and MLVs, which are electric powered, are not expected to produce emissions.

7.0 COMMUNITY IMPACT

The following information identifies the potential impacts on commercial and industrial sectors, housing, land values, labor market, health facilities, energy, sewage and water, solid waste management facilities, fire protection, law enforcement, recreational facilities, schools, transportation facilities, and other community and government facilities or services.

7.1 Population

Construction of the Project in South Dakota is proposed to commence in the second quarter of 2024, with phased in-service commencing in the first quarter of 2025. and restoration activities to continue through second quarter of 2025. Approximately 1,000 construction

personnel at peak construction are anticipated for the pipeline construction spread in South Dakota. It is estimated that up to approximately 30 – 50 percent of the total construction work force could be hired locally. The Project construction period will be relatively short in any given area and it is estimated that most non-local workers will not be accompanied by their families during their employment, and therefore should not have any long-term impacts on local population.

During operations, Applicant would seek to recruit local candidates to fill permanent positions to operate and maintain the Project. We anticipate up to 10 permanent jobs in South Dakota, which if hired locally or not, would not have a noticeable effect on the population; the small number of potential permanent jobs suggests that the Project will not have long-term impact on income, occupational distribution, or cohesion of the local communities.

7.2 Employment

Approximately 500 construction personnel (Applicant employees, contractor employees, construction inspection staff, and environmental inspection staff) are anticipated to be associated with each construction spread that commences in South Dakota and terminates into Iowa. The current construction plan anticipates involves 2 concurrent construction spreads in 2024 in South Dakota, for up to approximately 1,000 construction personnel. If construction spreads are constructed sequentially the number of personnel would decrease, respectively.

During construction of the Project, there is likely to be a positive impact on income with an estimated $202 million increase in labor income. Once the pipeline has been built, the yearly operations and maintenance spending will add up to 10 permanent jobs, at an average wage of $68,300, and approximately $9.7 million in additional production and sales to the South Dakota economy.

Selection of the construction contractors is expected to occur after receipt of all material permits necessary to construct the HGPS. However, Applicant has already executed a letter of intent with four trade Unions (Laborer' International Union of North America, International Union of Operating Engineers, International Brotherhood of Teamsters, and United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry) to ensure highly skilled and qualified labor resources to support construction of the Project.

The number of construction workers that will be hired locally will vary by contractor and by the availability of residents who are specifically trained and available for pipeline construction employment. The net economic effect on local communities should be positive for the duration of the construction period. Construction of the Project will result in short-term benefits to the local communities.

7.3 Taxes

SDCL Chapters 10-13 requires that the Department of Revenue annually determine the assessed value of the pipeline for ad valorem property tax purposes. Assessed value must be determined using the cost, market, and income approaches to appraisal per SDCL Chapter 10-37-9.1.

The increased economic activity that results during construction of the pipeline will generate additional sales, use, gross receipts, and lodging taxes of approximately $3.1 million. for state and local governments. Once the pipeline goes into operation South Dakota State and local governments will realize ongoing annual sales, use, and gross receipts of approximately $0.9 million. Also, during the first full year of operation the pipeline will generate an estimated $2.97 million in new property taxes for local governments.

7.4 Housing

Applicant anticipates that most non-local Project workers will use temporary housing, such as rental units, hotels, motels, campgrounds, and recreational vehicle parks. In the South Dakota counties that the pipeline corridor crosses, there are approximately 2,500 available rental units, 4,700 motel rooms, and 54 recreational vehicle parks (Homeland Infrastructure Foundation-Level Data, 2022) within approximately 10 to 40 miles of the pipeline corridor. During the construction months between Q2 2024 and Q1 2025, it is estimated that up to approximately 1,000 pipeline construction personnel will be in South Dakota at peak construction periods. It is anticipated that most of the temporary workers will seek housing in the more populated, service-oriented towns located within a reasonable commuting distance to the work site.

Applicant seeks to recruit local candidates to fill permanent operation and maintenance positions as part of its commitment to the communities in which its are located. It is anticipated that approximately 2 to 4 permanent employees will be hired in South Dakota, therefore long-term housing impacts will be negligible.

7.5 Public Health and Safety

Health Facilities

Applicant anticipates local healthcare facilities will provide services to workers throughout construction and operation of the Project. Applicant's commitment to health and safety policies and procedures should limit the need for use of local health facilities during the temporary influx of non-local construction workers during Project construction. Due to the small number of permanent employees required for operations and the goal of hiring local, no effect on health services and facilities are anticipated during operation of the Project.

Energy

Temporary short-term use of power will be through existing facilities and is anticipated to be minimal. Applicant is working with electric providers to determine the need for any supplemental facilities to power the capture facilities and will enter into appropriate agreements to ensure safe and reliable power is provided with negatively affecting other parts of the grid.

Sewage and Water

The influx of up to 1,000 temporary construction workers into the five Project counites is not anticipated to overtax sewage and water facilities during construction. Existing (hotels, offices, etc.) and portable facilities (along the ROW) and the local communities should not

see any impact on their public utilities as a result of the Project. No effects from operation of the Project are anticipated.

Solid Waste Management

Construction of the Project will result in an increased use of solid waste management facilities from pipeline construction office(s), influx of temporary construction workers utilizing local lodging and services, and solid wastes from pipeline construction. Non-hazardous pipeline construction wastes that will be generated includes human waste, general refuse, pipe banding and spacers, waste from coating products, welding rods and blast media, timber skids, cleared vegetation, stumps, rock and other miscellaneous construction debris.

Generally, trash will be removed from the construction ROW on a daily basis. Vegetation, rock and other natural debris will be removed from the construction ROW by the completion of clean-up. All trash and wastes will be removed from construction areas upon the completed of work at each location. All waste materials will be disposed at licensed waste disposal facilities.

All drill cuttings and drilling mud will be disposed of in an approved manner at approved locations in accordance with applicable regulations. Human waste will be handled and disposed of exclusively by means of portable self-contained toilets during construction, which will be managed in accordance with all regulations.

All waste, which contains (or at any time contained) oil, grease, solvents, or other petroleum products will be segregated for handling and disposed of in accordance with federal and state regulations.

Solid waste from operation and maintenance of the Project are not anticipated.to be notable. Significant impacts to solid waste management during construction nor operation are not anticipated.

Fire Protection and Law Enforcement

All employees and contractors must abide by all federal, state and local laws. If any infractions occur, the employees or contractors will be subject to termination. Local law enforcement agencies should have adequate full- and part-time law enforcement officers to accommodate the additional labor personnel as a result of the Project, although the Project can result in a minor short-term increase in workloads for those agencies. Law enforcement agencies in the communities adjacent to the Project should not experience a significant impact from the pipeline workers.

Response times to construction related incidents in remote areas may be prolonged given communication, dispatch, and travel time considerations. Applicant will work with the local law enforcement, fire departments, and emergency medical services to coordinate effective emergency response.

Operational safety is of the utmost importance to the Applicant. Upon completion of construction of the Project, in addition to the remote-control capabilities described in Section 5.0 – Operations and Maintenance, the Applicant and its contractors will maintain emergency response equipment and personnel at strategic points along the route and train

their personnel to respond to any pipeline emergencies. In addition, the Applicant will coordinate with and train local emergency responders and authorities in preventing and responding to any pipeline-related problems. An emergency response plan for the HGPS is being prepared and will be in place prior to commencing operation. In development of that plan, the Applicant will be coordinating with existing emergency response departments along, and in proximity to, the route to ensure they and any mutual aid parties are informed of the operation risks and equipped to respond in the unlikely event of a release. Throughout operation of the system, the Applicant will conduct and host emergency response drills with its employees and local emergency responders, which will include planned drills, desktop events, and simulated field events.

7.6 Recreation

South Dakota has extensive recreational opportunities including fishing, boating, hunting, hiking, camping, biking, and bird watching. The most heavily used areas will most likely occur where public access exists. Hunting is a popular activity throughout the state. The SDGFP manages numerous game species including big and small game, and waterfowl. Popular species hunted in South Dakota include whitetail deer, wild turkey (*Meleagris gallopavo*), ring-necked pheasant, bobwhite quail, and duck species such as mallard (*Anas platyrhynchos*) and lesser scaup. The Project does not cross any federal or state-owned wildlife lands; however, construction of the Project may temporarily limit access to certain private areas used for recreation. Walk-in access areas are found throughout the State of South Dakota, allowing public hunting access on private lands. The program is managed by the SDGFP. Walk-in access areas available to hunters vary from year to year, as available funds and contracts with landowners vary. Construction of the Project may limit access to these walk-in areas and private lands. In addition, hunting opportunities may be interrupted within the vicinity of construction activities; however, possible access and hunting opportunity impacts will be temporary and localized to the area of construction. No impacts associated with the operation of the Project are anticipated. Hunting is compatible with normal operation of the pipeline.

In addition to hunting, fishing and boating are popular recreation activities within South Dakota. The majority of the State's fishing and boating public access areas are located along big rivers and lakes (SDGFP, 2022). No impacts or limited access to any fishing or boating areas are anticipated as result of construction or operation of the Project. In the unlikely event an impact should occur, it will be short-term and infrequent, therefore impacts to fishing and boating is not anticipated.

7.7 Transportation

Transportation routes to be utilized during construction will be established through consultation with state and local agencies as necessary. Applicant and/or its selected Contractor expects to enter into road use agreements with and obtain any necessary permits from applicable state and local highway agencies.

Applicant will seek to have the Commission set a road bond in accordance with SDCL 49-41B-38.

The Department of Commerce and Regulation, Division of Highway Patrol has jurisdiction over the federal and state highway system in South Dakota and is responsible for issuing

transportation-related permits to accommodate construction vehicles and traffic. Applicant has initiated contacts with local permitting authorities for the purpose of establishing timelines for road permit approvals.

During construction, traffic on highways and secondary roads will be increased due to the construction activities and due to the influx of construction workers. Hauling of line pipe and most construction equipment will be within state road and bridge weight limits. There will be isolated hauling of equipment that will require special permits for weight and/or width. There may be an increased temporary demand for permits for vehicle load and width limits. The primary impact will be deterioration of gravel or stone surfaced roads requiring grading and/or replenishment of the surface materials. Applicant expects to be responsible for repairing damage to roads and restoring them to pre-construction condition or as agreements with the affected agencies dictate.

7.8 Noise

The HGPS does not involve the addition any pump or booster facilities that would emit noise; therefore, all impacts on noise will be temporary and associated with the operation of equipment during construction. In general, construction activities will occur from 7:00 AM to 7:00 PM, or daylight hours, Monday through Sunday. In order to address the potential for delays associated with weather and site conditions, the Applicant may need to conduct construction activities between the hours of 7:00 PM and 7:00 AM on an as needed basis. And occasionally HDD activities are required to run longer hours or even continuously to maintain the integrity of the drilled pathway for safe and proper installation of the respective pipe section.

The increase in noise during construction will only be noticeable within a short distance of the Project area, and no impacts on residential or commercial areas are anticipated due to the proximity of these areas to the HGPS and the short-term duration of construction activities.

7.9 Commercial and Industrial Sectors

Operation of the Project will promote, and benefit participants in, the ethanol industry in South Dakota, Iowa, and other Midwest states by providing a cost-effective solution to reducing their carbon emissions and thereby enhancing their long-term environmental and economic sustainability and viability. Further, by supporting the viability and sustainability of ethanol producers, the Project will help to maintain the markets for ethanol feedstocks (e.g., corn) that the ethanol industry provides for farmers and other agricultural participants in South Dakota and other Midwest states. The ability to capture CO_2 emissions at ethanol facilities and transport the CO_2 to a sequestration location or to locations for other carbon management purposes will assist ethanol facilities to meet required or voluntary carbon reduction objectives, and to do so in a more efficient manner than other alternatives, thereby supporting the long-term sustainability and viability of these facilities. In addition, capturing and sequestering CO_2, which the Heartland Greenway Pipeline System will facilitate, affords ethanol producers the opportunity to use federal tax incentives, participate in voluntary carbon offsets markets, and receive premium prices for their products that are produced through low carbon-emitting processes. Participating facilities can be eligible for a federal tax credit of up to $85 per metric ton of sequestered CO_2,

adjusted annually for twelve years at an established inflation factor, and ethanol facilities that reduce emissions will have the potential to achieve a premium in Low-Carbon Fuel Standard markets. Thus, the Project will help ethanol facilities in South Dakota and other Midwest states remain competitive with other fuel sources and support the long-term viability of this important Midwest industry.

Additionally, the Project will result in direct and indirect economic benefits in South Dakota and along the HGPS route (from both the initial construction and long-term operation of the Project) through ROW payments to landowners, construction, operation and maintenance jobs, purchases of components, materials and supplies, and related income, sales, and use taxes. The local economies are anticipated to benefit from temporary hiring of local employees and from the influx of non-local construction workers. The South Dakota portion of the Project area is anticipated to cost $142 million. Economic benefits to local commercial businesses are anticipated to increase through the sales of food, lodging, services, and goods that will be generated by the temporary non-local work force. Applicant will purchase goods, including construction materials and other supplies for the Project from local businesses. Local purchases for construction will include consumables, fuel, equipment maintenance, equipment rental, space leasing, miscellaneous construction-related materials such as office supplies, and some medical/dental needs. The direct spending within the state will cause indirect and induced spending of $9.7 million. Construction of the Project will positively impact industries that produce components of the Project and will create high paying jobs and economic growth across the Project footprint, including in South Dakota.

7.10 Agriculture

By supporting the long-term sustainability, viability, and cost-competitiveness of the Midwest ethanol industry, the Project will also strengthen and support Midwest agriculture, including in South Dakota. A strong, competitive ethanol industry is beneficial for Midwest agriculture. The ethanol industry is a significant purchaser of South Dakota corn, consuming more than 50% of South Dakota's corn crop each year (SD Corn, 2020). A stable ethanol industry provides South Dakota farmers with a reliable market for their corn and underpins the value of six million acres of South Dakota farmland those crops are grown on.

Pastureland and Rangeland

Temporary impacts to pastureland and rangeland areas will result during construction from vegetation and ground disturbances; however, with properly implemented construction mitigation and restoration measure, these areas should recover in one to three growing seasons after. Long-term or permanent impacts are not anticipated. The agricultural mitigation measures discussed above in section 6.8.5 will be applied to pasture and range lands. Additional measures within the ECG (Exhibit E) will be implemented to minimize potential impacts to agricultural areas. Applicant will reseed disturbed areas with seed mixtures approved by the landowner or local NRCS offices.

Restrictions on rangeland may be necessary during construction by such as relocating herds to non-construction parcels or otherwise restricting livestock from the construction workspaces. Landowners will be compensated for the temporary loss of land use. Grazing

practices should return to normal after vegetation is re-established; therefore, permanent impacts are not anticipated.

Access to and work on pastureland and rangeland will be in accordance with all easement agreements and applicable permits and regulations.

Cropland

With the easement process, Applicant will pay for crop damages anticipated to result from construction of the project; if damages in exceedance of the pre-paid amount is experienced as a result of construction, Applicant will further compensate the landowner. Permanent impacts on agricultural production are not anticipated since the pipeline will be buried deep enough to allow continued use of the land. Agricultural production across the permanent ROW will be allowed to resume following final clean-up of pipeline construction. Applicant will restore all lands equivalent to adjacent off-ROW lands and will provide compensation for crop loss, diminished productivity, and other damages to farmland. Reclamation and revegetation of croplands impacted by Project construction will be in accordance with applicable easement agreements. Land will be recontoured to pre-existing conditions as practical and disturbed structures, ditches, bridges, culverts, fences, and slopes will be restored. Measures within the ECG (Exhibit E) will be implemented to minimize potential impacts to agricultural areas.

Access to and work on croplands will be in accordance with all applicable permits and regulations.

7.11 Local Land Values

Navigator commissioned a detailed HGPS-specific market study that analyzed local property values based on a multitude of factors to guide the base offers for easements and other land rights. The Project will be constructed in predominantly rural, agricultural areas. Property values are not usually affected by the installation or presence of a pipeline in rural areas, which was reflected in the market study. Applicant will provide monetary compensation for pipeline ROW easements from landowners. Construction activities will create short-term impacts to land and property, including drainage tiles, irrigation systems, and fences. Any damage to land or property as a result of Project construction will be corrected by Applicant, through direct repair of damages, and/or compensation to the landowner.

Few land use restrictions will be put into place for the duration of the pipeline's operation. These are largely limited to restrictions on the placement of dwellings or other structures on the permanent pipeline ROW for the duration of the ROW easement. The 50-foot-wide operational ROW will be maintained in an open condition for the life of the pipeline facilities.

7.12 Local Land Use Controls

Applicant will design, construct, operate, and maintain the pipeline and valve stations in compliance with applicable zoning and county permit requirements. Applicant may request variances and/or special use permits, as necessary. Applicant recognizes the existence of SDCL 49-41B-28, regarding local ordinances and their application to the project, and reserves the right to request the Commission to invoke its provisions during the proceedings in this application should the need present itself.

7.13 Reducing Negative Impacts on The Community

Applicant's commitment to comply with and often exceed regulatory requirements applicable to pipeline construction and operation results in the protection of the communities along which its facilities operate. The design, operation, and installation of the pipeline is subject to regulatory inspection, including PHMSA inspectors operating from the agency's Central Regional office in Kansas City, Missouri. Additionally, Applicant's partnership with the trade unions demonstrates its assurance to using highly skilled and trained individuals to properly install a safe system that will meet the purpose of the Project while protecting the public and environment. Further, Applicant's implementation of its robust third-party inspection program utilizing construction, safety, agricultural, and environmental inspectors not affiliated with the pipeline contractors help assure compliance with Applicant's contract specifications for pipeline construction, which incorporate all regulatory and industry requirements.

The line will go into service only after thorough inspection and review to verify compliance with all applicable Federal and state statutes and regulations and all Project construction standards and requirements. Exhibit D depicts many ways in which the HGPS is being designed, constructed and operation in exceedance of the federal regulations in 49 CFR. Part 195.

Detailed discussion Applicant's operational safety measures is provided in Section 5.0 – Operations and Maintenance.

8.0 FUTURE ADDITIONS AND MODIFICATIONS

The initial design capacity of the HGPS, which is not expected to be fully utilized by the 21 facilities at the outset of the Project, will be capable of capturing and transporting up to 10 million metric tons (MMT) of carbon dioxide per year and can be expanded to its full potential capacity of up to 15 MMT of carbon dioxide per year by adding booster stations along the initial system and laterals to connect any new customer locations. Applicant currently an agreement with one of its customers to connect to an additional 10 facilities in a later phase of development, three of which are in South Dakota, and Applicant anticipates entering into agreements with additional CO_2-emitting facilities for future development phases. The timing of additional phases has not yet been established.

9.0 ADDITIONAL INFORMATION

Exhibits A, B, C, D, and E contain Project information referenced throughout this application.

10.0 TESTIMONY AND EXHIBITS

The Applicant is submitting the prepared direct testimony of the witnesses listed below in support of this application. Additional testimony will be submitted in accordance with the procedural schedule established by the SD PUC. The Applicant reserves the right to designate additional witnesses, as necessary. Table 10.1-1 provides the sections of the application each witness is responsible for.

Table 7.13-1
Project Witnesses

Section	Subsection	Witness
1.0 Project Description	1.1 Project Purpose	David Giles
	1.2 Demand for the Project	David Giles Elizabeth Burns-Thompson
	1.3 Project Overview	David Giles
	1.4 Project Ownership	David Giles
	1.5 Name of Participants	David Giles
	1.6 Project Cost	David Giles
	1.7 Project Schedule	David Giles
	1.8 Other Required Permits and Approvals	Brandi Naughton
2.0 Project Siting and Route	2.1 Project Siting	Stephen Lee
	2.2 Route Selection and Alternatives	Stephen Lee
	2.3 Proposed Route	Stephen Lee
3.0 Design and Engineering	3.1 Technical Specifications and Design Capacity	Stephen Lee
4.0 Construction	N/A	Stephen Lee
5.0 Operations and Maintenance	5.0 Operations and Maintenance	Stephen Lee
5.0 Operations and Maintenance	5.1 Decommissioning	Vidal Rosa
6.0 Environmental Impacts	6.1 Topography	Brandi Naughton
	6.2 Geology	Stephen Lee
	6.3 Soils, Erosion, and Sedimentation	Brandi Naughton
	6.4 Hydrology	Brandi Naughton
	6.5 Terrestrial Wildlife and Ecosystems	Brandi Naughton
	6.6 Aquatic Wildlife and Ecosystems	Brandi Naughton
	6.7 Threatened and Endangered Species	Brandi Naughton
	6.8 Land Use	Brandi Naughton
	6.9 Cultural Resources	Brandi Naughton
	6.10 Water Quality	Brandi Naughton
	6.11 Air Quality	Brandi Naughton
7.0 Socioeconomics	7.1 Population	Stephen Lee
	7.2 Employment	Stephen Lee Jonathon Muller
	7.3 Taxes	Jonathon Muller
	7.4 Housing	Stephen Lee
	7.5 Public Health and Safety	Stephen Lee
	7.6 Recreation	Brandi Naughton
	7.7 Transportation	Stephen Lee
	7.8 Noise	Brandi Naughton
	7.9 Commercial and Industrial Sectors	Elizabeth Burns-Thompson
	7.10 Agriculture	Elizabeth Burns-Thompson
	7.11 Local Land Values	Stephen Lee
	7.12 Local Land Use Controls	Stephen Lee
	7.13 Reducing Negative Impacts on The Community	Stephen Lee
8.0 Future Additions and Modifications	N/A	David Giles
Exhibit A - Project Mapping	N/A	Brandi Naughton

Table 7.13-1
Project Witnesses

Section	Subsection	Witness
Exhibit B - Process Flow Diagram	N/A	Stephen Lee
Exhibit C – Supplementary Data Tables	N/A	Brandi Naughton
Exhibit D- 49 CFR 195 Exceedance Table	N/A	Stephen Lee Vidal Rosa
Exhibit E - Environmental Construction Guidance and Project Typicals	N/A	Brandi Naughton

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