Federal Energy Regulatory Commission
Office of Energy Projects
Washington, DC 20426

Environmental Assessment

COLUMBIA TO EASTOVER PROJECT

Dominion Carolina Gas Transmission, L.L.C.

February 2016

Docket No.:
CP15-504-000

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas Branch 4
Dominion Carolina Gas
Transmission, L.L.C.
Docket No. CP15-504-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this environmental assessment (EA) for the Columbia to Eastover Project (Project) proposed by Dominion Carolina Gas Transmission, L.L.C. (DCG) in the above-referenced docket. DCG requests authorization to construct, install, own, operate and maintain certain facilities located in Calhoun, Richland, and Lexington Counties, South Carolina. This Project would enable DCG to provide 18,000 dekatherms per day of firm transportation service to the existing International Paper Plant in Eastover, South Carolina. Specifically, the proposed Project includes the following facilities:

- 28 miles of new 8-inch-diameter pipeline;
- a pig launcher;
- a joint new pig receiver and meter and regulator station;
- cathodic protection; and
- eight mainline valves along the pipeline.

The EA assesses the potential environmental effects of the construction and operation of the Project in accordance with the National Environmental Policy Act. The FERC staff concludes that approval of the proposed Project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment.

The EA has been placed in the public files of the FERC and is available for public viewing on the FERC's website at www.ferc.gov using the eLibrary link. A limited number of copies of the EA are available for distribution and public inspection at:

Federal Energy Regulatory Commission
Public Conference Room
888 First Street NE, Room 2A
Washington, DC 20426
(202) 502-8371

Copies of the EA have been mailed to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; libraries in the Project area; and parties to this proceeding.

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that your comments are properly recorded and considered prior to a Commission decision on the proposal, it is important that the FERC receives your comments in Washington, DC on or before **March 21, 2016**.

For your convenience, there are three methods you can use to submit your comments to the Commission. In all instances, please reference the Project docket number (CP15-504-000) with your submission. The Commission encourages electronic filing of comments and has dedicated eFiling expert staff available to assist you at (202) 502-8258 or efiling@ferc.gov.

(1) You may file your comments electronically by using the eComment feature, which is located on the Commission's website at www.ferc.gov under the link to Documents and Filings. An eComment is an easy method for interested persons to submit brief, text-only comments on a project;

(2) You may file your comments electronically by using the eFiling feature, which is located on the Commission's website at www.ferc.gov under the link to Documents and Filings. With eFiling, you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "eRegister." You will be asked to select the type of filing you are making. A comment on a particular project is considered a "Comment on a Filing"; or

(3) You may file a paper copy of your comments at the following address:

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Although your comments will be considered by the Commission, simply filing comments will not serve to make the commentor a party to the proceeding. Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to

Rule 214 of the Commission's Rules of Practice and Procedures (18 CFR 385.214).[1] Only intervenors have the right to seek rehearing of the Commission's decision.

Affected landowners and parties with environmental concerns may be granted intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which would not be adequately represented by any other parties. **You do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC**, or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP15-504). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to http://www.ferc.gov/docs-filing/esubscription.asp.

[1] See the previous discussion on the methods for filing comments.

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TECHNICAL ACRONYMS AND ABBREVIATIONS

Addendum Report	Phase I Archaeological Survey for Dominion Carolina Gas, Eastover 8-Inch Pipeline, Calhoun and Richland Counties, South Carolina Addendum I: Mill Creek and Bell Grove Reroutes, Richland County
AQCR	Air Quality Control Region
ATWS	additional temporary workspace
CAA	Clean Air Act
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CNG	compressed natural gas
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
DAK	DAK Americas, LLC
dB	decibels
dBA	decibels on the A-weighted scale
DCG	Dominion Carolina Gas Transmission, LLC
Director	Director of the Office of Energy Projects
Dt/d	Dekatherms per day
EA	Environmental Assessment
EI	Environmental Inspector
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
FERC Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
GHG	greenhouse gases
GIS	geographic information system
HCA	high consequence areas
HDD	Horizontal directional drill
HDD Contingency Plan	Horizontal Directional Drilling Contingency Plan
HUC	Hydrologic Unit Code
Inadvertent Release Plan	Response Plan for Handling Inadvertent Releases of Drilling Fluid
L_{dn}	day-night averaged sound level
L_{eq}	24-hour equivalent sound level
M&R	Meter and Regulator Station

MACT	maximum achievable control technology
MAOP	maximum allowable operating pressure
MLV	mainline valve
MMI	Modified Mercalli Intensity
MP	milepost
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
OEP	Office of Energy Projects
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
Phase I Report	Phase I Cultural Resources Survey Report for Dominion Carolina Gas Columbia to Eastover Project, Calhoun and Richland Counties, South Carolina
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM_{10}	particles with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to 2.5 microns
Project	Columbia to Eastover Pipeline Project
psig	pounds per square inch gauge
PSS	palustrine scrub-shrub wetland
PUB	open-water pond
RCCC	Richland County Conservation Commission
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDNR database	SCDNR Natural Resources Heritage Trust database
SCE&G	South Carolina Electric and Gas
Secretary	Secretary of the Commission
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide

Spill Plan	Spill Prevention and Hazardous Materials Management Plan
SWPPP	Stormwater Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEIA	U.S. Energy Information Administration
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compounds

A. PROPOSED ACTION

1. Introduction

On May 29, 2015, Dominion Carolina Gas Transmission, L.L.C. (DCG) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) in Docket No. CP15-504-000. DCG seeks a Certificate of Public Convenience and Necessity (Certificate) under Section 7(c) of the Natural Gas Act (NGA) to construct and operate a natural gas transmission pipeline and related facilities in South Carolina. DCG's proposed system expansion, referred to as the Columbia to Eastover Project (Project), includes construction and operation of approximately 28 miles of new 8-inch-diameter natural gas pipeline and associated ancillary facilities in Calhoun and Richland Counties, South Carolina. The proposed Project facilities would generally be within Calhoun and Richland Counties with the exception of a section of access road that crosses a portion of Lexington County. The pipeline would interconnect with the existing DCG 20-inch-diameter Salley to Eastman Line at the existing DAK Americas, LLC (DAK) facility in Calhoun County and terminate at the proposed joint pig receiver and International Paper Meter and Regulator Station (M&R station) within the International Paper facility in Richland County. The Columbia to Eastover Project would provide 18,000 dekatherms per day (Dt/d) of firm transportation service to the International Paper facility, with a proposed in-service date of August 12, 2016.

We[1] prepared this Environmental Assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations for implementing NEPA under Title 40 of the Code of Federal Regulations Parts 1500-1508 (40 CFR 1500-1508), and the Commission's implementing regulations under 18 CFR 380.

The assessment of environmental impacts is an integral part of FERC's decision on whether to issue DCG a Certificate to construct and operate the proposed facilities. Our principal purposes in preparing this EA are to:

- identify and assess potential impacts on the natural and human environment that would result from the proposed action;
- assess reasonable alternatives to avoid or minimize adverse effects on the environment; and
- identify and recommend mitigation measures, as necessary, to minimize environmental impacts.

The EA would be used by the Commission in its decision-making process to determine whether to authorize DCG's proposal. Approval would be granted if, after consideration of both environmental and non-environmental issues, the Commission finds the Project is in the public convenience and necessity.

2. Purpose and Need

DCG states the purpose of the Project is to provide the International Paper facility with 18,000 Dt/d of firm natural gas transportation service to serve two boilers at the International Paper facility in Richland County, South Carolina. International Paper currently uses one fuel oil powered lime kiln, one compressed natural gas (CNG) fueled lime kiln, one biomass powered boiler, and one coal powered boiler at this facility. If supplied with natural gas, International Paper would convert one coal powered boiler

[1] "We," "us," and "our" refer to the environmental staff of the Office of Energy Projects.

from coal to natural gas in order to comply with maximum achievable control technology (MACT) environmental air quality standards, as required under 40 CFR 63, Subpart DDDDD, also known as the "Boiler MACT" air quality regulations. According to International Paper in its letter to FERC on December 16, 2015, the CNG fueled lime kiln would also switch to use natural gas from the Project and CNG would no longer be trucked into the facility.

Under Section 7 of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decision on technical competence, financing, rates, market demand, gas supply, natural and human environmental impacts, long-term feasibility, and other issues concerning a proposed project.

3. Public Review and Comment

On June 12, 2015, the Commission issued a *Notice of Application* for the Project under Docket No. CP15-504-000. On July 16, 2015, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed Columbia to Eastover Project and Request for Comments on Environmental issues* (NOI)[2]. The NOI was mailed to 622 interested parties, including federal, state, and local government representatives and agencies; elected officials; affected landowners; environmental and public interest groups; potentially interested Native American tribes; and local libraries and newspapers. The NOI was published in the Federal Register on July 22.

Prior to filing its application for the Project, DCG held two town hall meetings in the vicinities of its proposed facilities to share information about the Project with the public. One meeting was held on August 19, 2014, at the Eastover Community Center in Eastover, Richland County, South Carolina. The second meeting was held on August 21, 2014, at the Garners Ferry Road Community Center in Hopkins, Richland County, South Carolina.

In response to the NOI, the Commission received a total of 22 comment letters, including 7 letters received prior to the issuance of the NOI. Comments were received from three federal agencies (the U.S. Fish and Wildlife Service [USFWS], U.S. Environmental Protection Agency [USEPA], and an individual on behalf of the McEntire Joint National Guard Base); one state agency (the South Carolina Department of Natural Resources [SCDNR]); the Richland County Conservation Commission; five non-governmental organizations; and eight affected landowners and individuals.

A number of the comments expressed general opposition to the Project, route, and access roads; however, many comments addressed specific environmental resources. In addition to general opposition to the Project, we received requests for minor and major reroutes of the pipeline to utilize more existing utility rights-of-way and a reduction in number and length of access roads. The primary environmental issues raised by the commenters are potential impacts on the following resources: sensitive fish species, the Cowasee Basin, specific archaeological sites, local tree farms, and recreation areas.

The issues identified in the environmental comments during our public scoping process are summarized in table A-1 and addressed, as applicable, in relevant sections of this EA.

[2] The NOI and all written comments are part of the public record for the Project and are available for viewing on FERC's website, www.ferc.gov, under Docket No. CP15-504, using the link called "eLibrary."

Table A-1

Issues Identified Prior to and During the Public Scoping Process

Issue	EA Section Addressing Issue
Proposed Action	
Purpose and need for the Project	A.2
Use of new and existing utility rights-of-way	A.5
Project construction schedule	A.6
Pipeline construction methods through waterbodies	A.7.2
Geology	
Impacts from flooding	B.1.1
Water Resources and Wetlands	
Support of horizontal directional drilling (HDD) crossings of waterbodies	B.2.2
Conservation of the Congaree and Wateree River basins	B.2.2
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Proximity of the proposed contractor yard increasing wildlife strike hazard	B.3.3
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Protection for shortnose and Atlantic sturgeon and striped bass	B.4.1
Analysis of impacts on state-listed fish species	B.4.1
Completion of survey for rough-leaved loosestrife	B.4.2
Land Use, Visual Resources, and Recreation	
Impacts from access roads and easements	B.5.1
Impacts on tree farms	B.5.1
Concerns about fractionalization/fragmentation of lands	B.5.1
Potential impact on 100-year-old trees on private property	B.5.2
Impacts on St. Matthews Baptist Church	B.5.3
Concerns about impacts on Cowasee Basin	B.5.3
Public lands such as Cabin Branch	B.5.3
Impacts on the Cloaninger property and slave dwellings	B.5.3
Socioeconomics	
Environmental justice analysis requested	B.6
Cultural Resources	
Impacts on land formerly owned by President Martin Van Buren's daughter	B.7
Accuracy of historical surveys	B.7.1
Request to avoid or minimize impacts on the Waverly Place and Rainbow Plantations	B.7.2
Consideration of the Kensington Plantation for mitigation of impacts on other sites	B.7.2
Safety and Security	
Security concerns during construction near McEntire Joint National Guard Base	B.9.2
Alternatives	
Consideration for bringing in natural gas by truck or rail	C.2
Consideration for route variations	C.4
Analyze route utilizing more existing utility rights-of-way	C.3

4. Proposed Facilities

The Project would consist of the following:

- 28 miles of new 8-inch-diameter pipeline;
- a pig[3] launcher at the Project starting point;
- a new joint pig receiver and M&R station at the Project terminus;
- eight mainline valves (MLVs) along the pipeline; and
- cathodic protection.

Figure 1 shows the overall Project location.

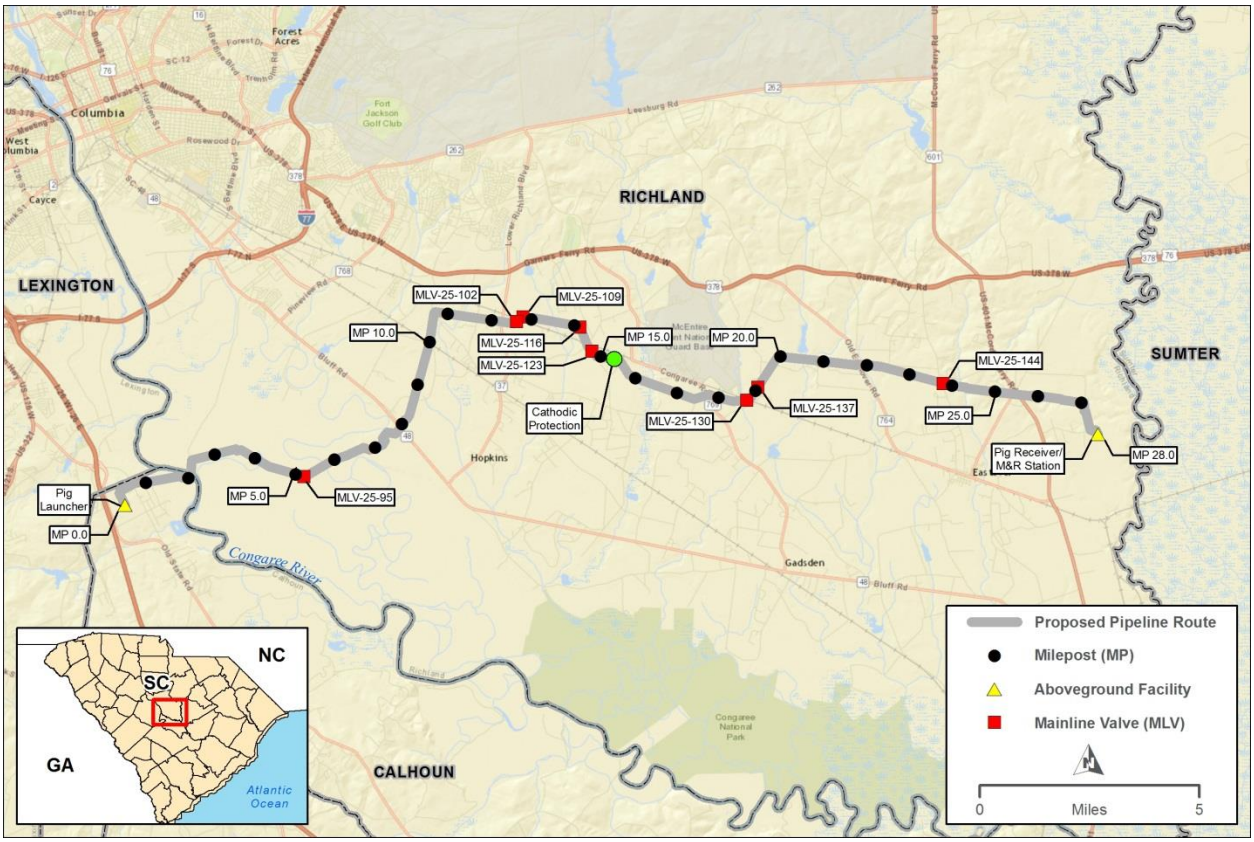


Figure 1: Project Overview

[3] A "pig" is a device to clean or inspect the pipeline. A pig launcher/receiver is an aboveground facility where pigs are inserted or retrieved from the pipeline.

4.1 Pipeline Facilities

The proposed Project would interconnect with the existing DCG 20-inch-diameter Salley to Eastman Line at the existing DAK facility in Calhoun County and terminate at the proposed M&R station in Richland County. The pipeline would have a maximum allowable operating pressure (MAOP) of 1,200 pounds per square inch gauge (psig) and would be constructed of carbon steel.

4.2 Aboveground Facilities

Minor aboveground facilities would be installed within or adjacent to the proposed pipeline, including a pig launcher at milepost (MP) 0.0 at the DAK facility and a joint pig receiver and M&R station at MP 28.0 (see figure 1). Eight MLVs would be installed at intervals along the pipeline and within the permanent right-of-way. Pipeline markers and cathodic protection stations would be installed along the length of the pipeline at fences, roadways, pipeline crossings, canals, and any other locations deemed necessary to identify the route and location of the pipeline. One cathodic protection station would be within the operational right-of-way at about MP 15.3. The pig launcher, cathodic protection, and the joint pig receiver and M&R station would be within permanent easements outside of the pipeline operational right-of-way. Land requirements specific to the aboveground facilities are summarized in table A-4 in section A.5.2 below.

5. Land Requirements

The Project would affect a total of about 357.5 acres of land during construction, including the pipeline construction right-of-way, additional temporary workspace (ATWS) areas, a contractor yard, access roads, and new aboveground facilities. Following construction, about 186.4 acres would be restored to pre-construction uses. The remaining 171.1 acres would be maintained for operation of the proposed Project. Land requirements for the entire Project are summarized in table A-2.

Table A-2

Summary of Land Requirements for the Project

Facility	Land Affected During Construction (acres)	Land Affected During Operation (acres)
Pipeline [a b]	237.6	119.7
Access Roads [c]	109.8	50.5
Contractor Yard	8.8	0.0
Aboveground Facilities	1.3	0.9
Project Total	**357.5**	**171.1**

a Does not include acreage of lands that would be avoided through use of trenchless construction methods.
b Includes ATWS.
c Includes the use of previously existing roads.

5.1 Pipeline Facilities

Pipeline construction would require a construction right-of-way width of 75 feet. The construction right-of-way would generally consist of 50 feet that would be retained as new permanent right-of-way and 25 feet of temporary construction workspace. The new permanent right-of-way would be maintained for pipeline operations in an herbaceous state, except in wetlands and adjacent to

waterbodies; the remainder of the construction right-of-way would be revegetated and allowed to revert to pre-existing conditions and previous land uses. Wetlands and waterbodies crossed by the horizontal directional drill (HDD) construction method would not be maintained as permanent right-of-way during operation, resulting in no temporary or permanent change in land use. Annual agricultural crop production would be allowed to resume within the permanent right-of-way in agricultural areas after construction; however, tree growth within the operational right-of-way, including tree farms, would be prohibited. Appendix A shows DCG's typical construction right-of-way configurations.

DCG would collocate about 75 percent of the pipeline with existing powerline and gas pipeline corridors. Table A-3 summarizes areas of new pipeline collocation with existing rights-of-way. Appendix A shows the typical construction right-of-way, including that for the collocated portions of the pipeline.

Table A-3

Summary of Pipeline Collocation with Existing Utility Rights-of-Way

Start MP	End MP	Length of Collocation (miles)	Existing Rights-of-Way
0.0	0.9	0.9	Powerline
1.2	1.9	0.7	Powerline
2.0	5.3	3.3	Powerline
7.5	8.0	0.5	Powerline
8.0	12.3	4.3	Powerline/Gas Pipeline
12.3	12.5	0.2	Powerline
13.0	14.1	1.1	Powerline
15.9	17.4	1.5	Powerline
18.7	20.8	2.1	Powerline
20.9	25.0	4.1	Powerline
25.2	27.1	1.9	Powerline
27.3	27.8	0.5	Powerline
Project Total		**21.1**	

ATWS would also be required for construction at waterbody crossings, road crossings, railroad crossings, and where special construction techniques would be used (e.g. HDD locations). Although DCG has identified areas where ATWS would be required (appendix B), additional or alternative areas could be identified in the future due to changes in site-specific construction requirements or contractor preference. In such cases DCG would be required to file information on each of those areas for Commission review and approval prior to use. ATWS would be returned to pre-construction conditions and land uses following construction.

5.2 Aboveground Facilities

Aboveground facilities include the new joint pig receiver and M&R station, pig launcher, and MLVs. The MLVs would be constructed within or adjacent to the pipeline right-of-way and are accounted for in the land requirements listed in table A-4.

Table A-4

Aboveground Facilities Proposed for the Project

Facility	MP	Acres	County
Pig Launcher	0.0	0.2	Calhoun
MLV-25-95	5.2	0.1	Richland
MLV-25-102	12.6	0.1	Richland
MLV-25-109	12.8	0.1	Richland
MLV-25-116	14.1	0.1	Richland
MLV-25-123	14.7	0.1	Richland
Cathodic Protection	15.3	0.1	Richland
MLV-25-130	18.7	0.1	Richland
MLV-25-137	19.0	0.1	Richland
MLV-25-144	23.8	0.1	Richland
Joint Pig Receiver and M&R Station	28.0	0.2	Richland
Project Total	**-**	**1.3**	**-**

5.3 Contractor yard

DCG proposes to use one 8.8-acre contractor yard for equipment, pipe and materials storage, parking, and a temporary field office. It is an open / industrial parcel of land, located north of the Project corridor near MP 18.3. It has been previously used as a steel mill, which is currently abandoned. The contractor yard is identified on Figure 1. DCG would grade and add gravel to minor sections of the contractor yard as needed for equipment and material storage. Once construction is complete, the gravel would be left in place in accordance with the landowner agreement. If additional pipe storage, contractor yards, or contractor offices are identified as being necessary, DCG would be required to file information on each new facility for Commission review and approval prior to use.

5.4 Access Roads

DCG has identified a total of 65 access roads that would be required for the Project (appendix C). Forty would be permanent and used for operation of the facilities while the remaining 25 would be temporary during construction and restored as applicable to permit requirements and landowner agreements. Of the 65 access roads, DCG would construct 8 new access roads, with 6 being relatively short, temporary roads that would span less than 0.1 mile. The remaining 57 access roads to be used for the Project are existing roads and would be improved, widened, graded, and/or graveled as needed for Project use. Two access roads would require improving or replacing existing culverts. The new temporary access roads developed for the Project would be converted back to their existing land use (existing condition or better) after construction is completed. The construction and use of temporary access roads along the pipeline route would affect about 59.3 acres of land. Temporary, permanent, existing, and new access roads proposed for the Project are also shown in figures 2A and 2B below.

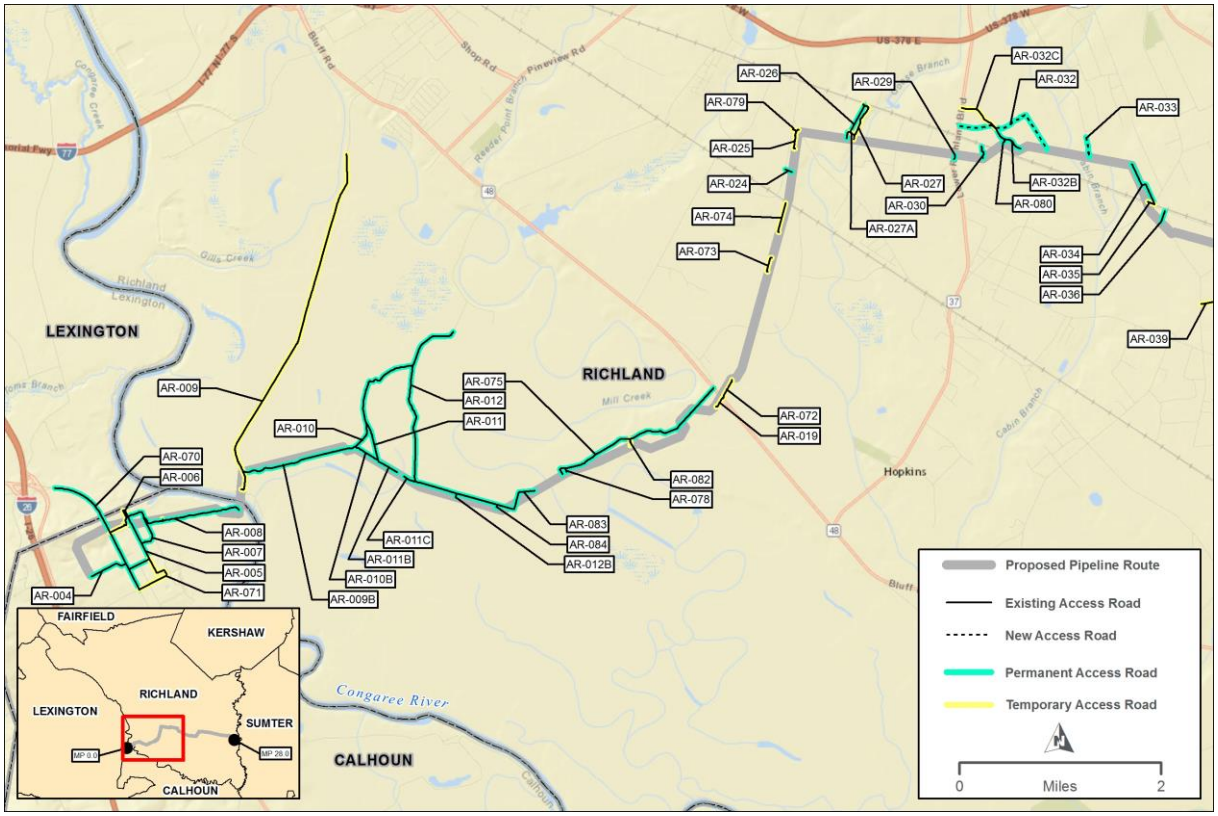


Figure 2a: Access Roads (MP 0.0 to 15.0)

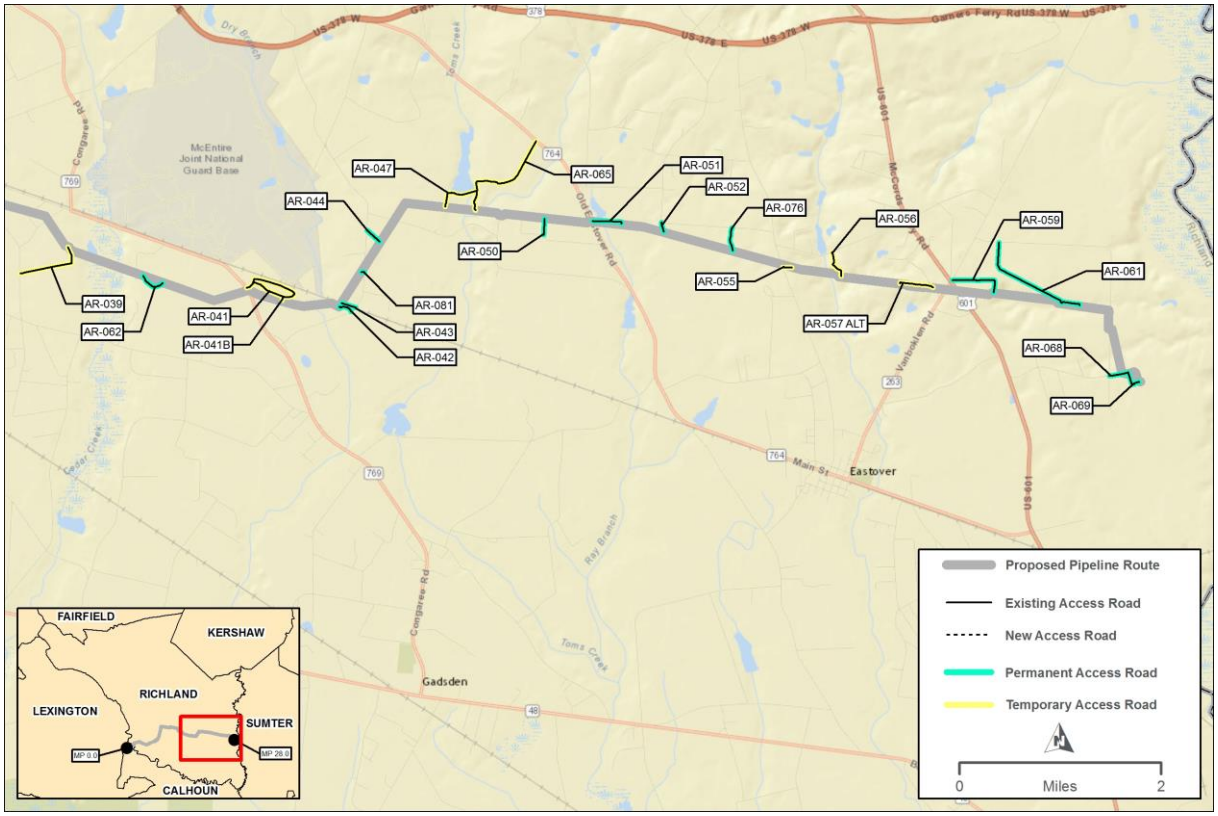


Figure 2b: Access Roads (MP 15.0 to 28.0)

6. Construction Schedule and Workforce

DCG anticipates that construction would commence in May 2016, subject to receiving the necessary permits and approvals that in-service would occur in August 2016. The overall construction and initial restoration activities are expected to take approximately 4 months.

DCG estimates that two or three construction spreads would be required for the Project. DCG states that construction would require about 275 workers (maximum at one time). DCG does not anticipate the need for additional permanent staff for operation of the new Project facilities, and no new operations offices or district offices would be required for operation of the facilities.

7. Construction, Operations, and Maintenance Procedures

The Project would be designed, constructed, operated, and maintained in accordance with applicable requirements defined by U.S. Department of Transportation (USDOT) regulations in 49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards; the Commission's Siting and Maintenance Requirements in 18 CFR 380.15; and other applicable federal and state safety regulations.

Generally, installation of the pipeline would be conducted using conventional overland construction techniques, where each of the construction spreads (crews) would proceed along the pipeline right-of-way in one continuous operation, with the entire process coordinated to minimize the total amount of time a tract of land is disturbed. There are several sensitive resources along the route that could be impacted by overland construction. Around these areas DCG has proposed use of 33 HDD crossings to construct 28 percent of the pipeline which would require sustained drilling at the entry locations and would avoid overland disturbance. DCG would comply with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan) and FERC *Wetland and Waterbody Construction and Mitigation Procedures* (FERC Procedures). The FERC Plan and Procedures provide a set of construction and mitigation measures developed to minimize the potential environmental impacts of the construction of pipeline projects in general. DCG has not requested any alternative measures to the FERC Plan or Procedures, except for one ATWS location within 50 feet of a wetland discussed in section B.2.3.

DCG would also implement additional construction, restoration, and mitigation plans prepared for the Project. These plans include the following: *Response Plan for Handling Inadvertent Releases of Drilling Mud (Inadvertent Release Plan), Horizontal Directional Drilling Contingency Plan (HDD Contingency Plan), Spill Prevention and Hazardous Materials Management Plan (Spill Plan), Access Road Plan, Site-specific HDD Crossing Plans, Stormwater Pollution Prevention Plan (SWPPP), Non-Native Invasive Species Management Plan, Pre- and Post- Construction Well Monitoring Plan, Alternating Current Mitigation Report/Plan, Residential Construction Plans, and the Plan and Procedures for the Unanticipated Discovery of Cultural Resources.* We have reviewed DCG's general construction and mitigation plans and find them acceptable except for the *Inadvertent Release Plan* and *HDD Contingency Plan* discussed further in section B.1.1. Plans not attached to this EA are available for viewing on our website (eLibrary under Docket No. CP15-504-000).

7.1 General Pipeline Construction Procedures

Figure 3 is a depiction of a typical pipeline construction sequence. Prior to construction, DCG's survey contractor would stake the pipeline centerline and the limits of the construction right-of-way, ATWS, road crossings, and access roads. Wetland boundaries and other environmentally sensitive areas would also be marked at this time.

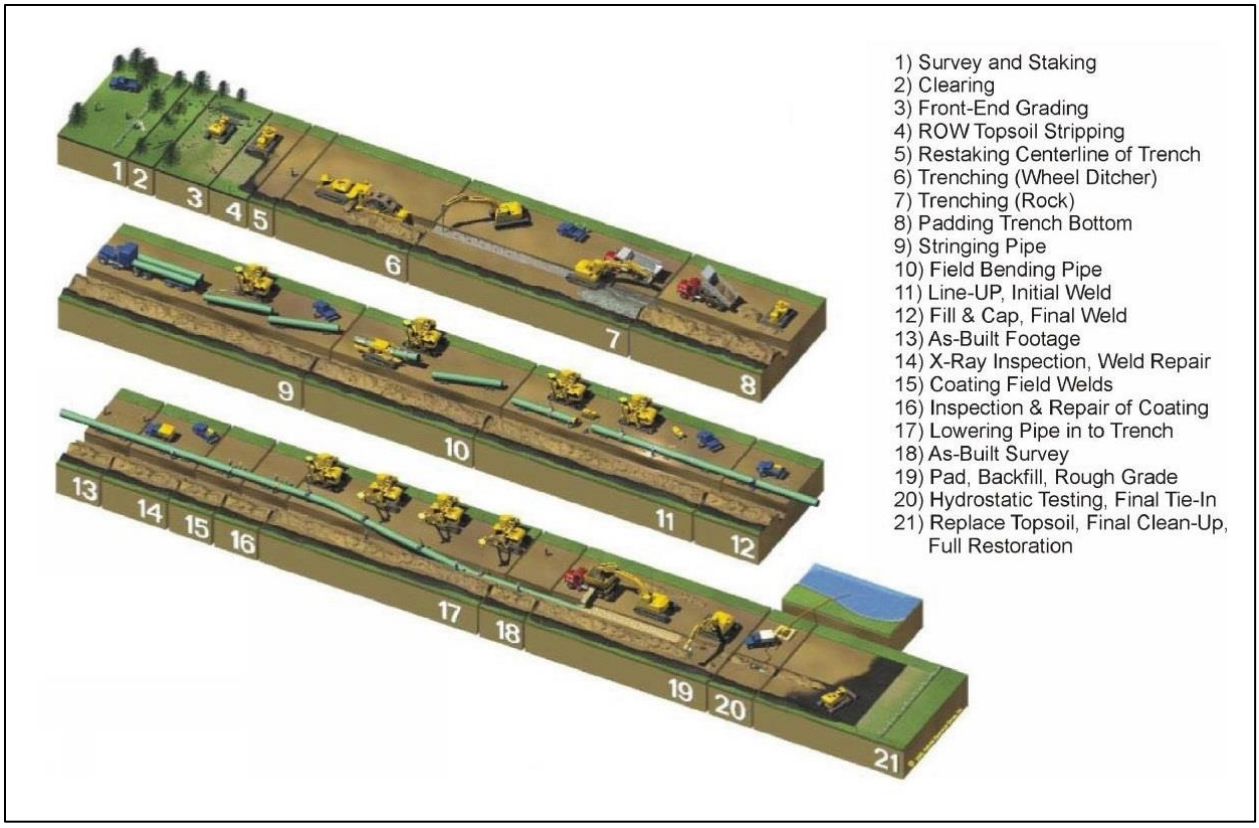


Figure 3: Typical Pipeline Construction Sequence

Prior to ground-disturbing activities, DCG would call the "Dig-Safe" call system for South Carolina, as well as the national "811" call system to identify underground utilities and foreign pipelines so their locations could be marked. In agricultural areas, any drain tile locations would be identified. Temporary soil erosion and sedimentation control devices would be installed as needed in accordance with the FERC Plan and Procedures and the DCG's *SWPPP*. These erosion and sediment controls would be inspected and maintained throughout construction and restoration of the Project.

A clearing crew would then clear workspaces of vegetation and other obstacles, as needed. DCG would minimize tree removal during construction to the extent practicable and refrain from any mechanized clearing under areas to be constructed using a trenchless method (e.g. HDD or boring, described below). Cleared vegetation and stumps would be chipped (except in wetlands), hauled off site to a commercial disposal facility, or otherwise handled per individual landowner agreements. Following clearing, the construction right-of-way and ATWS areas would be graded where necessary to provide a level work surface. Topsoil would be segregated in accordance with the FERC Plan and Procedures in agricultural lands (except pasture) including hayfields. Where topsoil segregation is required, DCG would segregate up to 12 inches of topsoil. In accordance with the FERC Plan and Procedures, DCG would stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

Individual sections of pipe (generally in 40-foot lengths) would be trucked to the construction right-of-way and strung along the trench line in a single, continuous line. Typically, a track-mounted, hydraulic pipe-bending machine would tailor the shape of the pipe to conform to the contours of the terrain. Then the sections of pipe would be welded together into long 'strings' and placed on temporary supports. DCG would conduct and inspect welding in compliance with 49 CFR 192 and American

Petroleum Institute standards. All pipe welds would be inspected for defects, and repaired, if necessary, and coated to prevent corrosion prior to lowering the pipe into the trench.

DCG would trench with crawler-mounted, rotary wheel-type trenching machines or track-mounted excavators. Excavated soils would be stockpiled along the right-of-way, typically on the side of the trench away from the construction traffic and pipe assembly area (the "spoil side"). In agricultural, residential, and unsaturated wetland areas (if applicable), subsoil would be stored adjacent to the trench within the construction right-of-way limits and maintained separately from topsoil piles. Trench depths would be established to provide the required cover between top of the pipe and finished ground surface (4 feet).

Prior to lowering in the pipe, DCG would inspect the trench to ensure it is free of rocks and other debris that could damage the pipe or its protective coating. The pipe would then be lifted from the temporary supports and lowered into the trench using side-boom tractors. As necessary, trench breakers (stacked sand bags or foam) would be installed in the trench around the pipe in steeply sloped areas to control movement of subsurface water along the pipeline. After lowering-in, final welds would be made in the trench by the tie-in crew. Once the tie-ins are complete, the trench would be backfilled with previously excavated materials. If excavated materials are not suitable (e.g., they are rocky), the pipeline would be covered with more suitable fill or protected with a rock shield. "Padding material" would either be imported or obtained by removing rock from the excavated spoil to backfill the area immediately around and 8 inches above the pipe in the trench. Topsoil would not be used to pad the pipe. Previously graded areas would be returned to original contours as near as practicable with a slight crowning at the top of the trench to allow for settling.

After backfilling, the pipeline would be hydrostatically tested in sections to ensure the system is free from leaks and provides the required safety at operating pressures. DCG would obtain the test water from existing municipal water supplies and/or filtered river water. Hydrostatic testing would be conducted in accordance with the requirements of USDOT pipeline safety regulations (49 CFR 191), South Carolina Department of Health and Environmental Control (SCDHEC) permits, and DCG testing specifications. No chemical agents would be used to dry the pipeline after testing. Upon completion of hydrostatic testing, DCG would discharge the test water in accordance with the FERC Plan and Procedures and the requirements of the applicable federal and state discharge permits.

DCG would begin final cleanup after backfilling and as soon as weather and site conditions permit. Efforts would be made to complete final cleanup (including final grading and installation of permanent erosion control devices) within 20 days after the trench is backfilled. In residential areas, cleanup and restoration would take place within 10 days of backfilling.

During cleanup, DCG would remove construction debris from the right-of-way. Pre-construction contours would be restored as closely as possible to pre-existing conditions. Segregated topsoil would be returned to the stripped area, and permanent erosion controls would be installed. DCG would implement revegetation measures in accordance with permit requirements, the FERC Plan and Procedures, and based on consultations with the local soil conservation authority or other applicable agencies. Private and public property modifications, such as fences, gates, driveways, and roads disturbed by construction, would be restored to original or better condition.

Markers showing the location of the pipeline would be installed at fence and road crossings to identify DCG as the owner and convey emergency information in accordance with applicable government regulations, including USDOT safety requirements.

7.2 Special Pipeline Construction Procedures

Waterbody Crossings

DCG would cross waterbodies using open-cut or trenchless construction methods (appendix D-1). If needed, DCG would install and maintain construction bridges at waterbodies with discernible flow at the time of crossing. DCG would adhere to the measures specified in the FERC Procedures, as well as any additional requirements specified in federal or state waterbody crossing permits.

In accordance with the FERC Procedures, DCG may also cross waterbodies that are dry or non-flowing at the time of crossing using standard upland construction techniques, provided that the environmental inspector (EI), as discussed in section A.7.4, verifies that water would be unlikely to flow between initial disturbance and final stabilization of the feature.

Open-Cut Methods

An open-cut waterbody crossing is typically conducted with backhoe-type excavators operating from the banks of the waterbody that would open a trench while flow is maintained across the trench. Spoil excavated from the trench would be placed on the bank above the high water mark for use as backfill. A prefabricated segment of pipeline would then be placed into the trench using side-boom tractors. Once the trench is backfilled, the banks would be restored as near as practicable to pre-construction contours and stabilized. Stabilization measures would include seeding, installation of erosion control blankets, or installation of riprap materials, as appropriate. Excavated material not required for backfill would be removed and disposed of at upland disposal sites. Open-cut crossings generally are completed within 24 to 48 hours, depending on the size of the waterbody.

Dry crossing methods (flume or dam-and-pump) would be used at certain waterbodies with perceptible flow. A dry ditch crossing diverts or isolates flow during pipe installation. A flume crossing temporarily directs the flow of water through one or more flume pipes placed over the area to be excavated. Trenching would then occur across the waterbody and underneath the flume pipes without reducing downstream water flow. After pipeline installation, backfilling of the trench, and restoration of the stream banks, the flume pipes would be removed. This crossing method generally minimizes downstream turbidity during trenching by allowing excavation under relatively dry conditions.

Similar to the flume crossing method, the dam-and-pump method involves installing temporary dams upstream and downstream of the proposed waterbody crossing, typically using sandbags and plastic sheeting. Following dam installation, appropriately sized pumps with hoses would be used to transport the streamflow around the construction work area and trench. Additional pumps would be used to dewater the area between the dams. Intake screens would be installed at the pump inlets to prevent or limit entrainment of aquatic life, and energy-dissipating devices would be installed at the pump discharge point to minimize erosion and streambed scour. Trench excavation and pipe installation would then commence through the dewatered and relatively dry portion of the waterbody channel. After pipe installation, backfilling of the trench, and restoration of the stream banks, the temporary dams would be removed; and flow through the construction work area would be restored. This method is generally appropriate only for waterbody crossings where pumps can adequately transfer stream flow volumes around the work area and there are no concerns about sensitive species passage.

Excavated materials would be stored at least 10 feet from the edge of the waterbody, and temporary erosion control devices would be utilized to prevent the sediment from reentering the waterbody. The pipeline may be welded and lowered in, or a section of pipe long enough to span the entire crossing would be fabricated on one bank and either pulled across the bottom to the opposite bank,

floated across the stream, or carried into place and submerged into the trench. Where these methods are employed, ATWS would be required for assembly of the pipe strings and storage of the spoil. ATWS would be at least 50 feet from the edge of the waterbody in accordance with FERC Procedures. The trench would then be backfilled and the bottom of the watercourse and banks restored and stabilized.

Trenchless Construction Methods

Horizontal Directional Drill

HDD is a trenchless crossing method that may be used to avoid direct impacts on sensitive resources (such as waterbodies and wetlands) by drilling beneath them. HDD crossings for the proposed Project are listed in appendix E; specific crossings by waterbody are listed in appendix D.1. HDD installation would result in a pipe segment installed beneath the ground surface by pulling the pipeline through a predrilled bore hole. Although DCG has filed conflicting information as discussed in section B.2.2, we used the available information to determine that DCG would utilize the HDD method for 35 of the 61 waterbody crossings, including the Congaree River. In several instances, a single HDD would cross several waterbodies. DCG has prepared site-specific drawings for 33 HDDs (not all cross waterbodies); we have reviewed and generally find these plans acceptable.

To facilitate the HDD installations, DCG would hand-clear small trees, limbs, and brush from one to two paths of sufficient width, not to exceed 5 feet wide, above and parallel to each HDD centerline to allow placement and surveying of an electric guide wire coil (closed loop system) along the ground surface between each HDD entry and exit point. This coil 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 HDD crossings that parallel the centerline of an installation with a variable spacing or offset on each side of the centerline depending on the depth of the particular HDD installation. At waterbody crossings, clearing for guide wires would stop at the water's edge and could be suspended over the waterbody from HDD entry to exit.

To begin each crossing, a truck based drill rig would be placed on the entry side of the HDD and a small pilot hole would be drilled along a predetermined path beneath the waterbody. The pilot hole would be progressively enlarged through a process called reaming. A reaming tool would be installed at the end of the drill string on the exit side of the pilot hole, and then drawn back to the drill rig to enlarge the hole. Several passes with progressively larger reaming tools could be needed to enlarge the hole to a sufficient diameter to accommodate the pipeline. During this process, drilling fluid, or mud, consisting of in-situ material, bentonite clay, and water would be circulated through the hole to remove drill cuttings, lubricate the drill bit, and maintain the integrity of the hole. Once the reaming process is complete, a prefabricated segment of pipe would be attached to the drill string on the exit side of the crossing and pulled back through the hole toward the drill rig. DCG states that all drilling would take place during daylight hours. However, we recognize that field conditions may require continuous drilling to prevent HDD failure. This is discussed further in relation to construction noise impacts in section B.8.2.

Although the HDD method avoids impacts on water quality by precluding disturbance of the waterbody bed and banks, an inadvertent release of drilling mud could occur if drilling fluids escape the drill hole and are forced to the surface. In order to minimize potential impacts from inadvertent releases of drilling fluids, DCG would implement the measures identified in its *Inadvertent Release Plan* to contain and remove the drilling fluid. This method also generally requires ATWS for pullback areas that are larger than would be necessary for other methods. These areas are needed to accommodate drilling equipment and to fabricate the long pipe segment.

In the event an HDD is no longer feasible due to subsurface field conditions and a contingent crossing method is required, DCG has stated that it would obtain any necessary permits and approvals to use open-cut crossing methods, as discussed above. At a minimum, DCG would be required to request a construction variance from FERC to use an alternative crossing method. The Director of the Office of Energy Projects (OEP) (Director) would consider approval of variances upon DCG's written request, if the Director agrees that a variance:

- provides equal or better environmental protection;
- is necessary because a portion of the authorized proposal is infeasible or unworkable based on Project-specific conditions; or
- is specifically required in writing by another agency for a portion of the Project on its land or under its jurisdiction.

In addition, we have recommended in section B.1.1 that DCG revise its *Inadvertent Release Plan and HDD Contingency Plan* in regard to the conditions and number of attempts that would be completed before an HDD is abandoned and when the use of an alternate crossing method may be authorized.

Conventional Bore

Conventional bore crossings consist of excavating a pit on each side of the resource, placing boring equipment within the pits, boring a hole under the resource, and pulling a section of pipe through the hole. For long crossings, pipe sections would be welded into a pipe string before being pulled through the borehole. Conventional bore crossings for the proposed Project are included in appendix E.

Wetlands

DCG would delineate and mark wetland boundaries in the field prior to construction activities based on the FERC Procedures. According to the FERC Procedures, "Wetland" includes any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands. DCG would utilize the HDD method for crossing 71 wetlands and 4 open water features; specific crossings by wetland are listed in appendix F. In several instances, a single HDD would cross several features. As discussed above, we reviewed DCG's site-specific drawings for 33 HDDs and we generally find them acceptable. DCG would use the HDD method for all wetlands crossed by the pipeline, regardless of whether they are wet or dry at the time of construction. Minimal hand clearing would occur within these wetlands to lay electric guide wires between the HDD entry and exit points as discussed above. ATWS would be located at least 50 feet from the edge of wetlands in accordance with our Procedures, except one location discussed in section B.2.3.

DGC would also temporarily affect wetlands that are crossed by existing roads and wetlands that encroach into the construction right-of-way, but are not crossed by the pipeline, as discussed in section B.2.3. When necessary, timber mats would be placed in wetlands to minimize temporary impacts.

Road and Railroad Crossings

DCG proposes to cross all public roads, highways, and railroads with either the HDD or conventional bore method (appendix E), and proposes to cross dirt and gravel roads with the open-cut method. Prior to construction, DCG would locate existing underground utilities and make provisions for traffic management in work areas as necessary. During construction, DCG would incorporate measures to ensure that construction activities would not prevent the passage of fire and emergency vehicles. This could include the creation of temporary travel lanes during construction or the placement of steel plate

bridges to allow continued traffic flow during open trenching. Traffic lanes and residential access would be maintained except for the temporary periods essential for pipeline installation.

DCG would use the open-cut technique at private roads which require the cutting, removal and/or replacement of materials over the trench. The trench would then be excavated, the pipe would be installed, and the trench would be backfilled. Most open-cut road or driveway crossings would be completed and the surfaces restored within a few days. If necessary, DCG would reroute of traffic around the open trench during installation.

Conventional bore crossings consist of excavating a pit on each side of the road, placing boring equipment within the pits, boring a hole under the roadbed, and pulling a section of pipe through the hole. For long crossings, pipe sections would be welded into a pipe string before being pulled through the borehole. The minimum depth for road crossings would be approximately 6 feet from the road bed to the top of pipe and maintain a minimum depth of approximately 4 feet of cover under ditches along the roadside. Trench depths would also be at least 2 feet below existing utilities located under ditches and along the roadside. All crossings would be conducted in accordance with the local department of public works or the appropriate state department of transportation permit requirements. Roads crossed by bores typically do not require rerouting of traffic during installation.

Agricultural Areas

Construction in agricultural areas would be conducted in a manner similar to conventional pipeline construction with the implementation of additional measures to conserve topsoil. Cleared vegetation would be chipped and spread across the work area or hauled off-site to a commercial disposal facility unless other arrangements have been requested by or otherwise made with the landowner.

DCG would segregate up to 12 inches of topsoil, unless otherwise specified by the landowner. In areas where topsoil is less than 12 inches deep, an effort would be made to separate the actual amount of topsoil. DCG would store topsoil and subsoil in separate windrows along the construction right-of-way to prevent soil mixing, as shown in appendix A. Subsoil would be used to initially backfill the trench, and then the topsoil would be reapplied to the top of the trench and the graded right-of-way. DCG would remove rocks from the top 12 inches (topsoil layer) or from the existing subsoil horizon to a level such that the construction right-of-way is similar to surrounding areas. DCG would test the working side of the right-of-way for compaction and decompact, as necessary, in compliance with the FERC Plan. All excess rock would be removed from the surface of the subsoil or handled in accordance with individual landowner agreements prior to topsoil replacement.

Existing drainage and irrigation systems would be located prior to construction and would be monitored throughout construction and restoration to ensure no Project-related damage has occurred. Should Project activities affect these systems (including those beyond the trench line); DCG would repair them to their pre-construction level of functioning.

Residential

DCG identified five residences that would be within 50 feet of the construction work areas, two of which are located within the proposed right-of-way. DCG entered negotiations with the property owners in order to purchase these two residences. Negotiations were completed in October 2015 and DCG acquired both properties. Of the three remaining residences, two would be within 25 feet of the construction work area. DCG developed site-specific construction plans for the three affected residences within 50 feet of proposed construction work areas, which are provided in appendix H. See section B.5.1 for further information on construction methods to minimize impacts on residential areas.

7.3 Aboveground Facility Construction Procedures

DCG would carry out construction at the aboveground facilities in accordance with industry standards and the FERC Plan and Procedures. These minor facilities would be within the construction workspace for the pipeline, and the timing of the work would coincide with construction of the pipeline. Aboveground facility sites would be cleared and graded as necessary in preparation for construction. High pressure piping would be coated for protection against corrosion, and DCG would install a cathodic protection system to protect buried piping. Modifications at the aboveground facilities would be pressure tested prior to being put in-service. Final grading and landscaping of disturbed areas would be consistent with the FERC Plan for restoration of uplands.

7.4 Environmental Compliance Inspection and Monitoring

Prior to construction, DCG would conduct environmental training for company and contractor supervisory personnel to familiarize them with the Project's environmental requirements. The training program would focus on the requirements of the FERC Plan and Procedures, Certificate conditions, other Project-specific permit conditions, and Project-specific mitigation plans.

DCG would use at least one EI per spread during construction and restoration. The EI would have peer status with other inspectors and would report directly to DCG's Environmental Consultant. The EIs' responsibilities would include: (1) monitoring the contractor's compliance with environmental measures required by the Certificate, other environmental permits or approvals, and all other construction, restoration, and mitigation plans; (2) taking corrective actions, including issuing stop-activity orders to the contractor; (3) documenting compliance with environmental requirements; and (4) preparing status reports for submittal to the Commission's environmental staff.

DCG would conduct post-construction monitoring to document restoration and revegetation of the right-of-way and other disturbed areas, and to address any landowner concerns. DCG would monitor upland areas, as necessary, to determine the success of revegetation; at a minimum, inspections would occur after the first and second growing seasons following restoration and would continue until revegetation is successful. DCG would also submit quarterly activity reports to FERC to document the status of revegetation in disturbed areas. These reports would describe the results of post-construction inspections, any problem areas, and corrective actions taken. In addition, FERC staff would inspect the Project throughout construction to independently verify compliance with any Order the Commission would issue for the Project. FERC staff would continue to monitor and inspect the Project route until restoration and revegetation are deemed to be successful.

7.5 Operations and Maintenance

Throughout the life of the Project, DCG would periodically inspect the pipeline from the air and on foot to identify potential concerns that may affect the safety and operation of the pipeline, in accordance with USDOT regulations for pipeline operation. If pipeline patrols or vegetation maintenance crews identify areas on the right-of-way where erosion is occurring, DCG would repair existing erosion control devices or install additional devices as necessary to stabilize the area and prevent future erosion, throughout the life of the Project.

Forty permanent access roads would be utilized to access, inspect, repair, and maintain the permanent right-of-way (appendix C). Most of these roads are existing forest or farm roads that would require some minor modifications within the existing roadway corridor (blading and gravel placement in potholes, ruts, and rough areas) to create a more stable construction road. Comments were received expressing concern over the number and length of permanent and temporary access roads for the Project

and their impacts on resources. In response, DCG reduced the number of roads by 10 (from the 75 originally proposed) and reduced the length of two roads from its FERC filing in May 2015. The number of permanent access roads allows DCG to access all portions of the Project during construction and operation without having to establish access across wetlands and waterbodies that would otherwise be unaffected by use of the HDD method.

To maintain accessibility to the right-of-way and accommodate pipeline integrity surveys, vegetation along the permanent pipeline right-of-way would be cleared periodically using mechanical mowing or cutting where necessary. As required by the FERC Plan, routine vegetation maintenance would be conducted not more than once every 3 years to maintain the permanent right-of-way in an herbaceous to low scrub-shrub cover state. However, DCG may maintain a 10-foot-wide strip centered on the pipeline more frequently to allow for periodic corrosion and leak surveys. In accordance with the FERC Plan and Procedures, in no case would routine vegetation maintenance clearing occur between April 15 and August 1 of any year. This restriction is designed to minimize potential impacts on migratory birds during pipeline operation.

Except for orchards or tree farms, active cropland would be allowed to revert to pre-construction use for the full width of the right-of-way. In wetlands, DCG would not maintain vegetation during operation due to the use of HDD. If removal of trees in wetlands is required during operation, DCG would be required to request a variance from FERC for this activity.

DCG personnel also would perform regular operation and maintenance activities on equipment at aboveground facilities. The cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection. Annual MLV inspections would be conducted. DCG would test safety equipment to ensure proper functioning and correct identified problems.

8. Non-jurisdictional Facilities

Occasionally, projects have associated facilities that are constructed in support of the Project, but do not come under the jurisdiction of the FERC. Such non-jurisdictional facilities are often constructed upstream or downstream of the jurisdictional facilities for the purpose of delivering, receiving, or using the proposed gas volumes or may include utilities necessary for aboveground facility operation.

Three non-jurisdictional facilities have been identified for the Project. South Carolina Electric and Gas (SCE&G) would construct and operate three new electric lines to service the Project. One new powerline would service the proposed pig launcher facilities at MP 0.0; this new electric line would be about 3,280 feet. The second powerline would provide electric service to the proposed MLV-25-95 at MP 5.2. This new line would be about 1,500 feet and installed at a transformer adjacent to the proposed DCG right-of-way. The third powerline is estimated to be about 875 feet and would provide power to the joint pig receiver and M&R station at MP 28.0. Prior to construction, SCE&G would obtain any necessary federal and state permits. Construction of the SCE&G electric lines is expected to coincide with the Project construction in 2016.

In the interest of providing the public and the Commission with enough information to make a fully informed decision, the environmental data characterizing the impacts of these three non-jurisdictional facilities are included in our cumulative impacts analysis in section B.10.

9. Permits and Approvals

Table A-5 provides a list federal, state, and local permits related to construction and operation of the Project.

Table A-5

Permits, Approvals, and Consultations for the Project

Agency	Permit/Approval/Consultation	Status
Federal		
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity	Application submitted May 29, 2015.
U.S. Army Corps of Engineers (USACE)	Nationwide Permit 12	Application submitted May 28, 2015. Consultation ongoing.
U.S. Fish and Wildlife Service	Endangered Species Act – Section 7 Consultation	Consultations initiated May 2015 and are ongoing.
National Marine Fisheries Service	Endangered Species Act – Section 7 Consultation	Consultations initiated May 2015 and are ongoing.
National Park Service	Special Use Permit	Submitted Special Use Permit for crossing Congaree River Blue Trail on May 27, 2015.
State		
South Carolina Department of Health and Environmental Control (SCDHEC)	Section 401 Water Quality Certification	Application submitted joint with USACE application in May 28, 2015.
South Carolina Department of Natural Resources	State Endangered Species Consultation	Consultations initiated May 2015 and are ongoing.
South Carolina Department of Archives and History	National Historic Preservation Act Section 106 Consultation/Approval	Initial Phase 1 Cultural Resource Report submitted on May 26, 2015. Addendum I Report submitted on August 6, 2015. Consultation ongoing.
SCDHEC Richland County Portion	Notice of Intent (NOI) National Pollution Discharge Elimination System (NPDES) to Discharge Storm Water Associated with Construction Activities	Submittal pending the approval of the Richland County Municipal Separate Storm Sewer System.
SCDHEC Calhoun County Portion	NOI NPDES to Discharge Storm Water Associated with Construction Activities	Anticipated to be filed in first quarter 2016, but not yet submitted by DCG.
SCDHEC	NOI NPDES General Permit for Hydrostatic Test Water Discharges	Anticipated to be filed in first quarter 2016, but not yet submitted by DCG.
South Carolina Budget & Control Board	Application for State Easement to Tidelands or Submerged Lands (Navigable River Crossing)	Final executed agreement received on August 3, 2015.
South Carolina Department of Transportation	State Road Crossing Permits (Utilities)	Permit received July 1, 2015.
South Carolina Department of Transportation	State Road Crossing Permits (Driveways)	Application submitted on August 6, 2015.
Local		
Richland County	NOI to Discharge Storm Water Associated with Construction activities	Application submitted on August 4, 2015.

Table A-5

Permits, Approvals, and Consultations for the Project

Agency	Permit/Approval/Consultation	Status
Richland County	County Road Crossing Permits (Driveways & Utilities)	Application submitted on August 4, 2015.
Other		
Norfolk Southern Railway	Railroad Crossing Permit	Permit received September 28, 2015.
CSX Transportation	Railroad Crossing Permits	Three applications submitted on July 1, 2015. One crossing has been approved. One crossing was resubmitted on October 14, 2015. One crossing is pending approval.
SCE&G	Electric Transmission Crossing Permit	Application submitted on July 27, 2015.
SCE&G	Gas Transmission Crossing Permit	Application submitted on July 27, 2015.
Santee Cooper	Electric Transmission Crossing Permit	Received October 30, 2015.

B. ENVIRONMENTAL ANALYSIS

Construction and operation of the Project would have temporary, short-term, long-term, and permanent impacts. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting up to 3 years. Long-term impacts would eventually recover, but require more than 3 years. Permanent impacts are defined as lasting throughout the life of the Project.

1. Geology and Soils

1.1 Geology

Geologic Setting

The proposed Project would be within the Upper Coastal Region of the Coastal Plain Physiographic Province in South Carolina (SCDNR, 2015a). The Upper Coastal Plain is defined by Cretaceous to Early Neogene clastic fluvial, upper delta plain, and marine strata associated with depositional systems draining the Appalachians and Piedmont to the northwest (Shelley, 2007a). The Project area is within the Congaree sand hills and Richland red hills divisions of the Upper Coastal Plain which are characterized by rolling hills cut by steep drainages formed through fluvial incision and drainage development. The Project area is underlain by Piedmont-equivalent crystalline bedrock (Shelley, 2007a). The Congaree sand hills area roughly corresponds to the exposed Upper Cretaceous Tuscaloosa Formation which is composed of irregularly bedded sand, clay, and gravel. The Richland red hills are composed of hard red argillaceous sand of the Black Mingo Formation. Based on recent U.S. Geological Survey (USGS) quadrangle maps, elevation across the proposed Project area ranges from 100 to 300 feet above mean sea level (USGS, 2014a-f).

Mineral Resources

Extraction of mineral resources within the Project area is limited to non-fuel resources (U.S. Energy Information Administration [USEIA], 2013). In Richland and Calhoun counties, mineable mineral resources include shale, kaolin, sand, granite, and clay.

All mining within South Carolina is done via surface mining. DCG consulted with the SCHDEC, which indicated there are no known sites of ongoing resource extraction within the Project area. We reviewed USGS online mineral resource mapping which confirmed that no active surface mines are crossed by or are within 0.25 mile of the Project (USGS, 2014g). We conclude that construction of the Project would not affect any current mineral resources or mining activity.

Paleontology

DCG consulted the Earth and Oceanographic Science Department at the University of South Carolina and the South Carolina Geological Survey to determine whether paleontological resources could be impacted by the proposed Project. The South Carolina Geological Survey indicated that the Project area is unlikely to contain significant paleontological resources (Howard, 2015); therefore, we conclude there would be no impacts on regional paleontological resources.

Geologic Hazards

Geologic hazards are natural physical conditions that can result in damage to land or structures, and injury to the public. Potential geologic hazards may include seismic hazards such as earthquakes or surface faulting, soil liquefaction, flooding, landslides, and karst terrain.

Seismicity

Earthquake intensity is a measure of the extent to which man-made structures are damaged by a seismic event and generally depends on distance from the epicenter of that event. The Modified Mercalli Intensity (MMI) Scale ranges from an earthquake intensity value of I, in which the earthquake is not felt, to an intensity value of XII, in which damage is nearly total, large rock masses are displaced, and objects are thrown into the air (Cargo and Mallory, 1977).

Seismic hazards may be expressed as peak ground acceleration on firm rock. The USGS (2015c) has developed a means of generating estimated MMI based on instrumental ground motion recordings such as peak ground acceleration. The proposed Project area is not expected to experience peak ground acceleration levels greater than 20 to 30 percent of gravity, with a 2 percent probability of exceedance in 50 years (USGS, 2015a). This represents an MMI of VII which indicates a moderate risk of potential structural damage and very strong perceived shaking (USGS, 2015c). South Carolina is within the North American plate. The nearest plate boundary is approximately 2,000 kilometers southeast of South Carolina near Puerto Rico, where the North American and Caribbean plates join (USGS, 2010).

The largest historic earthquake in South Carolina occurred in 1886, referred to as the Charleston earthquake (approximately 90 miles southeast of Project area). This seismic event had an estimated MMI of X. The affected area covered almost 2 million square miles with damage being reported in Columbia, South Carolina. From 1698 to 2009 there have been nine reported earthquakes centered in Richland County and nine centered in Calhoun County. Only one earthquake with an MMI rating as high as V has occurred within proximity to the proposed Project area, which indicates maximum shaking levels which would be felt by nearly everyone with some dishes and windows broken and unstable objects overturned (USGS, 2010 and USGS, 2015a). The epicenter of this earthquake was approximately 20 miles from the proposed Project area in Lexington County (USGS, 2010). Another earthquake with an MMI of V occurred in February 2014 in Edgefield County, which is approximately 55 miles from the Project area (Collins, 2014).

The potential risk for structural damage within the proposed Project area is moderate based on the frequency and location of historical seismic activity (USGS, 2015a). The Project would be constructed in accordance with USDOT safety requirements; therefore the construction of the Project is not expected to be significantly impacted by local seismic activity.

Soil Liquefaction

Soil liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. The SCDNR has mapped areas for low to high potential for liquefaction throughout the state. These areas coincide with stream valleys that would be crossed by the proposed Project where the geologic units are comprised of alluvial deposits and the overlying soils are derived from these materials (SCDNR, 2015). All portions of the Project area have been identified as having low potential for liquefaction. However, should seismic events occur, water-saturated loose sands may be susceptible to short-term, minor liquefaction caused by localized vibration.

Based on the low probability of soil liquefaction occurring in or near the proposed Project area, impacts on the Project facilities or adjacent land due to soil liquefaction would not be significant.

Landslides

Landslide susceptibility is the likelihood of a landslide occurring in an area on the basis of local terrain conditions. Based on review of topographical maps, the proposed Project area is relatively flat. The steepest surface terrain occurs along waterways; however, DCG proposes to cross these waterbodies using trenchless construction methods, thereby reducing the potential for landslides. In addition, the proposed Project is not in an area where there is a measureable risk of landslides (SCDNR, 2012).

Based on the low probability of landslides occurring in or near the Project area, impacts on the Project facilities or adjacent land due to landslides are not anticipated.

Land Subsidence and Karst Terrain

Land subsidence is a lowering of the land-surface elevation resulting from changes that take place underground. Common causes of land subsidence include dissolution of limestone or other carbonate rock; collapse of underground mines; and the pumping of water, oil, and gas from underground reservoirs. Karst terrain is a landscape type produced by the dissolution of carbonate rocks and the formation of underground drainages. The proposed Project area is mapped within an area containing deposits of unconsolidated calcareous sediments with the potential for subtle, shallow subsidence sinkholes; however, these areas are not known to pose significant collapse hazards and are not necessarily considered to be karst (Weary, 2008). Neither underground mines nor pumping of oil or gas occur in the Project area (USEIA, 2013).

Based on the lack of significant collapse hazards, underground mines, and pumping of oil and gas in and around the proposed Project area, impacts on the Project facilities or adjacent land due to groundsoil land subsidence and karst terrain are not anticipated.

Flooding

The Federal Emergency Management Agency (FEMA) is responsible for mapping and delineating floodplains and determining the flood risk for susceptible areas. The pipeline would cross 10 preliminary FEMA Special Flood Hazard Areas in 12 locations. FEMA preliminary data are used to provide the public an early look at an in-progress flood hazard study for the state of South Carolina and is subject to modification prior to final issuance (FEMA, 2015). FEMA preliminary data were used for this analysis because finalized data were not available for the entire length of the Project. FEMA defines Special Flood Hazard Areas as “the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year” (FEMA, 2015). These areas are commonly referred to as the 100-year floodplain. Table B-1 identifies areas where the Project would cross Special Flood Hazard Areas.

The National Oceanic and Atmospheric Administration (NOAA) estimates that the average precipitation rate required for flash flooding at the Project area would be approximately 2 to 2.5 inches over a 1-hour interval, 2.5 to 3.5 inches over a 3-hour interval, 3 to 5 inches over a 6-hour interval, 4 to 5.5 inches over a 12-hr interval, or 4 to 6 inches over a 24-hour interval (NOAA, 2015).

Table B-1

FEMA Special Flood Hazard Areas Crossed by the Project

Start MP	End MP	Length (miles)
2.1	6.5	4.4
8.7	8.9	0.2
10.8	11.0	0.2
11.2	11.4	0.2
13.4	13.7	0.3
13.8	13.9	0.1
16.4	16.4	<0.1
16.5	16.6	0.1
18.5	18.6	0.1
20.5	20.6	0.1
20.7	20.8	0.1
24.2	24.3	0.1

Source: FEMA Preliminary Flood Hazard Data, 2015

In October 2015, heavy rainfall resulted from a low-pressure system which directed moisture from Hurricane Joaquin across South Carolina including the proposed Project area. The heavy rainfall caused flooding across much of the state including Richland and Calhoun Counties. USGS stream flow station 02169500, Congaree River at Columbia, has one of the longest records of annual peak stream flows in the state, with records from 1892 to the present. These records provide historical context for the recent storm event. On October 4, 2015, the Congaree River's peak flow at Columbia was 185,000 cubic feet per second at a peak flood stage of 31.8 feet (USGS, 2015b). This peak ranks eighth out of the station's 123 years of record.

One MLV at MP 5.2 and 11 permanent access roads totaling about 40.0 acres of disturbance would also be within Special Flood Hazard Areas. Ten of these roads are existing, of which eight would require minor improvements (listed in appendix C), thus no significant impacts would occur from the use or improvement of these roads. Access Road 084 is a proposed new permanent access road that would be constructed for MLV 25-95. Due to the recent flooding and proposed location of MLV 25-95 and the associated Access Road 084 within the FEMA Special Flood Hazard Area of the Congaree River, **we recommend that:**

- **<u>Prior to construction</u>, DCG should file with the Secretary of the Commission (Secretary) documentation of its consultation with the SCDHEC and Richland County regarding applicable mitigation measures and associated permits for operation of the MLV at MP 5.2 and Access Road 084 within a Special Flood Hazard Area.**

DCG considered hazards associated with flooding potential during the design of the proposed Project. DCG stated that buoyancy control (e.g., concrete coated pipe, weights) would not be required for the Project. During construction, DCG would implement the measures in its *SWPPP* in accordance with site conditions to manage stormwater runoff and runon. These measures include silt fencing, diversion ditches, riprap, and other erosion control measures. In addition, DCG proposes to cross all wetlands and most waterbodies using a trenchless construction method (described in sections A.7.2) therefore

minimizing the chance of exposure or damage to the pipeline during high flow events when localized erosion could destabilize vegetation cover. Due to the known occurrence of flooding within this area, the multiple crossings of FEMA Special Flood Hazard Areas, and the number of waterbody crossings, DCG may determine that buoyancy controls are necessary if a contingency, shallower crossing method is required utilized.

Blasting

No areas with shallow depth to bedrock, which the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) defines as being within 5 feet of the ground surface, were identified along the proposed Project (NRCS, 2014; Terracon, 2015). In the event that bedrock is encountered and blasting is required, the technique used for bedrock removal would depend on factors such as strength and hardness of the rock.

DCG stated that blasting is not anticipated or planned; however, if blasting is determined to be necessary, DCG would develop specific blasting plans in coordination with the appropriate agencies that address pre- and post-blast inspections; advanced public notification; and mitigation measures for building foundations, groundwater wells, and springs. DCG would also use appropriate methods (e.g., blasting mats) to prevent damage to nearby structures and to prevent debris from entering sensitive environmental resource areas. If it is determined during construction that blasting is required, **we recommend that:**

- **Prior to conducting blasting activities, DCG should file its blasting plan(s) with the Secretary for the review and written approval of the Director of the OEP.**

HDD Feasibility

DCG proposes to construct 33 HDDs along the pipeline route to avoid disturbing waterbodies, wetland areas, and some existing structures (appendix E). Successful completion of a HDD depends on suitable geologic conditions and the skill and care of the operators. Issues which could arise during a HDD include inadvertent returns of drilling mud and abandonment of the borehole due to encountering problematic geologic conditions.

Geotechnical studies were conducted by drilling multiple soil borings at the proposed HDD locations along the Project. These studies encountered various soils and sediments, many of which are sandy in nature. DCG also conducted preliminary feasibility studies, in which all 33 HDDs were considered to be feasible (URS, 2015). Inadvertent returns of drilling mud may occur, especially when drilling in layers of soft organics, such as peat, very loose to loose sands, or gravels which were encountered in multiple soil borings at several proposed HDD locations (Terracon, 2015). DCG prepared and would implement its *Inadvertent Release Plan* to prevent, monitor, control, and cleanup potential inadvertent returns of drilling mud at HDD crossings. During construction, if an HDD is not able to be completed, DCG stated it would also implement the measures in its current *HDD Contingency Plan* to relocate the drill or request the use of an alternative construction method. DCG did not provide information related to hydrofracture analyses based on the planned HDD depths and the expected drilling pressures nor did DCG provide consultation from a qualified HDD contractor discussing the feasibility of the proposed HDD crossings. Given the number of HDDs and a small, but potential risk of failure, **we recommend that:**

- **Prior to construction, DCG should file with the Secretary, for review and written approval by the Director of the OEP, a revised combined *Inadvertent Release Plan* and *HDD Contingency Plan*. The revised plan should include:**

a. specific contact information for local, state, and federal agencies that would be contacted if an inadvertent release occurs and/or a contingent crossing method is required;

b. details for the conditions and number of attempts that would be completed before an HDD is abandoned, a new HDD location is chosen, and when the use of an alternate crossing method may be required; and

c. contingent crossing methods for each HDD location and a discussion of the regulatory authority and process that DCG would be required to follow if a trenchless construction method is not feasible.

Based on the overall geologic conditions present in the proposed Project area, DCG's proposed construction methods and minimization measures, and our recommendations, we conclude that construction of the Project would have a minor and temporary effect on the geologic conditions of the area and we do not anticipate any significant geological hazard impacts on the Project facilities.

1.2 Soils

Construction activities such as clearing, grading, trench excavation, pipe installation, backfilling, and the movement of construction equipment along the right-of-way would affect soil resources. Clearing the right-of-way would remove protective vegetation cover and expose the soil to the effects of wind, rain, and runoff, which would increase the potential for soil erosion and sedimentation in erosion-prone areas. Grading, spoil storage, and equipment traffic could compact soil, reducing porosity and increasing runoff potential, and decreasing vegetative productivity. Construction activities could also affect soil fertility and facilitate the dispersal and establishment of noxious or invasive plants as discussed in section B.3.1. In addition, contamination due to spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. Inadvertent returns of drilling mud could also reduce the permeability of affected soils.

Soil types that occur within the Project area were identified by the NRCS Major Land Resource Areas classifications (NRCS, 2006) and the NRCS Web Soil Survey website (NRCS, 2014). Potential impacts on these soils from the Project are generally associated with soil characteristics and limitations.

Standard Soil Limitations

Several soils and soil characteristics have the potential to affect, or be affected by, construction and operation of the Project. These include prime farmland, potential for soil compaction and rutting, moderate erosion potential, poor drainage potential, and shallow depth to water table. Construction and operation of the proposed pipeline, aboveground facilities, temporary and permanent access roads, and contractor yard would affect 402.7 acres of soils. Table B-2 summarizes soil characteristics and limitations by Project component.

Construction and operation of the proposed pipeline, aboveground facilities, temporary and permanent access roads, and contractor yards would affect about 402.7 acres of soils. Of the soil limitation factors affecting construction of the proposed Project, a total of 332.6 acres (82.4 percent) are considered to be prime farmland, 0.0 acres (0 percent) are considered to have severe compaction potential, 147.3 acres (36.5 percent) are considered to have severe rutting potential, 0.0 acres (0 percent) are considered to be highly erodible, 78.0 acres (19.3 percent) are considered to have low revegetation potential, 0.0 acres (0 percent) have a shallow depth to bedrock, and 293.0 acres (72.6 percent) have a shallow water table.

Table B-2

Soil Characteristics and Limitations for the Project (acres)

Facility	Prime Farmland Soil Type [a]	Severe Compaction Potential [b]	Severe Rutting Potential [c]	Severe Erosion Potential [d]	Poor Revegetation Potential [b]	Poor Drainage Potential [e]	Shallow Bedrock [f]	Shallow Water Table [f]
Pipeline [g]	235.9	0.0	96.5	0.0	59.3	30.3	0.0	208.1
Aboveground Facilities [h]	0.2	0.0	0.0	0.0	1.6	0.0	0.0	0.0
Access Roads	87.7	0.0	50.7	0.0	18.3	4.7	0.0	76.0
Contractor Yard	8.9	0.0	0.0	0.0	0.0	0.0	0.0	8.9
Project Total [i]	**332.7**	**0.0**	**147.2**	**0.0**	**79.2**	**35.0**	**0.0**	**293.0**

a Includes Prime Farmland and Farmland of Statewide Importance (NRCS, 2015).
b Based on qualitative assessments provided by the NRCS (Holsonback, 2015).
c Areas identified to have "Severe Soil Rutting Hazard" by the NRCS (NRCS, 2015).
d The NRCS has evaluated soils based on slope and soil erosion factor k values (NRCS, 2015).
e Areas identified to have poor drainage potential are ranked as "poorly drained" or "very poorly drained" by the NRCS (NRCS, 2015).
f Parameters defined as being "shallow" if within 5 feet of the ground surface based on the NRCS data (NRCS, 2015).
g Totals include permanent and temporary workspace, ATWS, and MLVs. Does not include areas proposed to be crossed by the HDD construction method.
h Totals includes the pig launcher and joint pig receiver and M&R station.
i Total acreage does not exactly equal total Project acreage, as not all soils are classified in the categories presented in this table.

Soils would be stabilized following proper restoration in accordance with the FERC Plan and the DCG *SWPPP*. Therefore, maintenance of the proposed pipeline right-of-way is not expected to negatively impact soils long-term.

United States Department of Agriculture Designated Farmland Soils

The USDA defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses." Prime farmland has an acceptable and reliable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. In addition, soils that do not meet all of the requirements to be considered prime farmland may be considered soils of local importance if they are capable of producing a high yield of crops when treated or managed according to accepted farming methods. For the purposes of this report, prime farmland includes USDA designations of "prime farmland," "prime farmland if drained," "prime farmland of local significance," and "farmland of statewide importance" independent of whether these areas are or have been used for agricultural purposes.

The USDA defines "farmland of statewide importance" as "land, in addition to prime and unique farmlands that is of statewide importance for the production of food, feed, fiber, forage, and oil seed

crops." Generally, farmlands of statewide importance are areas that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by state law (NRCS, 2015b).

In the proposed Project area, 23 of the soil map units are classified as prime farmland comprising approximately 82 percent of the Project area (NRCS, 2014). The Project would affect 332.6 acres of prime farmland during construction. Of this, 71.3 acres are currently in use as farmland, as further discussed in section B.5.1. Approximately 8.9 acres of prime farmland soils within active farmlands and commercial silvicultural tracts would be permanently affected. Of this, about 6.5 acres would be affected in areas of commercial silviculture due to the placement of one MLV and the maintenance of the permanent right-of-way where tree growth would not be allowed, and 2.4 acres would be impacted in agricultural land due to the installation of four MLV facilities and construction of one new permanent access road.

DCG would employ several methods to maintain fertility and protect agricultural lands affected by Project construction, such as segregating topsoil from subsoil. Other measures to mitigate impacts on agricultural land are described in section B.5.1. We conclude that implementation of the measures in the FERC Plan and Procedures would minimize and mitigate impacts on farmland soil resources; therefore, the Project would have a temporary and minor effect on farmland soils.

Soil Compaction and Rutting

Soil compaction modifies the structure of soil and, as a result, alters its bulk density and drainage properties. Soil compaction decreases pore space and water retention capacity and restricts the transport of air and water to plant roots. As a result, plant productivity and growth rates may be reduced, soils may become more susceptible to erosion, and natural drainage patterns may be altered. Consequently, soil compaction is of particular concern in agricultural areas, residential areas, and in areas of hydric soils. The susceptibility of soils to compaction varies based on moisture content, grain size distribution (texture), structure, and organic content. Soils that formed under conditions of extended saturation, flooding, or ponding during the growing season and developed anaerobic conditions in the upper horizon are considered hydric (NRCS, 2015). Hydric soils can have low soil strength and be prone to compaction and rutting due to extended periods of saturation. Sandy soils are less prone to compaction than soils high in silts and clays; however, these soils often have low strength and are prone to rutting.

The Project would not cross any known soils classified as having severe compaction potential per the NRCS (Holsonback, 2015). However, the Project would cross about 147.3 acres of soils identified as having severe rutting potential (NRCS, 2015). Severe rutting potential within the proposed Project area is primarily due to the low strength of many of the sandy soils occurring in the area.

DCG would employ several management practices to reduce the potential for soil compaction and rutting including attempting to avoid construction activity during periods of soil saturation and use of mats as necessary based on soil conditions. DCG would implement the measures described in the FERC Plan and Procedures and in its *SWPPP* to minimize compaction and rutting. Sediment control barriers would be used to reduce runoff and divert water into well vegetated areas. DCG may utilize mats or trench dewatering techniques to reduce compaction potential. During site restoration, DCG would also test compaction in areas disturbed for temporary workspace, backfilled soils, and deep till soils exhibiting compaction, as compared to adjacent undisturbed soils. Other measures to mitigate impacts on agricultural land are described in section B.5.1.

We conclude that implementation of the measures in the FERC Plan and Procedures would minimize and mitigate impacts on soil resources with compaction and rutting potential; therefore, the Project would have a minor effect on these soil types.

Severe Erosion Potential

Erosion is a natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope gradient and length, vegetation cover, rainfall intensity, and wind intensity can influence the rates of erosion. Soils most susceptible to erosion by water and wind typically have bare or sparse vegetation cover, non-cohesive soil particles with low infiltration rates, and are situated on moderate to steep slopes. Soils more resistant to erosion by water and wind include those that occupy positions of low relief, are well-vegetated, and have high infiltration capacity and internal permeability. Wind induced erosion often occurs on dry soil where vegetative cover is sparse and strong winds are prevalent. Clearing, grading, and equipment movement could accelerate the erosion process and, without adequate protection, potentially result in the discharge of sediment to adjacent sensitive resources.

The Project not would cross any soils classified as having severe erosion potential (NRCS, 2015). The Project area also lacks steep slopes thus decreasing the likelihood of severe erosion. DCG would implement measures in the FERC Plan and Procedures such as installation of sediment control barriers to reduce the potential for soil erosion.

Poor Revegetation Potential

Based on consultation with the NRCS, the Project would cross 78.0 acres of soils identified as having poor revegetation potential. Poor revegetation potential in the Project area is due to soils with sandy or loamy sand surface horizons with low water holding capacities (Holsonback, 2015). If areas are not re-established appropriately, the potential for erosion in these areas could increase. In accordance with the FERC Plan, DGC would implement the following measures to increase the potential for successful revegetation: addition of fertilizer amendments, application of mulch, and proper seedbed preparation. DCG would also implement fertilization and seeding recommendations made by the NRCS and specific landowner restoration agreements (NRCS, 2015; Mikell, 2014 and 2015).

We conclude that implementation of the measures in the FERC Plan and Procedures would minimize and mitigate impacts on soil resources with poor revegetation potential; therefore, the Project would have a minor effect on these soil types.

Poor Drainage Potential

Soil drainage roughly indicates the degree, frequency, and duration of inundation or near surface saturation. Soil drainage class refers to the frequency and duration of wet periods under conditions similar to those present when the soil formed. Soil map units classified as poorly drained and very poorly drained are typically classified as hydric soils.

The Project would cross 35 acres of soils classified as having poor drainage potential (NRCS, 2015). In most areas where hydric soils would occur, such as at wetland and waterbody crossings, DCG is proposing the use of HDD. Therefore, this would reduce the potential for soil drainage impacts given that construction equipment would not be traversing regularly through these areas and would be contained to the entry and exit pits. DCG would employ the techniques in the FERC Plan and Procedures to minimize effects on poorly drained soils and would avoid construction activity during periods of soil saturation and/or would use mats based on soil conditions.

We conclude that implementation of the measures in the FERC Plan and Procedures, as well as DCG's plan for compaction testing, would minimize and mitigate impacts on soil resources with poor drainage potential; therefore, the Project would have a minor effect on this soil type.

Shallow Depth to Water Table

The Project would cross 293.0 acres of soils identified as having a shallow depth to water table (NRCS, 2015). The depth to seasonal mean high water table indicates the average shallowest depth of the water table measured from the ground surface at the wettest time of the year. For the purposes of this EA, soils noted as having a shallow water table refers to soils classified as having a seasonal high water table within 5 feet of the ground surface. High water tables may affect trenching design and construction methods. High water tables at or near the surface during part of the growing season may be indicative of wetland hydrology and may generally coincide with the presence of hydric soils. Dewatering of the trench and conventional bore pits (and/or additional precautions) may be necessary where groundwater is encountered during pipeline installation. DCG would dewater the trench or bore pits in accordance with the FERC Plan, which would include discharging water into well-vegetated upland areas, using filter bags for energy dissipation where necessary, and monitoring the dewatering activities to avoid releasing sediments into sensitive resources, such as wetlands, waterbodies, or cultural resource areas.

We conclude that implementation of the measures in the FERC Plan and Procedures would minimize and mitigate impacts on soil resources with shallow depth to water table; therefore, the Project would have a minor effect on these soils.

Inadvertent Spills, Releases, or Discovery of Contaminants

Inadvertent spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely affect soils. The impacts of such releases are typically minor because of the low frequency and small volumes of spills and leaks. DCG would implement the measures in its *Spill Plan* to prevent accidental spills of materials such as petroleum products and other hazardous products that may contaminate soils, and to ensure that inadvertent spills are contained, cleaned up, and disposed of in an appropriate manner.

Inadvertent returns of drilling mud could occur due to the use of the HDD construction method, especially when drilling in layers of soft organics, such as peat, or very loose to loose sands which exist within multiple proposed HDD locations (Terracon, 2015). Inadvertent returns of drilling mud would have the potential to reduce the permeability of affected soils. DCG would implement its *Inadvertent Release Plan,* as revised per our recommendation in section B.1.1, to prevent, monitor, control, and cleanup potential inadvertent returns of drilling mud at HDDs crossings.

The Project would be within 0.25 mile of four previously contaminated sites, described further in section B.5.3. Because the Project would not directly cross these previously contaminated locations, no impacts on these lands would occur due to construction of the Project. However, if unanticipated contaminated materials are discovered during construction, DCG would suspend work, clear personnel from the area, and contact the SCDHEC Emergency Response Section immediately.

DCG would implement the measures in its *Spill Plan* to prevent accidental spills of materials such as petroleum products and other hazardous products that may contaminate soils, and to ensure that inadvertent spills are contained, cleaned up, and disposed of in an appropriate manner. DCG would implement its *Inadvertent Release Plan*, as revised per our recommendation in section B.1.1, to prevent, monitor, control, and clean-up potential inadvertent returns of drilling mud at HDDs crossings.

2. Water Resources and Wetlands

2.1 Groundwater Resources

Generally, the Project facilities overlie aquifers of central South Carolina within coastal plains sediments, consisting of Cretaceous to Tertiary age sand and clay formations that overlie crystalline bedrock (Newcome, 2003). The Project would be entirely above the Middendorf Aquifer, which consists of thin, laminated layers of fine to medium sand and clay of irregular thickness and extent within the Middendorf Formation (Aucott and Sperian, 1985). Water wells in this formation range in depth from 50 to 600 feet, and yields range from 15 to 20 gallons per minute for domestic and lawn irrigations needs to over 2,000 gallons per minute for large industrial and farm-irrigation wells (Newcome, 2003). Water quality from these wells in Richland County ranges from excellent to poor but is generally good (Newcome, 2003). The nearest actively monitored SCDNR well to the Project area is about 7,600 feet north of MP 14.0, and consistently confirms the Middendorf Aquifer level at approximately 208 feet above sea level (SCNDR, 2015c). The groundwater level of the Middendorf Aquifer declines as the aquifer slopes southeastward towards the coast between clay confining layers. The easternmost portion of the Project would be within the Black Creek Formation outcrop which overlies the Middendorf Aquifer; however, the Black Creek Aquifer is at least 10 miles southeast of the proposed Project and would not be crossed. The Middendorf Aquifer is recharged primarily through precipitation received in aquifer outcrop areas (Aucott and Sperian, 1985).

There are limited surficial aquifer data available for the region. Unknown shallow aquifers and/or perched water tables may be present in the Project area. Perched water tables are an accumulation of groundwater which is trapped above the underlying water table/aquifer by an impermeable soil layer such as clay. These features may be the sole source of hydrology for wetlands and other features in the Project area.

Construction activities would require the use of heavy machinery within the right-of-way, which could compact soils and affect groundwater. In areas where the water table is near the surface, water flow and recharge of groundwater could be temporarily and locally affected by trench excavation. In areas of the Project where HDDs and conventional bores are proposed, groundwater could be directly affected by introducing sedimentation or drilling mud into the groundwater immediately surrounding the borehole.

With the exception of the locations crossed by the HDD construction method (appendix E), the majority of construction activities would involve shallow, temporary, and localized excavation or grading. In areas with shallow aquifers, unmapped perched groundwater, or where the water table is near the surface, water flow and recharge of groundwater could be temporarily and locally affected by trench excavation. Where HDDs or conventional bores are proposed, groundwater could be directly affected by introducing sedimentation or drilling mud into the groundwater. DCG would use drilling mud that is non-toxic and composed of a mixture of approximately 80 percent water, 19 percent bentonite (a naturally occurring mineral), and up to 1 percent additives (can include fibrous materials such as sawdust, rice or cottonseed hulls or other available materials). Impacts on groundwater would be localized to the area immediately around the borehole during construction, and thus would be temporary and minor. Section A.7.2 contains additional information regarding the HDD construction method and HDD drilling fluid.

DCG would implement construction practices designed to reduce and/or mitigate potential impacts on groundwater as detailed in the FERC Plan and Procedures. These practices include procedures for trench breakers (i.e., sand bags or foam) to prevent erosion caused by water flowing through the trench, as well as for dewatering the trench.

DCG would also restrict refueling and storage of hazardous substances, and parking of equipment to at least 100 feet from a waterbody and/or wetland because they could be a source for or channel to groundwater including public and private wells as discussed below.

An inadvertent spill of fuel or hazardous liquids during construction could potentially contaminate groundwater resources in the Project area if not appropriately contained and remediated. To minimize the risk for potential spills, DCG would implement its *Spill Plan*, which includes control measures during construction such as: locating spill control and countermeasure materials (e.g., spill kits, bulk sorbent material) in readily accessible locations, parking construction equipment overnight at least 100 feet from wetlands and waterbodies, and inspecting equipment daily for leaks, damage, and signs of deterioration which could result in a leak.

Although not anticipated, if blasting is required for pipeline installation where bedrock prevents conventional excavation impacts on groundwater resources could result in decreased water yields or quality in nearby wells. Before any blasting, DCG per our recommendation would prepare a site-specific blasting plan which would be designed to control energy release and safeguard personnel and property in the area, as discussed in section B.1.1. DCG would acquire the appropriate federal, state, and local permits prior to commencing blasting.

Designated Sole Source Aquifers

The USEPA defines sole or principal source aquifers as those aquifers that supply at least 50 percent of the drinking water consumed in the area overlying the aquifer, and where there is no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend on the aquifer for drinking water. DCG would not cross any sole source aquifers as part of the proposed Project. The nearest sole source aquifer to the Project is the Volusia-Floridan Aquifer, approximately 300 miles south of the Project area near Daytona Beach, Florida (USEPA, 2015a).

Public and Private Supply Wells

DCG identified two private wells within 150 feet of the proposed Project area using the SCDNR online well database as well as environmental field surveys (SCDNR, 2015f) (table B-3). No perennial springs have been identified within 150 feet of the Project area.

Table B-3

Identified Water Supply Wells Within 150 Feet of the Project

MP	Well	Well Owner	Town/ County	Distance from Centerline (feet)	Distance from Construction Work Area (feet)	Well Use	Drinking Water
17.9	RIC-283	East Coast Steel	Congaree/ Richland	28.0	0.0	Industrial	No
18.1 [a]	Unknown	Owen Joist Corporation	Congaree/ Richland	N/A	65.0	Private	Unknown

N/A = not applicable

a Near proposed new temporary Access Road 041.

DCG would implement its *Pre- and Post- Construction Well Monitoring Plan* for these wells prior to and after construction for quality and yield. Water quality would be tested in accordance with the SCDHEC Bureau of Water instructions and includes parameters such as pH, hardness, turbidity, lead, mercury, arsenic, and coliform bacteria. In accordance with its *Spill Plan*, DCG would not refuel or store hazardous materials within a 200-foot radius of private wells and within a 400-foot radius of municipal wells. In the event that water supply quantity or quality is affected during construction, DCG would provide an alternative water supply source or pay damages to the landowner. To ensure all wells within the Project area are properly identified and the potential for well contamination is sufficiently minimized, **we recommend that:**

- **<u>Prior to construction</u>, DCG should file with the Secretary:**
  - **a. the location, by milepost, of any previously unidentified private water wells within 150 feet of construction workspaces, as identified during remaining field surveys and landowner coordination; and**
  - **b. documentation indicating where testing plans would be implemented for any previously unidentified wells.**

Contaminated Groundwater

DCG identified two properties within 0.25 mile of the proposed Project area with potential historical contamination (Environmental Data Resources, Inc. [EDR] Radius Report, 2015). The DAK property is about 300 feet south of the proposed Project at MP 1.2. This property contains several known contaminants such as selenium, nitrate, and diphenyl (EDR, 2015). The Westinghouse Electric property is about 1,100 feet southeast of the proposed Project near MP 7.2. This property contains several known contaminants such as chlorinated hydrocarbons, fluoride, nitrate, ammonia, and alpha and beta radionuclides (EDR, 2015).

Both of the sites identified are in Monitored Natural Attenuation remediation status, which SCDHEC defines as "the verifiable reduction of chemicals of concern through natural occurring microbial activity or attenuation mechanisms" (SCDHEC, 2015a). Monitored Natural Attenuation is a form of site rehabilitation which monitors the levels of chemicals of concern once site-specific target levels are achieved. Due to the distances from the proposed Project to the affected properties and the level of contamination on those properties, it is unlikely that the Project would encounter contaminated groundwater during construction or operation. During HDD activities, the potential exists for inadvertent releases to occur which may allow contaminated groundwater to reach the surface. If DCG encounters any contaminated groundwater during construction, DCG would halt work operations and immediately notify the applicable state and federal agencies as well as local municipalities.

Based on our recommendations, and implementation of DCG's *Inadvertent Release Plan, Spill Plan, Pre- and Post- Construction Well Monitoring Plan,* and the FERC Plan and Procedures, we conclude that the Project's impacts on groundwater resources would be minor and temporary.

2.2 Surface Water Resources

The Project would cross two Hydrologic Unit Code (HUC) 8 watersheds (the Congaree River and Wateree River basins). See table B-4 below for a summary of the watersheds that would be crossed by the proposed Project and table B-23 for the sub-watersheds. Discussion of flooding hazards and floodplains in the Project area can be found in Section B.1.1.

Table B-4

River Basins and Watersheds Crossed by the Project

Watershed	Major Basin	County	Crossing Length (miles)	Drainage Area (square miles)
Congaree River	Santee	Lexington/Calhoun/Richland [a]	25.5	708.0
Wateree River	Santee	Richland	2.5	1,210.0

a Only proposed existing permanent Access Road 070 would be within Lexington County.

FERC defines waterbodies as "any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes." Based upon our review of the alignment sheets, data sets, and field surveys provided by DCG, we identified that construction of the proposed pipeline would result in 61 waterbody crossings. Fifty-seven of the waterbodies are classified as minor (water's width less than 10 feet), three are intermediate (10 to 100 feet wide), and one (Congaree River) is classified as major (greater than 100 feet wide). In its filings with FERC, DCG provided conflicting information in regard to the proposed construction method at these waterbodies. Specifically, at one point DCG stated that all waterbodies would be crossed with a trenchless construction method; however, our review of DCG's alignment sheets, tables, and workspaces determined otherwise. Our evaluation of all the information filed in the Project docket has led us to conclude that 35 waterbodies are proposed to be crossed by HDD, 11 minor waterbodies are proposed to be crossed by conventional bore, and 15 minor waterbodies are proposed to be crossed using an open-cut method (open-cut methods include the dry crossing methods [i.e., flume or dam-and-pump] and wet open cuts as discussed in section A.7.2). The assigned crossing method for each waterbody is provided in appendix D-1. Unless further clarification is received, we expect DCG to cross waterbodies in accordance with our crossing determinations.

FERC understands that DCG may request the use of an open-cut crossing method as a contingency in the event that an HDD is unable to be completed. Prior to the use of a contingency construction method, DCG would also be required to obtain the proper approvals from the U.S. Army Corps of Engineers (USACE) and other applicable agencies. Furthermore, given the presence of threatened and endangered fish species in the Congaree River (proposed to be crossed via the HDD construction method), there is no feasible contingent crossing method available without further, potentially lengthy, consultation with the USACE, USFWS, NOAA National Marine Fisheries Service (NMFS), and SCDHEC. DCG developed a site-specific HDD crossing plan for the Congaree River. Although technically feasible, HDD crossings can fail for various reasons, including failure to complete the pilot hole, inability to maintain a stable open hole, or inability to pull the pipeline through the borehole. While we do not believe an HDD crossing of the Congaree River is likely to fail, we recognize the potential problems with an HDD crossing method; therefore, **we recommend that**:

- **Prior to the use of an alternative waterbody crossing method for the Congaree River HDD, DCG should develop an alternative site-specific crossing plan in consultation with the FERC and the USACE, NMFS, USFWS, and SCDHEC, as applicable. The final alternative crossing plan should be filed for review and written approval from the Director of the OEP prior to its implementation.**

If needed, DCG would install and maintain construction bridges at waterbodies with discernible flow at the time of crossing. After construction, DCG would not mow or clear within riparian areas

between the HDD entry and exit points for routine maintenance; this is consistent with the FERC Procedures.

An additional 14 waterbodies (one waterbody crossed twice) would be crossed by the proposed temporary and permanent access roads as provided in appendix D-2. DCG would replace a culvert at new permanent Access Road 032 and install a new culvert at existing permanent Access Road 051. DCG stated it would not need to replace culverts at the remaining waterbodies crossed by existing roads. A list of proposed access roads is provided in appendix C. In all locations where waterbodies are crossed by or are adjacent to access roads, silt fencing would be installed to prevent sedimentation of the waterbodies.

Construction of the Project has the potential to result in temporary effects on water quality, such as increased sedimentation and turbidity (the concentration of suspended sediments in the water) due to construction activities within or near flowing surface waters. Construction activities could also result in spills of fuels or other contaminants. DCG would follow the measures in its *Spill Plan, SWPPP*, the FERC Procedures, and applicable permit conditions to avoid and minimize impacts on waterbodies. These measures include erosion control devices such as hay bales and silt fencing to prevent sedimentation and adhering to ATWS setbacks and refueling restrictions near waterbodies.

We received comments from the Friends of Congaree Swamp and Congaree Riverkeeper expressing concern regarding inadvertent releases of HDD drilling mud. The HDD method would avoid direct impacts on the streambeds and banks; however, a temporary, localized increase in turbidity could occur in the event of an inadvertent release of drilling fluid (bentonite and water). Such impacts would be greater on waterbodies which convey small volumes of water. Generally, the risk of inadvertent release of drilling fluid decreases as the depth of cover increases. To minimize the potential impacts of an inadvertent release of drilling mud into waterbodies, DCG would implement its *Inadvertent Release Plan*, which includes:

- maintaining appropriate tools and equipment in working condition at the site;
- temporarily shutting down the drill upon the loss of fluid pressure; and
- installation of containment structures (e.g., floating booms, hay bales, or earthen berms).

Additionally, we have recommended in section B.1.1 that DCG revise its *Inadvertent Release Plan* and *HDD Contingency Plan* to further reduce the likelihood of inadvertent releases. This recommendation includes providing contact information for all applicable agencies in the event a release occurs, detailing the criteria which would lead to the abandonment of an HDD and to the use of contingent crossing methods for each HDD location.

Per the FERC Procedures, herbicides or pesticides would not be used within 100 feet of a waterbody, except as allowed by the appropriate federal or state agency as discussed in DCG's *Non-native Invasive Species Management Plan*.

Sensitive Waterbody Crossings

The Congaree River is the only major waterbody crossed and is a navigable waterbody under the jurisdiction of USACE. It is known to be spawning habitat for two federally listed sturgeon species as discussed in section B.4.1. In order to avoid or minimize impacts on the Congaree River, DCG has proposed to use the HDD construction method to cross these waterbodies. No other waterbodies crossed by the Project include habitat for federally listed threatened or endangered species, as verified by the USFWS and discussed in section B.3.2. The SCDNR identified five waterbodies containing "priority species of conservation" as discussed in B.3.2.

Section 303(d) of the Clean Water Act (CWA) requires that every 2 years, all states submit a list to the USEPA of all impaired state surface waters. The listed state waters could be impaired by pollutants; which affect beneficial uses such as drinking, recreation, aquatic habitat and industrial use. The proposed Project would not cross any impaired waterbodies or streams.

The Nationwide Rivers Inventory is a list of river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values and are of local or regional significance (National Park Service [NPS], 2015). No surface waters that would be crossed by the Project are on the Nationwide Rivers Inventory. The National Wild and Scenic Rivers Act was created to preserve rivers with outstanding natural, cultural, and recreational values (USFWS, 2015a). The Project would not cross any national wild and scenic rivers. The South Carolina Scenic Rivers Act of 1989 further protects rivers that "possess unique or outstanding scenic, recreational, geologic, botanical, fish, wildlife, historic or cultural values." No river segments in the Project area have been designated as wild, scenic, or recreational in South Carolina. The closest waterbody designated as wild and scenic by the South Carolina Scenic Rivers Act is the Saluda River, which is 9.5 miles northwest of the Project area (SCDNR, 2015d).

Surface Water Intakes and Surface Water Protection Areas

No potable (drinkable) water intakes or surface water protection areas are known within 3 miles downstream of any waterbody that would be crossed by the Project. No watershed protection areas or municipal water supplies would be impacted by the proposed Project (Devlin, 2015).

Contaminated Sediments

Impaired waterbodies associated with hazardous waste sites in the Project vicinity could be a potential source of contaminated sediments. DCG searched federal and state databases to determine if contaminated waterbodies would be crossed by the Project (EDR, 2015). No waterbodies either crossed by the Project or within 0.25 mile of the Project are known to have contaminated sediments. If unknown hazardous waste materials or contaminated sediments are encountered during construction, DCG would halt work operations and immediately notify appropriate state and federal agencies as well as local municipalities.

Hydrostatic Testing

DCG would hydrostatically test the pipeline in accordance with USDOT regulations. Hydrostatic testing would be conducted for the completed pipeline and HDD sections prior to operation. All water would come from existing public water supplies. DCG estimates that 533,400 gallons of water would be required for testing. In the event that municipal water was unavailable, hydrostatic test water would be withdrawn from the Congaree River according to applicable federal and state permits. Measures such as installing screens to avoid entrainment of small fish and other aquatic wildlife, controlling water withdrawal rates, and placing water intakes above streambeds to avoid disturbing sediments would be implemented to avoid or minimize impacts on fisheries resources.

As many as three hydrostatic test sections would be needed for the Project. No chemicals or additives would be mixed with water used for hydrostatic testing. Water would remain in the pipe between 8 and 24 hours per test. DCG would reuse hydrostatic test water, where possible, for the separate sections. After hydrostatic testing is complete, all water would be discharged into a dewatering structure to prevent erosion from discharge into the waterbody of origin or within upland areas. DCG would discharge all hydrostatic test water according in accordance with the FERC Procedures and with

the SCDHEC National Pollution Discharge Elimination System (NPDES) General Permit for Hydrostatic Test Water Discharge.

Based on our recommendations and DCG's implementation of its *Inadvertent Release Plan, HDD Contingency Plan, Spill Plan, SWPPP,* and the FERC Procedures, we conclude that impacts on surface water resources would be minor and temporary.

2.3 Wetlands

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE, 1987). Wetlands are a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, flood control, recreational opportunities, and improved water quality. Wetlands in the Project area are regulated under Section 404 of the Clean Water Act. The USACE reviews and issues permits for activities that would result in the discharge of dredged or fill material into waters of the United States, including wetlands. Construction activities involving wetlands under the jurisdiction of the USACE would require a Section 404 permit from the USACE Charleston District. Additionally, Section 401 of the CWA requires that proposed dredge or fill activities under Section 404 be reviewed and certified by the designated state agency (in this case, the SCDHEC) to ensure the Project meets state water quality standards.

Standards set by the USACE require the avoidance of wetlands, where possible, and minimization of disturbance where impacts are unavoidable, to the degree practicable. Any unavoidable wetland impacts in USACE jurisdictional wetlands may require compensatory mitigation[4], as reviewed and approved by the USACE. Additionally, Section 401 of the CWA requires that proposed dredge or fill activities under Section 404 be reviewed and certified by the SCDHEC.

Wetland Resources

DCG conducted wetland delineations according to standard practice, using the *1987 U.S. Army Corps of Engineers Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region (Version 2.0)*. The Project area was surveyed for wetlands between September 19 and December 4, 2014. Wetland types were assigned using the classification system used nation-wide (Cowardin et al., 1979). Four types of wetlands were identified: palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM), and open-water pond (PUB). Wetlands were identified as PFO, PSS, PEM, PUB, or a combination of these four cover types as defined in table B-5. Vegetation types are discussed in section B.3.1.

Carolina Bays, also called 'pocosins,' are elliptical or oval depressions of uncertain origin predominantly found in South Carolina, and are typically considered PFO wetlands. They are usually isolated and fill with rainwater in the winter and spring before drying in the summer months. Carolina Bays provide important refuges for many wetland species which are often restricted to individual bays. These species include rare plants, amphibians, reptiles, wading birds and mammals (SCDNR, 2015c). The proposed Project does not cross any Carolina Bays. The nearest Carolina Bay to the Project area is 200 feet south of MP 17.0 (SCDNR, 2015c).

[4] The restoration, creation or preservation of wetland resources in order to offset unavoidable impacts on wetlands.

Table B-5

Characteristics of Wetland Types

Wetland	Characteristics
PFO	Freshwater wetlands dominated by woody vegetation greater than 20 feet in height. Dominant species include mature canopy trees.
PSS	Freshwater wetlands dominated by woody vegetation less than 20 feet in height. Species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.
PEM	Non-tidal wetlands characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. Usually dominated by perennial plants.
PUB	Open-water features characterized by a lack of vegetation cover and an unconsolidated shore.

The Project work areas would traverse a total of 34 PFO, 2 PSS, and 31 PEM wetlands, as well as 4 PUB open-water features (appendix F). Wetlands would be crossed by the pipeline, workspaces, and access roads. No aboveground facilities would be sited in wetlands.

DCG has proposed to cross all wetlands using a trenchless construction method (i.e., HDD or conventional bore) which would avoid most temporary and all permanent impacts on these wetlands. To facilitate the safe placement of this guide wire, some hand clearing of vegetation would be necessary along the 5-foot-corridor. For the Project, this could require up to 1.7 acres of hand-clearing for guide wires in wetlands. There is risk for an inadvertent release of drilling fluid in wetlands along the Project route. An inadvertent release of drilling fluids into wetlands could result in impacts on nearby vegetation and soils. In the event that there is an inadvertent release in a wetland, DCG would implement its *Inadvertent Release Plan.* The EI would be responsible for measuring the area affected, characterizing the type of impact, and estimating the additional impacts on wetlands caused by clean-up activities. After consultation with the appropriate agencies, DCG would determine a course of action based on expediting the cleanup while minimizing any additional impacts.

In the event that DCG is unable to stop the release, the borehole would be abandoned and a contingency plan would be implemented. We have recommended in section B.1.1 that DCG revise its *Inadvertent Release Plan and HDD Contingency Plan* to further reduce the likelihood of inadvertent releases, provide contact information for agencies, and detail the criteria which would lead to the abandonment of an HDD and the use of contingency crossing method. If a contingency crossing method is required, DCG would be required to obtain the proper approvals from the USACE and other applicable agencies. After construction, DCG would follow the FERC Procedures, which do not allow routine vegetation mowing or clearing in wetland areas between HDD entry and exit points.

About 1.1 acres of temporary impact on PEM wetlands would occur because of the proposed use of existing private roads that cross wetlands. An additional 0.3 acre of temporary impacts on PFO, PSS, and PEM wetlands that encroach into the construction right-of-way but are not crossed by the pipeline would be affected. Table B-6 summarizes impacts on wetlands from access roads and extra workspaces (i.e., not crossed by the centerline). Temporary impacts on wetlands within the construction right-of-way but not crossed by the pipeline and temporary access roads would be minimized through the temporary use of timber mats. Although wetland vegetation would be crushed, soils would not be compacted and roots would remain intact; no long-term impacts would occur. In PEM wetlands, vegetation would generally reestablish within 1 to 2 years. In PFO wetlands, cleared vegetation could take 20 years or more to fully reestablish. DCG has proposed workspace within one PFO wetland that we believe should be avoided; therefore, **we recommend that:**

- **<u>Prior to construction,</u> DCG should file with the Secretary, for review and written approval by the Director of the OEP, a revised construction configuration to avoid PFO wetland WLRR-01 at MP 5.3, or provide justification for the workspace.**

Table B-6

Wetlands Impacted by Project Access Roads and Extra Workspaces

Wetland ID	MP/ Access Road [a]	Cowardin Classification	Crossing Length (feet)	Temporary Impacts (acres) [b]	Permanent Impacts (acres)
Access Roads [c]					
RD025WL01	AR-025	PEM	27.9	<0.1	0.0
RD056WL01	AR-056	PEM/PFO	8.0	<0.1	0.0
RD056BWL03	AR-056	PEM	12.2	<0.1	0.0
RD056BWL04	AR-056	PEM	8.5	<0.1	0.0
WL08-02	AR-072	PEM	818.6	0.4	0.0
WL09-09	AR-073	PEM	693.2	0.3	0.0
WL10-02	AR-074	PEM	851.9	0.4	0.0
Workspaces [d]					
WL07-01	7.5	PEM	0.0	0.2 [f]	0.0
WLRR-05	7.7	PEM	0.0	0.1 [f]	0.0
WLRR-01	5.3	PFO	0.0	<0.1 [f]	0.0
WL12-01	11.8	PSS	0.0	<0.1 [f]	0.0

a MP refers to location where the construction workspace first intersects the wetland.
b Does not include impacts from minimal hand clearing for HDD guide wires.
c Wetland crossed by access roads only, not crossed by centerline.
d Wetland in workspace only, not crossed by centerline or an access road.
e Obtained using GIS calculation.

Note: No wetlands are proposed to be crossed by open trenching.

Erosion and runoff from Project construction in upland areas and accidental spills could also negatively affect wetlands. During clearing in adjacent upland areas, DCG would install temporary erosion control measures to prevent sediment run-off into wetlands. DCG would implement the measures in its *Spill Plan* to avoid or minimize spills from migrating into wetland resources. Herbicides or pesticides would not be used within 100 feet of a wetland, except as allowed by the appropriate federal or state agency as discussed in DCG's *Non-native Invasive Species Management Plan*.

One ATWS would be located within 50 feet of PFO wetland WLRR-06. DCG provided site-specific justification for this ATWS to provide sufficient workspace for safe construction with the collocated right-of-way. We have reviewed this request and find it acceptable.

Based on our recommendation, as well as DCG's implementation of its *Inadvertent Release Plan, HDD Contingency Plan, Spill Plan, SWPPP*, *Non-native Invasive Species Management Plan,* and the FERC Procedures, we conclude that impacts on wetlands resources would be minor and temporary.

3. Vegetation, Aquatics, and Wildlife

3.1 Existing Vegetation Resources

The proposed Project is in northern Calhoun County and southern Richland County, South Carolina, intersecting three USEPA Level III ecoregions: 1) Sand Hills; 2) Southeastern Floodplains and Low Terraces; and 3) Atlantic Southern Loam Plains (USEPA, 2014). Construction and operation of the Project would affect three general upland vegetative cover types: upland forest (including commercial forestry land); open lands (existing rights-of-way, open fields, non-agriculture); and agricultural lands. The commercial forestry lands are discussed below and in section B.5.1 as commercial silvicultural lands (i.e., the growing and active management of trees). Wetlands are discussed in detail in section B.2.3. Impacts on agricultural lands are discussed in detail section B.5.1. Table B-7 outlines the vegetation types within the proposed Project area.

Table B-7

Construction and Operation Impacts on Vegetation Types in the Project Area [a]

Facility	Forested Upland		Forested Wetland		Open Upland [b]		Open Wetland		Agricultural		Totals	
	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper	Const	Oper
Pipeline [c d]	100.5	57.5	<0.1 [e]	0.0	62.2	24.7	0.3	0.0	67.5	36.0	230.5	118.2
Aboveground Facilities [f]	0.2	0.1	0.0	0.0	0.3	0.2	0.0	0.0	0.5	0.4	1.0	0.7
Access Roads	3.9	3.7	0.0	0.0	88.7 [g]	32.8 [g]	1.1	0.0	2.0	2.0	95.7	38.5
Project Total	**104.6**	**61.3**	**0.0**	**0.0**	**151.2**	**57.7**	**1.4**	**0.0**	**70.0**	**38.4**	**327.2**	**157.4**

Const = Construction (includes land needed for both Project construction and operation)
Oper = Operation (land permanently affected by Project operation)

a Totals may not add up due to rounding. Open water and developed land are not included as categories in this table; therefore, Project totals are not directly comparable to those reported in table B-8 and presented in section B.5.1.
b Open upland includes open land and residential land.
c Hand clearing may be conducted if necessary between HDD entry and exit points within a 5-foot-corridor centered over the pipeline; impacts are not included in this table.
d Includes ATWS and MLVs.
e Value is less than 0.1 acre and is not included in the calculations for Project Totals.
f Aboveground facilities include a joint pig receiver and M&R station, pig launcher, and cathodic protection sites.
g Includes existing roads.

Our analysis shows the Project would temporarily affect 327.2 acres of vegetation during construction and permanently impact 157.4 acres during operation. Impacts and mitigation on forest land, including commercial silvicultural tracts, are also discussed in section B.5.1. Impacts on forested wetlands are discussed in section B.2.3.

The open land habitats in the Project area are characterized by vegetation species including winged sumac, smooth sumac, winged elm, pokeweed, morning glory, dog fennel, blackberry, pineweed, broomsedge, plantain, Johnson grass, Brazilian verbena, wingstem, coastal Bermuda grass, crabgrass, rabbit tobacco, bahia grass, and goldenrod. Both Johnson grass and bahia grass are non-native, invasive species and are discussed further below.

Clearing of vegetation in open lands and agricultural areas would cause minor and temporary impacts because these areas would return to their herbaceous vegetation cover within 1 to 2 years following construction. DCG would restore temporary workspaces using native seed mixes recommended by the NRCS or seed mixes requested by landowners in agricultural and residential areas, in accordance with the FERC Plan and individual landowner agreements. Based on consultation with the NRCS, the use of potassium and phosphorus fertilizers may increase growth based on soil analysis, but the use of nitrogen is not recommended for native plants (Mikell, 2015). The Project would cross about 78.0 acres of soils identified as having poor revegetation potential, as discussed in section B.1.2. In these areas, if revegetation is not completed properly, the potential for erosion could increase. To minimize the potential for increased erosion and allow for successful revegetation, DCG would apply fertilizer according to the recommendation discussed above, and adhere to the FERC Plan by applying mulch and preparing the seedbed prior to seeding. DCG proposes to place the contractor yard near MP 18.3 in a developed/industrial area to avoid impacts on vegetation, and new temporary access roads would primarily cross open lands or agricultural lands where the vegetation would revert to pre-construction conditions within 1 to 2 growing seasons after construction. About 1.1 acres of open wetland vegetation would be affected due to the use of existing temporary access roads.

The upland, non-silvicultural forest habitat in the Project area is characterized by two forest types. The pine-mixed hardwood forest communities are located throughout the Project area and include an overstory/midstory comprised of loblolly pine, water oak, southern red oak, sweet gum, red maple, flowering dogwood, American holly, and black cherry. The understory is comprised of American beautyberry, muscadine, Japanese honeysuckle, common green brier, yellow jessamine, ebony spleenwort, and partridge berry. The oak-hickory forest communities are located in the Project area between MPs 19.0 and 23.0. Dominant species include mockernut hickory, water oak, southern red oak, flowering dogwood, American beautyberry, muscadine, common green brier, and spotted wintergreen. Japanese honeysuckle found in the pine-mixed hardwood forest is a non-native, invasive species.

Commercial silvicultural tracts in the Project area are dominated by loblolly pine stands, with common understory species consisting of sweet gum, black cherry, water oak, trumpet creeper, Japanese honeysuckle, ebony spleenwort, and blackberry. Longleaf pine stands were observed in the Calhoun County portion of the Project, associated with an understory comprised of water oak, turkey oak, bluejack oak, blackjack oak, blueberry, yellow jessamine, and reindeer lichen. A small, commercial sweet gum stand was also observed near MP 20.0. Japanese honeysuckle found in the commercial loblolly pine stands is a non-native, invasive species.

The forested floodplains are located within the Congaree River floodplain and their overstory includes loblolly pine, red-maple, box elder, sugarberry, southern red oak, swamp chestnut oak, and sweet gum. Understory species include Chinese privet, pawpaw, poison ivy, giant cane, Nepalese browntop, and Indian wood oats. Forested wetlands are discussed in greater detail in section B.2.3. Both Chinese privet and Nepalese browntop are non-native, invasive species.

About 75 percent of the proposed Project would be collocated with existing utility easements, which would reduce the amount of clearing needed to construct the Project, as discussed in section A.5.1 and shown in table A-3. DCG has proposed a number of HDDs and conventional bores to avoid or minimize impacts on wetlands and waterbodies and associated vegetation (see appendices D-1, E, and F). DCG would adhere to the FERC Procedures by not clearing between the exit and entry points of each HDD during construction or operation, with the exception of minor hand clearing within a 5-foot-wide area centered over the proposed HDD path for line of sight and laying guide wires, as necessary. In addition, DCG would clearly mark the workspace limits and any areas that are not approved for clearing.

Clearing of upland forest vegetation within the construction workspace would cause long-term impacts on upland forested areas because trees can require 20 to 50 years to reach maturity, depending on the species. About 61.3 acres of upland forest vegetation would be permanently converted to an herbaceous state along the maintained permanent right-of-way. Routine vegetation mowing or clearing over the full width of the permanent right-of-way (50 feet wide) would not occur more than once every 3 years, in accordance with the FERC Plan. However, regular vegetation maintenance may occur more frequently in a 10-foot-wide corridor centered on the pipeline, as necessary for pipeline maintenance. DCG would not perform maintenance clearing of vegetation during migratory bird nesting season, which is from April 15 through August 1 of each year, unless specifically authorized by the USFWS.

Four of the 40 proposed permanent access roads for construction and operation of the Project would be newly constructed. New permanent access roads would affect 3.7 acres of upland forest vegetation. Aboveground facilities constructed in upland forest would affect about 0.1 acre. In these areas, impacts on forest land would be permanent because the land would be converted to road surface or maintained as part of an aboveground facility for the life of the Project. Impacts and mitigation on forest land are also discussed in section B.5.1.

The term "edge effect" is commonly used in conjunction with the boundary between natural habitats, especially forests, and disturbed or developed land, such as utility rights-of-way. Typically, interior forest is defined as forest more than 300 feet from a non-forested edge or opening, and disturbance to these interior forest patches is commonly referred to as forest fragmentation (CLEAR, 2015). Where land adjacent to a forest has been cleared, sunlight and wind can penetrate to a greater extent, which can result in tree destabilization from increased wind shear, drying out of the interior of the forest close to the edge, and encouraging growth of invasive species at the edge. Fragmentation of forested areas can also result in changes in vegetation, such as invasion of shrubs along the edge. Because DCG has collocated the majority of the Project with existing infrastructure, forest fragmentation would be minimal. The remainder of the Project would result in minimal forest fragmentation because the pipeline would mainly be constructed through open lands and agricultural lands, or the forest area would be avoided through the use of the HDD construction method. In addition, much of the pipeline would be within 300 feet of open areas such as roads or railroads, resulting in minimal effects to interior forest parcels. About 0.4 mile of the Project from MPs 6.7 to 7.1 would be within a forested area further than 300 feet from any open areas or maintained areas; however, this location crosses or is within 300 feet of a silviculture area where maintenance and clearing would occur at a frequency determined by the landowner.

To minimize impacts on vegetation communities from construction and operation of the Project, DCG would follow the FERC Plan and Procedures for restoration and post-construction monitoring and reporting, including:

- conducting follow-up inspections of all disturbed areas, as necessary, to determine the success of revegetation during at least the first and second growing seasons;
- installing temporary erosion control measures, such as silt fence, sediment basins, and mulch; and
- annually monitoring and reporting to FERC on the status of revegetation until deemed successful.

Revegetation would be considered successful when native vegetation cover and diversity within the disturbed areas are similar to adjacent, undisturbed lands, in accordance with the FERC Plan. In agricultural areas, revegetation would be considered successful when crop yields are similar to adjacent undisturbed portions of the same field and pre-construction conditions. As wetlands would be crossed

using the HDD construction method or conventional bore method, vegetation would not be removed with the exception of minor hand clearing within a 5-foot-wide corridor centered on the pipeline. Wetlands not crossed by the pipeline but within construction workspaces may be temporarily affected by equipment crossing. If crossed by equipment, timber mats would be installed to avoid rutting; however, herbaceous vegetation would be compressed. Following construction, these wetland areas would be restored, as necessary, in accordance with the FERC Procedures.

Vegetation Communities of Special Concern

The SCDNR identified the following 16 vegetation communities of special concern within 1 mile of the proposed Project area: Atlantic white cedar swamp; bald cypress-tupelo gum swamp; bottomland hardwoods; mesic mixed hardwood forest; longleaf pine forest; montane longleaf pine-heath bluff woodland; pond pine/shining fetterbush-coastal sweet pepperbush-little gallberry woodland; *Pinus serotina/Arundanaira gigantea* ssp. tecta woodland; pond cypress pond; mesic subacid southern piedmont oak-hickory forest; rhododendron thicket; xeric sandhill scrub; Carolina bay; water tupelo-swamp blackgum swamp forest; swamp blackgum floodplain seepage forest; oak-hickory forest; and pine savanna (SCDNR, 2014a). These areas are considered vegetation communities of special concern because of their limited distribution and density in known locations, declining occurrences, and their ability to serve as habitat for threatened and endangered species (SCDNR, 2014a; SCDNR, 2015g).

The SCDNR requested that DCG take the vegetation communities of special concern into consideration during construction and operation of the Project. The majority of the listed vegetation communities of special concern (10 of 16) are associated with wetland systems, which would be avoided by using trenchless construction methods.

Noxious and Invasive Plant Species

Noxious or invasive plant communities can out-compete and displace native plant species, thereby negatively altering the appearance, composition, and habitat value of the affected areas. Non-native/invasive plant species that have been documented in the Project area include Chinese privet, Japanese honeysuckle, Nepalese browntop, Johnson grass, showy rattlebox, and bahia grass.

To minimize the spread of exotic and invasive species, the following preventative measures, among others, would be implemented during construction activities:

- equipment and timber mats would be cleaned of soil and debris and inspected by the EI prior to arrival on-site;
- DCG would install intermediate cleaning stations at locations where invasive plant species are identified, recommendations from state and federal agencies, locations of sensitive resources, and landowner requirements;
- cleared vegetation and stripped topsoil from areas containing invasive plants would be stored in place, identified as “invasive species stockpiles” using appropriate signs, and secured using erosion control measures, such as silt fencing. These materials would be returned to the same areas from which they were extracted during backfill operations; and
- materials used for erosion control would be certified by the appropriate state representative as “weed free,” based on the origin of the material.

In certain areas, chemical means (i.e., herbicides) may be used in conjunction with mechanical means to prevent the spread of invasive species prior to clearing and grading. Chemical means would be used in accordance with the USFWS, NRCS, and South Carolina Department of Pesticide Regulation

rules and regulations, as well as specific landowner agreements. DCG would not use herbicides or pesticides within a 100-foot buffer of wetlands or waterbodies without first acquiring approval by the appropriate state agency. Mechanical methods may include mowing, disking, hand-pulling, cutting with hand or power tools, and girdling larger shrubs or saplings (i.e., cutting through the bark all the way around a tree to kill it). DCG would conduct post-construction monitoring of invasive species during the growing season for two years following completion of construction. If invasive species are found in higher densities than adjacent lands, appropriate control measures would be implemented. These measures and others are described in more detail in DCG's *Non-Native Invasive Species Management Plan*, available for viewing on our website (eLibrary under Docket No. CP15-504-000).

Based on the types and amounts of vegetation that would be affected by the Project, and DCG's proposed avoidance, minimization, and mitigation measures to limit Project impacts, we conclude that impacts on vegetation from the proposed Project would be minor. These minor impacts would be long-term in forested areas and short-term in non-forested areas. The small amount of permanent impact on vegetation would not result in a significant impact on vegetation communities overall.

3.2 Aquatic Resources

All waterbodies crossed by the Project are freshwater and support only warmwater fisheries (see appendix D for a list of waterbodies crossed by the Project). Warmwater habitat is generally characterized by slower-moving bodies of water and their associated streams, which are less oxygenated compared to coldwater systems. Fish species associated with warmwater systems near the Project area include black crappie, blue catfish, bluegill, largemouth bass, pumpkin seed sunfish, smallmouth bass, striped bass, and yellow perch (SCDNR, 2014b). Common mussel species found throughout South Carolina include eastern floater, paper pondshell, and the eastern (or Florida) pondhorn (SCDNR, 2015g).

The proposed pipeline would cross 61 waterbodies as discussed in section B.2.2; however, DCG proposes to use a trenchless construction method to cross most waterbodies and those identified below and in section B.2.2 as containing fisheries of special concern. Use of a trenchless crossing method would avoid or minimize impacts on fisheries within the Project area. Specifically, DCG proposes to cross the Congaree River using the HDD construction method; therefore, impacts on the priority fish species under the purview of the Santee-Cooper Basin Diadromous Fish Plan and state priority species of concern would be minimized. However, if an inadvertent release of drilling mud occurs within a waterbody, the resulting turbidity could affect water quality and impede fish movement, potentially increasing the rates of stress, injury, and/or mortality experienced by individual fish.

Drilling mud or fluid is primarily made up of water and bentonite, as discussed in section B.2.1. Although bentonite is considered non-toxic to aquatic organisms (Hair et al., 2002), it is composed of fine particulate matter that at high concentrations in the water column can interfere with oxygen exchange via fish gills (USEPA, 1986). In addition, due to its small particle size, bentonite is likely to stay suspended in flowing water longer than in standing water; however, flowing water is likely to disperse the material more quickly than if discharged into standing water. The effect on mobile fish species would depend primarily on the duration of the inadvertent return and the amount of bentonite discharged and suspended in the water column. Impacts could occur on immobile aquatic species, such as mussels, eggs, and larvae, or less mobile juvenile fish. In the event of an inadvertent return, DCG would implement the measures in its *Inadvertent Release Plan*, to respond and minimize the duration of an event, and employ methods to contain the drilling mud following the release. While impacts on mobile fish species would be temporary and minimal, direct mortality of immobile mussel species or fish life stages could occur following an inadvertent release. Given the temporary nature of construction and DCG's implementation of its *Inadvertent Release Plan*, impacts on immobile species from inadvertent releases would not be expected to jeopardize the populations.

Based on our discussion in section B.2.2, DCG would cross 15 minor waterbodies using the open-cut construction method and would use the open-cut method in the event an HDD or conventional bore crossing fails, which could result in temporary sedimentation and turbidity in the water column. In addition, water quality could be adversely affected by an accidental spill of hazardous material into a waterbody. However, the majority of construction would occur between June and August of 2016, which would fall within the appropriate construction window for warmwater fisheries according to the FERC Procedures; therefore, impacts on warmwater fish species would be minimized.

DCG proposes to use eight existing roads that would cross waterbodies that may support certain species of fish (appendix D-2). The existing roads have culverts installed that DCG has determined would be sufficient for construction to maintain water flow and allow the passage of fish. In addition, DCG proposes to construct one new permanent access road (Access Road 032) that would cross an unnamed minor waterbody about 4 feet in width (NJ13-03 in appendix D-2) and would require the replacement of an existing culvert. Direct impacts on the waterbody during construction of the road would be short-term and minimal, and impacts on fish species in this particular waterbody would be temporary. Impacts could occur during use of the access roads, such as turbidity due to fugitive dust or sediment flow from the road into the waterbody during a rain event, but these impacts would occur during use of the road and only during certain weather conditions.

Impacts may also occur on fisheries during general construction activities should sediments run off the right-of-way and into a waterbody. Sedimentation would have similar effects on a waterbody as an inadvertent release, discussed above, including reduced feeding ability, stress, and potential oxygen deficiency.

Recreational fishing may occur in the perennial streams crossed by the Project, but no state-designated recreational fisheries are in the Project area (Mixon, 2016). Possible warmwater game fish in the Project area include bluegill, flier, green sunfish, pumpkin seed, redbreast, redear, spotted sunfish, warmouth bass, largemouth bass, smallmouth bass, spotted bass, redeye bass, striped bass, white bass, hybrid striped bass-white bass, white crappie, black crappie, rainbow trout, brown trout, brook trout, chain pickerel, redfin pickerel, sauger, walleye, and yellow perch. No coldwater fisheries would be crossed by the Project.

To minimize impacts on fisheries and aquatic resources from inadvertent releases during HDDs, spills of hazardous materials in upland areas, use of access roads, and sedimentation due to construction activity in upland areas, DCG would adhere to the FERC Procedures and its construction plans. DCG would use the following measures, among others:

- verify that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing and maintained throughout construction;
- install erosion controls to prevent sediment and siltation from entering streams and wetlands;
- inspect and ensure the maintenance of temporary erosion control measures at least:
  - on a daily basis in areas of active construction or equipment operation;
  - on a weekly basis in areas with no construction or equipment operation; and
  - within 24 hours of each 0.5 inch rainfall; and
- identify areas that should be given special attention to ensure stabilization and restoration after the construction phase.

Fisheries of Special Concern

Surface waters can be considered fisheries of special concern if they have exceptional recreational value, provide habitat for protected species, are subject to state fishery management regulations, are part of a stocking program, or support commercial or tribal harvests. Several surface waters in the vicinity of the Project area meet these criteria; however, none of the surface waters that meet the criteria occur at any of the crossings proposed by the Project. There are no waterbodies supporting commercial fisheries that would be crossed by the Project, and no state-designated recreational fisheries are in the Project area (Mixon, 2015). No federally-designated essential fish habitat was identified in or near the proposed Project area (NOAA, 2014a).

The Atlantic sturgeon and shortnose sturgeon are federally listed as endangered and may be present in the Congaree River. Potential impacts on these species and other threatened and endangered species are discussed in section B.4. The Congaree River provides habitat for the following priority species under the purview of the interagency Santee-Cooper Basin Diadromous Fish Passage Plan: blueback herring; American shad; American eel; and striped bass. Restoration efforts for the Santee-Cooper Basin and the priority fish species included in the Santee-Cooper Basin Diadromous Fish Passage Plan are ongoing (USFWS, 2015c). The SCDNR also identified the following species as "priority species of conservation" that are known to occur in waterbodies within or near the Project area: flat bullhead, present in Mill Creek (MP 5.7); sawcheek darter, present in Cabin Branch (ST14-03 at MP 13.4); seagreen darter, present in Cedar Creek (ST16-01 at MP 16.4); swampfish, present in a tributary to Cedar Creek; and both the sawcheek darter and swampfish in Toms Creek (ST21-01 at MP 20.7) (SCDNR, 2015g). Based on our review of DCG's application and supplemental filings as well as NHD data, the tributary to Cedar Creek referenced by the SCDNR could not be confirmed. Although the waterbody crossing could not be identified, it could be affected if the Project crosses this specific waterbody or a connecting waterbody upstream. No listed mussel species or species of concern were identified in the Project area (SCDNR, 2014a; USFWS, 2014a).

DCG would use a trenchless construction method to cross all of the waterbodies in the Project area that are known to contain sensitive species, thereby avoiding impacts on these species listed above. If a trenchless crossing is abandoned and a contingency crossing method is required, DCG has proposed to use an open-cut method which would require approval from the USACE and/or FERC prior to changing the crossing method. FERC would review DCG's request as a variance to the originally proposed construction method and would likely require that DCG use a dry open-cut crossing method, such as dam-and-pump or flume (as discussed in section A.7.2) at these five waterbodies.

Based on the proposed crossing methods for waterbodies within the Project area and DCG's adherence to the FERC Plan and its *SWPPP*, which includes erosion and sediment control measures, as well as the FERC Procedures, its *Inadvertent Release Plan*, and *Spill Plan*, we conclude that impacts on aquatic resources from the Project would be intermittent throughout construction and restoration, and minor.

3.3 Wildlife Resources

Within the Project area, there are several wildlife habitat types that correspond to the vegetation cover discussed in section B.3.1. Habitats include upland forest, open lands (existing rights-of-way, open fields, non-agriculture), agricultural lands (silviculture, pasture land, crop land), and wetlands (forested, scrub-shrub, emergent, open pond). Upland vegetation types are described in detail in section B.3.1 and wetland vegetation types are described in detail in section B.2.3.

Forested upland habitat is primarily comprised of pine/mixed hardwoods, oak-hickory forest, and floodplain forest containing mostly hardwood species, as well as silvicultural properties. These forest types provide food, cover, and nesting habitat for large mammals, such as black bear, bobcat, and white-tailed deer; small mammals, such as eastern chipmunk, gray fox, gray squirrel, opossum, pine vole, raccoon, and striped skunk; birds, such as tufted titmouse, Carolina wren, northern cardinal, wild turkey, and wood duck; reptiles, such as common garter snake, copperhead, and eastern box turtle; and amphibians such as oak toad.

Open land consists of scrub-shrub areas, open fields, and previously disturbed areas, such as maintained rights-of-way. In addition, the Project area contains agricultural land, such as pasture land and crop land. Open lands provide food, cover, and nesting habitat for a variety of wildlife species. Species common to these areas include mammals, such as bobcat, white-tailed deer, opossum, and striped skunk; and birds, such as American kestrel, mourning dove, northern cardinal, and red-tailed hawk. Although agricultural areas do not generally support a multitude of wildlife species, they are particularly good for foraging and provide cover in the hedge rows between fields.

Four different types of wetland habitat commonly occur in the Project area: PFO, PSS, PEM, and PUB. Additionally, some wetland habitats are best characterized as a mixture of habitat types (e.g., PEM/PSS, PFO/PSS). Wetland habitat types are described in detail in section B.2.3. Wetlands provide an abundance of food, cover, and habitat to a variety of mammals, reptiles, amphibians, and birds. Wildlife species use common herbaceous plants in the emergent wetlands encountered along the Project for nesting, feeding, and migratory stopovers. Species commonly found in wetland habitats in the Project area including mammals such as black bear, American beaver, opossum, raccoon, and swamp rabbit; birds such as egrets, herons, hooded warbler, and wood duck; reptiles such as broadhead skink, cottonmouth, eastern box turtle, glass lizard, and rattlesnake; and amphibians such as oak toad.

Construction and operation of the Project would result in various short- and long-term impacts on wildlife. Impacts would vary depending on the specific habitat requirements of the species in the area and the vegetation land cover crossed by the proposed right-of-way (see table B-7 in section B.3.1). Potential short-term impacts on wildlife include the displacement of individuals from construction areas and adjacent habitats to less suitable habitats, which could cause wildlife to expend energy to find alternate habitats and potentially reduce foraging or breeding success. Small, less-mobile mammals, reptiles, and amphibians could experience direct mortality as they may be unable to leave the construction area or leave quickly enough. In addition, larger wildlife that prefer to travel in open areas, such as white-tailed deer, could experience direct mortality from use of the access roads. Long-term impacts would include conversion of forested or early successional habitats to cleared areas and maintained right-of-way, and periodic disturbance of wildlife during operational maintenance. Altered habitat and periodic disturbance could also increase wildlife mortality, injury, and stress.

DCG has collocated the majority of the proposed route with existing utility rights-of-way to minimize disturbance on wildlife habitat. In total, construction of the proposed pipeline and associated workspace would temporarily impact 104.6 acres of upland forest, 151.2 acres of open land, 70.0 acres of agricultural land, and 1.4 acres of wetlands. During operation, 57.5 acres of upland forest within the permanent right-of-way would be converted to and maintained in an early successional stage, as well as 0.1 acre of aboveground facilities and 3.7 acres of access roads. Within open land, 24.7 acres within the permanent right-of-way would not experience a vegetation change, and 31.5 acres of agricultural land would be allowed to return to pre-construction condition. DCG would use trenchless crossing methods at wetland crossings to avoid permanent impacts on wetlands (discussed in section B.2.3).

DCG proposes to use 57 existing roads and 8 newly constructed access roads during construction of the pipeline facilities. Nine permanent access roads, seven of which are existing roads, would be used

for aboveground facility operation. A total of 3.7 acres of forested uplands, 0.1 acre of open uplands, and 2.0 acres of agricultural land would be permanently affected by construction of new access roads or widening of existing roads. As the majority of the access roads are existing roads, construction impacts on wildlife would be minimal; however, some wildlife could experience direct mortality during construction and operation from use of the access roads. The access roads would be low speed roadways; therefore, direct mortality from use of the roads would be minimal.

Forest fragmentation is defined as the separation of interior forest parcels from one another, which could result in changes in vegetation (e.g., invasion of shrubs along the edge), curtail the movement of species between adjacent forest blocks, increase predation, and decrease reproductive success for some species (Rosenberg et al., 1999). Typically, interior forest is defined as forest land more than 300 feet from a forest edge or open land (CLEAR, 2015). DCG would collocate the majority of the Project with existing utility rights-of-way; therefore, forest fragmentation would be minimal (discussed in more detail in section B.3.1).

Given the presence of previously disturbed habitat, many of the wildlife species in the Project area are accustomed to changing habitat conditions and are capable of moving to adjacent areas to find alternative sources of food, water, and shelter until the disturbed habitats become re-established (DeGraaf et al., 1992). Although individuals of some wildlife species could be affected, the effects would primarily be temporary and minor.

Based on the extent of collocation with existing rights-of-way, the presence of similar habitats adjacent to and in the vicinity of construction activities, and the implementation of avoidance and minimization measures according to the FERC Plan and Procedures, we conclude that construction and operation of the Project would not have population-level or measurable negative impacts on wildlife.

Managed and Sensitive Wildlife Areas

The USFWS and SCDNR were consulted to identify managed or sensitive wildlife habitats in the Project vicinity. No Wildlife Management Areas or National Wildlife Refuges were identified near the proposed Project; however, the Project would cross conservation land, potential habitat for threatened and endangered species, and would be located about 5 miles north of Congaree National Park, an important birding area. Conservation land that would be crossed by the pipeline includes areas within the Cowasee Basin, the Wavering Place Plantation, Richland County-owned land, and the Rainbow Place Plantation. Impacts on conservation land crossed by the Project are discussed in section B.5.2. Impacts on threatened and endangered species are discussed in section B.4. Impacts on migratory birds are discussed below.

DCG has proposed a pipeline route that would minimize impacts on sensitive lands and habitat types, and would implement impact minimization measures as described in the FERC Plan and Procedures. These measures include:

- minimizing the amount of extra workspace needed;
- not conducting vegetation maintenance over the full width of the permanent right-of-way in wetlands when maintenance is needed;
- maintaining a 25-foot-wide riparian strip at waterbodies if trenchless methods cannot be used;
- restricting maintenance clearing to August 2 through April 14 to avoid impacts on nesting birds;

- stabilizing and revegetating affected lands with seed mixes containing native species, as approved by federal and state agencies; and
- allowing revegetation by natural succession where practicable while still allowing for safe operation and maintenance of the pipelines.

Migratory Birds

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S. Code 703-711) and bald and golden eagles are additionally protected under the Bald and Golden Eagle Protection Act (16 U.S. Code 668-668d). Executive Order 13186 (66 FR 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the USFWS.

Executive Order 13186 was issued, in part, to ensure that environmental analyses of federal actions assess the impacts of these actions/plans on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and it prohibits the take of any migratory bird without authorization from the USFWS. On March 30, 2011, the USFWS and the Commission entered into a Memorandum of Understanding that focuses on avoiding or minimizing adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the USFWS. This voluntary Memorandum of Understanding does not waive legal requirements under the Migratory Bird Treaty Act, the Endangered Species Act (ESA), the NGA, or any other statutes, and does not authorize the take of migratory birds.

The proposed Project is within Region 27 (Southeastern Coastal Plain) of the North American Bird Conservation Initiative. Priority landbirds within the Region include the red-cockaded woodpecker, painted bunting, Bachman's sparrow, Swainson's warbler, and swallow-tailed kite. The red-cockaded woodpecker is federally listed as endangered and is discussed in section B.4. The Region also provides important wintering and spring migration areas for shorebirds, such as the short-billed dowitcher and dunlin, and waterfowl such as canvasback, mallard, American wigeon, redhead, American black duck, and tundra swan; important fall staging areas for the red knot; and nesting and foraging habitats for herons, egrets, ibis, and terns (NABCI, 2016).

The primary concern for migratory birds is mortality of eggs and/or young, as mature birds generally avoid active construction. Tree clearing and ground disturbing activities could impact birds during critical breeding and nesting periods, potentially resulting in the loss of nests, eggs, or young birds. In addition, forest fragmentation, described above in section B.3.1, could increase predation, competition, and reduce nesting and mating habitat for migratory birds (Faaborg et al., 1995).

The proposed construction schedule would require clearing beginning in May 2016, which is within the April 15 to August 1 timeframe when nesting migratory birds could be affected. The painted bunting, swallow-tailed kite, short-billed dowitcher, dunlin, waterfowl species, the red knot, ibis, and several of the tern species do not breed within or near the Project area (NAS, 2016). These species would likely avoid the Project area during construction. The Swainson's warbler typically nests in shrubs near or over water. The heron and egret species that could be present within the Project area generally breed in colonies near water. Because DCG is proposing to cross the majority of wetlands and waterbodies using trenchless methods, impacts on these species would be minimized. In addition, DCG did not observe any wading bird nesting colonies during field surveys. The gull-billed tern and the least tern could be present

within the Project area and may breed near the Project area; however, they typically prefer bare or lightly vegetated shallow depressions on beaches, islands, or sand flats (NAS, 2016). The preferred nesting habitat for these two tern species is not present in the Project area; therefore, impacts on nesting of these species would be minimal. The Bachman's sparrow may nest within the Project area on the ground in herbaceous or shrubby areas and nests could be affected during clearing of the right-of-way (NAS, 2016).

In order to reduce impacts on birds during construction, DCG would implement the following mitigation measures:

- minimize overlap of construction clearing with primary nesting seasons as much as practicable;
- inspect forested areas where clearing would take place prior to clearing activities to identify active nests; and
- avoid active nests to the extent practicable in accordance with provisions of the Migratory Bird Treaty Act.

To further ensure that appropriate avoidance and minimization measures would be used for migratory birds, **we recommend that:**

- **Prior to construction, DCG should file with the Secretary consultation with the USFWS South Carolina field office regarding migratory birds to determine what, if any, additional minimization and mitigation measures would be appropriate for the Project.**

The bald eagle is federally protected under the Bald and Golden Eagle Protection Act. Bald eagles prefer to forage and nest near large bodies of open water, including rivers (USFWS, 2007). Eagles could potentially be present within the Project area; therefore, DCG reviewed the SCDNR occurrence records and found that a known nest location was recorded near the Congaree River approximately 0.7 mile west of a proposed access road and 0.9 mile west of the proposed pipeline right-of-way. The known nest location is outside of the required 660-foot buffer as mandated in the USFWS National Bald Eagle Management Guidelines, and blasting is not likely to be required for the Project; therefore, the known nest location would not likely be affected by Project activities. We conclude the proposed Project would not adversely impact the bald eagle. In a letter to FERC from the USFWS dated June 30, 2015, the USFWS agreed.

Based on the extent of collocation with existing rights-of-way, the presence of similar habitats adjacent to and in the vicinity of construction activities, and the implementation of impact avoidance and minimization measures, we conclude that construction and operation of the Project would not have population-level or measurable negative impacts on migratory birds.

4. Threatened, Endangered, and Other Special Status Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the ESA or are proposed or candidates for such listing by the USFWS or by NOAA/NMFS, and those species that are state-listed as threatened, endangered, or other special status. As described in section A.9, table A-5, FERC is required by Section 7(a)(2) of the ESA to ensure that any action authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened, endangered, or proposed species, or result in the destruction or adverse modification of the designated critical habitat for a federally listed or proposed species. FERC, as the lead federal agency is responsible for the Section 7 consultation process with the USFWS and the NMFS.

Species classified as candidates for listing under the ESA do not currently have federal protection; however, because they may be listed in the near future, they are discussed herein.

To assist us with complying with the requirements of the ESA, DCG, as our non-federal representative, initiated informal consultations with the USFWS South Carolina field office, the NMFS Southeast Regional Office, and the SCDNR to determine if any federally or state-listed threatened and endangered species (including federal and state species of concern) or their designated critical habitats occur within the Project area.

DCG also conducted habitat assessment surveys to identify potential habitats for threatened and endangered species within the proposed Project area. A description of federal and state-listed species that may occur in the Project area, preferred habitats, and our determinations of effect are provided in appendix G. As discussed below, the USFWS concurred with DCG's determinations of *may affect, not likely to adversely affect* for five of the federally protected species and we conclude no further consultation is required under Section 7 of the ESA. To comply with Section 7, we are submitting this EA as our Biological Assessment for the Project for the remaining three species and request concurrence from the USFWS on our determination for the rough-leaved loosestrife, and from the NMFS on our determinations for the Atlantic sturgeon and shortnose sturgeon.

4.1 Federally Listed Threatened and Endangered Species

Seven federally listed species were identified as potentially occurring in the Project area. Additionally, one species was identified as a candidate for listing, one species was identified as federally protected, and 12 species were identified as at-risk species. The at-risk species included in appendix G have been petitioned for listing and a positive 90-day finding has been issued. At-risk species are not further discussed, as they have not yet been determined to be candidate species for listing and do not have federal protection. However, we conclude that impacts on these species would be minimal, given DCG's implementation of the FERC Plan and Procedures and other protection measures discussed in this EA. While individuals could be affected or experience direct mortality, this would not result in significant or population-level impacts.

Red-Cockaded Woodpecker

The red-cockaded woodpecker is federally listed and state-listed as endangered. Habitat surveys were conducted by DCG in 2014 to identify potential habitat and nesting sites in a survey corridor 200 feet wide along the proposed pipeline route and 50 feet wide along proposed access roads. Potential foraging habitat for the red-cockaded woodpecker was identified in the vicinity of the Project on properties with commercial silvicultural operations. In addition, suitable nesting habitat was identified during surveys in a hardwood floodplain forest between MPs 5.5 and 6.5. The suitable nesting habitat was surveyed for evidence of nesting cavities, or the beginning stages of nesting cavities; however, none were found. DCG also reviewed the SCDNR Natural Resources Heritage Trust database (SCDNR database) for records of red-cockaded woodpeckers in the area, but no occurrence records were found. Based on the survey data, database review, and desktop review of aerial imagery in the vicinity of the Project area, we conclude the Project *may affect, but would not likely adversely affect* the red-cockaded woodpecker. In a letter to FERC from the USFWS dated June 30, 2015, the USFWS concurred with this determination; thus no further consultation is required for this species.

Wood Stork

The wood stork is federally listed as threatened and state-listed as endangered. Wood storks are generally found in larger wetland systems, and several areas within the Project area were identified as potential nesting habitat for the wood stork near Mill Creek, Sunset Lake, and Tom's Creek. Although

potential habitat was identified and wood storks may be present in the area, no wood stork nest sites were identified during field surveys. DCG also reviewed the SCDNR database and no occurrence records were found. To avoid impacts on wetlands and waterbodies, DCG is proposing to use the HDD or conventional bore methods for many areas along the proposed Project, including the areas with potential nesting habitat for the wood stork. An inadvertent release could occur during a trenchless crossing of an area with wood stork nesting habitat. DCG would follow its *Inadvertent Release Plan* should one occur, which would increase activity in the area. However, wood storks present in the Project area would likely avoid the area during cleanup and return once construction is complete and the area is restored. If a trenchless crossing must be abandoned and a contingent crossing method used, DCG has proposed to use an open-cut method which would require notification to USACE and FERC prior to changing the crossing method. Given the survey information, database reviews, and the proposed use of the HDD method, we conclude the Project *may affect, but would not likely adversely affect* the wood stork. In a letter to FERC from the USFWS dated June 30, 2015, the USFWS concurred with this determination; thus no further consultation is required for this species.

Atlantic Sturgeon and Shortnose Sturgeon

The Atlantic sturgeon is federally listed as endangered. The Atlantic sturgeon is one of the largest sturgeon species. It spends the majority of its life in saltwater, but enters freshwater to spawn between February and March each year. Most adults do not appear to spawn every year. Within days of spawning, the eggs hatch and the juveniles migrate downstream to brackish water and estuarine habitats for several years before moving to open saltwater. The Congaree River contains suitable habitat for the Atlantic sturgeon; however, dams on the downstream sides of Lake Marion and Lake Moultrie generally inhibit the movement of Atlantic sturgeon from the ocean to the Congaree River. According to the *Draft Summary of Biological Information and Economic Analysis Prepared for Consideration of Critical Habitat Designation for the Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon Report* produced by the NMFS in 2015, one Atlantic sturgeon has been recorded in Lake Marion that could have access to the Congaree River and the Project area (NMFS, 2015).

The shortnose sturgeon is federally and state-listed as endangered. This sturgeon is one of the smaller sturgeon species. In the southern portion of its range, which includes South Carolina, it spends the majority of its adult life in saline estuaries or in its natal river. The shortnose sturgeon typically spawns in late winter and early spring; however, individuals do not appear to spawn every year. Once hatched, the young begin their migration toward saline water and can spend up to 10 years at the saltwater/freshwater interface of their natal river. The population of shortnose sturgeon upstream of the Santee and Pinopolis Dams on Lake Marion and Lake Moultrie are generally considered a landlocked population. Several shortnose sturgeon have been observed within the Congaree River and Lake Marion and could be present within the Project area (NMFS, 1998; Santee-Cooper, 2015).

Both sturgeon species could use the Congaree River for spawning in the late winter and early spring months (FLFWC, 2015; NOAA, 2015b, 2015c). During spawning, sturgeon species are known to emit low-frequency vibrating sounds that attract other males and maximize the mating opportunities for both males and females (Bruch and Binkowski, 2002). To avoid impacts on the Congaree River and both species of sturgeon, DCG proposes to use the HDD method to cross the river. However, the USFWS, in its letter to FERC dated June 30, 2015, suggested that impacts on spawning could occur due to vibration from the HDD, creating potential interference with the low-frequency sounds emitted by the males. We believe the potential impact on sturgeon from HDD vibration would be minimal. HDD operations do not typically use pile driving or hammering, but rather continuous drilling through the substrate, resulting in fewer vibratory impacts. Since the drill path would be well below the bed of the river, vibrations would need to travel through approximately 25 feet of substrate and the water column, and do so at an intensity great enough to affect the sturgeon. DCG proposes to cross the Congaree River between mid-June and

late July 2016, which would avoid the spawning period and therefore avoid impacts on spawning success of the sturgeon species. As the sturgeon that could reproduce in the Congaree River are landlocked, the number of sturgeon of reproduction age is likely limited and a reproducing population of Atlantic sturgeon is not likely to be present in the Project area (Rohde, 2015). Impacts could occur on the adults that remain present in the area following spawning, due to vibration during the HDD; however, sturgeon are very mobile species and would likely vacate the area if disturbed during the HDD. Coordination with the NMFS, the agency with jurisdiction over the Section 7 process for these species, is ongoing.

In some instances, it is possible that the use of the HDD method may not succeed due to site-specific crossing conditions, and an alternative crossing method may be utilized. Implementation of our recommendation in section B.2.2 that DCG consult with the FERC and the USACE, NMFS, USFWS, and SCDHEC, prior to initiating any alternative crossing method for the Congaree River HDD would minimize potential impacts on Atlantic sturgeon and shortnose sturgeon.

To complete the required ESA consultations for the Project, the FERC requires concurrence with our determinations of effect from NMFS for the Atlantic and shortnose sturgeon. Therefore, **we recommend that:**

- **DCG should not begin construction activities until:**
  - **a. FERC staff receives comments from the NMFS regarding the proposed action relative to the Atlantic sturgeon and shortnose sturgeon;**
  - **b. FERC completes any necessary Section 7 consultation with the NMFS for the Atlantic sturgeon and shortnose sturgeon; and**
  - **c. DCG has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.**

Given the timing of the proposed HDD of the Congaree River and our recommendations, impacts on the sturgeon species are expected to be short-term during the HDD only and minimal in nature. Therefore, we conclude the Project *may affect, but would not likely adversely affect* the Atlantic sturgeon and the shortnose sturgeon.

Broad River Spiny Crayfish

The Broad River spiny crayfish is an at-risk species identified by the USFWS in Richland County. It is present only within the Broad River watershed and can be found in areas that are indicative of flash flooding and contain sand deposits or log jams. Little is known about the species, as collection is not abundant during surveys, but it seems they prefer primarily large river habitats (SCNDR, 2015a). At the request of the USFWS in its October 7, 2014 letter, DCG conducted surveys for the Broad River spiny crayfish. These surveys were conducted during a time of heavy rainfall in the area and would, therefore, include areas that may previously have been dry but are now inundated. DCG proposes to cross all wetland areas and most waterbodies using trenchless construction methods, which would avoid most impacts on the Broad River spiny crayfish and its habitat. As discussed above, in the event of an inadvertent release, DCG would follow its *Inadvertent Release Plan* to minimize impacts and clean the area as quickly as possible, and would notify the USACE and FERC prior to making a change in crossing method should a trenchless crossing method not be feasible. Therefore, we conclude the Project would not likely cause a trend toward federal listing for the Broad River spiny crayfish.

Canby's Dropwort

Canby's dropwort is a perennial herb that is federally listed as endangered and is a species of concern in South Carolina. The species generally prefers herbaceous wetland habitats, which are present throughout the Project area in the existing rights-of-way (USFWS, 2015e). Although habitat is present within the Project area, no individuals or populations were identified during DCG's field surveys, and the SCDNR database did not contain any occurrence records for this species. In addition, DCG is proposing to cross wetlands using the HDD or conventional bore methods to minimize impacts and would follow its *Inadvertent Release Plan* in the event of a release. Therefore, we conclude that the Project *may affect, but is not likely to adversely affect* the Canby's dropwort. In a letter to FERC from the USFWS dated June 30, 2015, the USFWS concurred with this determination; thus no further consultation is required for this species.

Rough-Leaved Loosestrife

Rough-leaved loosestrife is a perennial herb federally listed as endangered and considered a species of concern by the SCDNR. Typically, this species is found in grass-shrub transition zones between longleaf pine communities and pond pine pocosins (USFWS, 2015f), especially in open areas maintained by fire or other action. No habitat of this type was found within the Project area, and the closest occurrence record for this species is approximately 10 miles north of the Project area. In addition, DCG proposed to cross the majority of wetland habitats using trenchless construction methods; therefore, if present, impacts on the pond pine pocosins and the habitat immediately adjacent to them would likely be minimal. However, surveys have not yet been completed throughout the Project area, and this species is known to inhabit powerline rights-of-way where regular maintenance occurs. In a letter from the USFWS to DCG dated October 7, 2014, the USFWS indicated that surveys must be completed prior to its concurrence with a determination. Therefore, **we recommend that:**

- **DCG should not begin construction activities until:**
  - **a. surveys for the rough-leaved loosestrife are complete and the results and any comments from the USFWS have been provided to the Secretary for review;**
  - **b. FERC completes any necessary Section 7 consultation with the USFWS for the rough-leaved loosestrife; and**
  - **c. DCG has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.**

Although we believe the chance that the Project would impact this species is small, given the lack of known occurrences in the Project area and the lack of preferred habitat, impacts on the rough-leaved loosestrife cannot be discounted. Our recommendation will ensure ESA consultation for this species is completed prior to any Project construction.

Smooth Coneflower

Smooth coneflower is a perennial herb that is federally listed as endangered and considered a species of concern by the SCDNR. However, the SCDNR did not identify smooth coneflower as present within 1 mile of the proposed Project area, per its letter to DCG dated October 24, 2014. This species typically can be found in areas that contain soils with significant amounts of magnesium or calcium, and have little vegetation and open canopies (USFWS, 2015g). Within the Project area, suitable habitat was found in existing rights-of-way, along roadsides, and at the edges of open fields. However, no soils within the Project area are known to contain high levels of magnesium or calcium and no individuals or

populations were observed during field surveys. In addition, the SCDNR database did not contain any occurrence records in the vicinity of the Project area; therefore, we conclude the Project *may affect, but would not likely adversely affect* the smooth coneflower. In a letter to FERC from the USFWS dated June 30, 2015, the USFWS concurred with this determination; thus, no further consultation is required for this species.

Georgia Aster

The Georgia aster is a perennial herb that is a candidate species for federal listing and considered a species of concern in South Carolina. However, the SCDNR did not identify the Georgia aster as present within 1 mile of the proposed Project, per its letter to DCG dated October 24, 2014. This species is generally found along edges and openings in rocky, upland oak-hickory-pine forests, and rights-of-way within these habitats. It is primarily a Piedmont species rather than a coastal species where the Project is located (Georgia DNR, 2015; USFWS, 2014b). Surveys were not conducted for this species. Should the species become listed or proposed for federal listing prior to completion of construction, the FERC would need to consult with the USFWS under Section 7 of the ESA to determine the appropriate avoidance, minimization, and/or mitigation measures to protect the species. Given the lack of suitable habitat, we conclude that the Project would not adversely impact the Georgia aster nor contribute to a trend toward federal listing.

4.2 State-Listed Threatened, Endangered, and Special Status Species

Several of the state-listed species that could be present in the Project area also have federal status; these are discussed above. In addition, the bald eagle could be present in the Project area and is discussed above in section B.3.3. The SCDNR also identified the Rafinesque's big-eared bat, which is state-listed as endangered and could be present in the Project area. This species could be affected by tree clearing at the beginning of construction, as roost trees may be cleared while bats are present. However, given their propensity for different types of roosts and their mobility, the bats could move to another roost if disturbed during clearing or construction. Based on the construction timeline, it is not likely that the species would be disturbed by construction during the hibernation period when they are more sensitive to disturbance (SCDNR, 2015b). Therefore, we conclude the Project would not significantly impact Rafinesque's big-eared bats.

5. Land Use, Recreation, and Visual Resources

5.1 Land Use

Construction of the Project would impact land use along the pipeline route as described below. Land use types affected by the Project include agricultural, upland forest, open land, wetlands, open water, developed, and residential. Table B-8 summarizes the acreage of each land use that would be affected during construction and operation of the Project.

The Project would affect a total of about 357.5 acres of land during construction, including the pipeline construction right-of-way, ATWS areas, contractor yard, access roads, and new aboveground facilities. Following construction, about 230.1 acres would be restored to pre-construction uses. The remaining 171.1 acres would be maintained for operation of the Project.

Table B-8

Land Use Acreages Affected by the Project

Land Use / Impact	Pipeline	Access Roads	Aboveground Facilities	Contractor Yard	Totals
Agricultural Land					
Construction [a]	67.5	2.0	0.5	0.0	**70.0**
Operation [b]	36.0	2.0	0.4	0.0	**38.4**
Forest [c]					
Construction [a]	100.5	3.9	0.2	0.0	**104.6**
Operation [b]	57.5	3.7	0.1	0.0	**61.3**
Open Land					
Construction [a]	59.3	89.8 [d]	0.3	<0.1	**149.4**
Operation [b]	23.5	32.8 [d]	0.2	0.0	**56.5**
Developed/Industrial					
Construction [a]	7.1	14.1	0.3	8.8	**30.3**
Operation [b]	1.5	12.0	0.2	0.0	**13.7**
Residential					
Construction [a]	3.2	0.0	0.0	0.0	**3.2**
Operation [b]	1.2	0.0	0.0	0.0	**1.2**
Project Total					
Construction [a]	**237.6**	**109.8**	**1.3**	**8.8**	**357.5**
Operation [b]	**119.7**	**50.5**	**0.9**	**0.0**	**171.1**

a Includes land that would be needed for both construction and operation.
b Includes land that would be permanently impacted from Project operation.
c Commercial silvicultural land is included in this category.
d Includes the use of existing roads.

Agricultural Land

About 5.7 miles (20 percent) of the pipeline route crosses agricultural land used for crop production (predominantly corn, soybeans, sunflower, and sorghum), hayfields, and pasture land. The Project would not affect any areas containing organic farms or specialty crops. Areas within commercial silvicultural tracts (i.e., planted pine and sweet gum) are discussed in the Forest Land section below. About 70.0 acres of agricultural land would be affected by construction, including 31.6 acres of temporary construction use and 38.4 acres of permanent use. The 38.4 acres of permanent use include 36.0 acres of permanent right-of-way, 2 acres of newly constructed access roads, and 0.4 acre of aboveground facilities.

Following construction, all temporary work areas as well as 36 acres of permanent right-of-way would be allowed to revert to a similar agricultural use (i.e., would not be able to convert to silviculture). About 2.4 acres of prime farmland soils within agricultural land would be permanently impacted due to construction of four MLVs and one new permanent access road. Prime farmland soils affected by construction of the pipeline are discussed in section B.1.2.

DCG would minimize adverse impacts on agricultural land by implementing measures in accordance with the FERC Plan and Procedures, unless otherwise specified by the landowner. DCG would work with landowners to ensure proper restoration of agricultural areas, based on discussions and/or agreements regarding seed mixes or other restoration methods. To minimize and mitigate impacts on agricultural resources within the construction area, DCG would:

- segregate and stockpile topsoil on cultivated lands, including up to 12 inches of topsoil in deep soil. Every effort would be made to segregate the entire topsoil layer in soils with less than 12 inches of topsoil;
- maintain natural flow patterns within agricultural fields;
- remove excess rock material from around the pipeline and within the upper 12 inches of soil;
- conduct compaction testing and decompact the soil, where necessary;
- protect drain tile and irrigation systems during construction and perform repairs if any damage occurs during construction of the Project; and
- return agricultural land to pre-construction contours, as practicable.

Following construction, in accordance with the FERC Plan and terms of landowner easement agreements, crops would be visually inspected and revegetation would be considered successful when crop growth and yield are similar to adjacent undisturbed portions of the same field, construction debris has been removed (unless requested otherwise by the landowner), and proper drainage for agricultural land has been restored. At a minimum, DCG would conduct inspections after the first and second growing seasons and would continue revegetation efforts until revegetation is successful. Based on the mitigation measures described above, including implementation of the FERC Plan, we conclude construction-related and operational impacts on agricultural land would be predominantly short term and minor.

Forest Land

About 15.4 miles (55 percent) of the pipeline route is forest land composed of upland forest and commercial silvicultural tracts. Upland forests are primarily comprised of pine/mixed hardwoods, oak-hickory forest, and floodplain forest containing mostly hardwood species as discussed in section B.3.1. Commercial silvicultural tracts primarily consist of loblolly pine and longleaf pine (with common understory species, also discussed in section B.3.1), and sweet gum. As shown in table B-8 above, about 104.6 acres of forest land, including 15.1 acres of commercial silvicultural tracts, would be affected by the Project during construction. Of the total forest land that would impacted, about 61.3 acres would be permanently converted during operation, including 2.7 acres of newly constructed permanent access roads and 1 acre of permanent conversion due to widening of existing roads.

Of the 15.1 acres of forest land within commercial silvicultural tracts, about 7.1 acres would be temporarily impacted during construction of the Project and 8.0 acres would be permanently impacted by operation as shown in table B-9. About 6.5 acres of prime farmland soils within commercial silvicultural tracts would be permanently impacted due to maintenance of the permanent right-of-way and construction of an MLV. Prime farmland soils affected by construction of the pipeline are discussed in section B.1.2.

Table B-9

Commercial Silvicultural Land Affected by the Project

Impact	Pipeline	Access Roads [b]	Aboveground Facilities	Project Total
Temporary	7.1	<0.1	0.0	7.1
Permanent	6.3 [a]	1.5 [c]	0.2	8.0
Project Total	**13.4**	**1.5**	**0.2**	**15.1**

a An additional 0.8 acre of commercial silvicultural land is crossed by the proposed route; however, impacts would be avoided through the use of the HDD construction method. Therefore, the 0.8 acre that would be avoided is not included in the permanent right-of-way calculation for the pipeline.

b Existing roads are classified as Open Land and are represented as such in table B-8. In commercial silvicultural land, DCG would use 2.1 acres of existing roads temporarily and 4.4 acres of existing roads permanently.

c Includes permanent widening of existing roads and construction of one new access road.

Construction of the Project would result in long-term effects on forest land due to clearing along the construction corridor, access roads, and within temporary workspaces. To minimize impacts on forest land, DCG has collocated the proposed pipeline within existing utility rights-of-way or open fields, to the extent practicable. Once construction is complete, trees and shrubs would be allowed to regrow and landowners would be allowed to replant within the temporary construction work areas. Furthermore, DCG would install and maintain measures to control unauthorized vehicle access to the permanent right-of-way in forest lands in accordance with the FERC Plan and terms of landowner easement agreements. Further discussion on impacts on vegetation communities can be found in section B.3.1. Impacts on forest lands in temporary construction areas would be temporary, but long-term, as it would take 20 years or more for mature trees to re-establish. Visual impacts from forest clearing are discussed in section B.5.4.

Open Land

About 5.8 miles (21 percent) of the proposed pipeline route crosses open land primarily consisting of existing dirt and gravel roads, as well as upland that is actively maintained in scrub-shrub and herbaceous vegetation and is mainly associated with existing utility rights-of-way. About 149.4 acres of open land would be affected by the Project, including 92.9 acres of temporary construction work areas and 56.5 acres retained for permanent use. About 89.8 acres of open land would be maintained as access roads, of which 0.1 acre would be newly constructed. The remaining 89.7 acres represent existing roads that would be permanently improved by DCG. Areas within both the temporary construction right-of-way and the permanent right-of-way would be allowed to revert to their original conditions following construction. As such, we conclude impacts on open land would be predominantly short-term and minor.

Wetlands

DCG proposes to cross wetlands using the HDD method or conventional boring method. Therefore, little to no land use impacts on wetlands are expected. Additional information on wetland impacts, mitigation, and restoration is provided in section B.2.3.

Open Water

Open waterbodies are characterized as waterbodies 100 feet wide or greater. DCG proposes to cross the Congaree River using the HDD method. Therefore, no land use impacts on open water are expected. Section B.2.2 discusses the impacts and mitigation associated with waterbody crossings.

Developed/Industrial Land

About 0.6 mile (2 percent) of the pipeline would cross developed/industrial land identified as commercial areas, paved areas, railroads, and paved roadways. About 30.3 acres of developed/industrial land would be affected by the Project, including 16.6 acres temporarily during construction and 13.7 acres permanently during operation. The contractor yard is an abandoned 8.8-acre industrial facility which DCG would use during construction. Of the 16.6 acres of temporary construction use, 14.1 acres represent existing roads that would be permanently improved by DCG. No new access roads would be constructed in developed/industrial land.

The Project would cross 5 railroads, 18 state roads, 7 county roads, and 5 private roads. Roads consist of asphalt-paved, gravel, and dirt, and include residential and commercial entrance drives and parking areas. All railroads, paved public roads, and paved private roads would be crossed using the HDD or conventional bore methods (appendix E). DCG identified 11 dirt and gravel roadways that would be crossed by the open-cut method as described in section A.7.2. No commercial buildings are within 50 feet of the proposed construction work areas.

Based on DCG's commitment to use trenchless crossing methods at all railroads and paved roads, as well as its implementation of the FERC Plan, we conclude impacts on developed and industrial land would be predominantly short-term and minor.

Residential Land

About 0.6 mile (2 percent) of the pipeline would cross active residential land. About 3.2 acres of residential land would be affected by the Project, including 2.0 acres of temporary construction work areas and 1.2 acres of permanent right-of-way. No new access roads would be constructed across residential land.

DCG identified five residences within 50 feet of the proposed construction work areas, two of which are within the proposed right-of-way. DCG entered negotiations with the property owners in order to purchase these two residences. Negotiations were completed in October 2015 and DCG acquired both properties. Of the three remaining residences, two would be within 25 feet of the construction work area, as described in table B-10.

Table B-10

Residential Structures within 50 Feet of Construction Work Areas

County	MP	Distance to Workspace (feet)	Direction to Workspace
Richland	11.9	7	South
	12.0	28	South
	23.8	0	North

DCG developed site-specific construction plans for the three affected residences within 50 feet of proposed construction work areas (appendix H). We have reviewed the plans and find the safety measures adequate; however, DCG has not provided evidence that the owners of the affected residences within 10 feet of construction work areas have reviewed and concur with the site-specific plans. Therefore, **we recommend that:**

- **Prior to construction, DCG should file with the Secretary, for the review and written approval of the Director of the OEP, revised site-specific plans that show evidence of landowner concurrence for each residence that would be located within 10 feet of construction work areas and fencing.**

In general, as the distance from the construction work area increases, the impacts on residences decrease. In residential areas, the greatest impacts associated with construction and operation of a pipeline are typically temporary disturbances during construction and restrictions preventing construction of permanent structures within the permanent right-of-way during operation. Temporary construction impacts on residential areas include inconveniences caused by noise and dust generated by construction equipment, personnel, and boring of roads or driveways; traffic congestion; ground disturbance of lawns; removal of trees, landscaped shrubs, or other vegetation screening between residences and/or adjacent rights-of-way; potential damage to existing septic systems or wells and other utilities; and removal of aboveground structures such as fences, sheds, or trailers from within the right-of-way.

In accordance with the FERC Plan, DCG would begin cleanup operations immediately following backfill, and would complete final grading, topsoil replacement, and installation of permanent erosion control structures within 10 days after backfilling the trench in residential areas. DCG would be responsible for ensuring successful revegetation of soils disturbed by Project-related activities and restoring turf, ornamental shrubs, and specialized landscaping in accordance with the landowner's request.

To further minimize potential disruptions on residential areas near construction work areas, DCG would coordinate construction work schedules with affected landowners prior to construction. In addition, DCG would work to ensure construction activities progress in a timely manner to minimize the residents' exposure to noise, dust, and the general presence of construction activities. DCG would maintain property access and traffic flow to residences, especially for emergency vehicles, by using temporary crossing means. To further minimize impacts on residential areas within the vicinity of construction work areas, DCG would:

- implement dust minimization measures, described further in section B.8.1;
- implement noise mitigation for select HDDs, described further in section B.8.2;
- remove litter and debris on a daily basis;
- preserve mature trees and landscaping where practicable;
- maintain a minimum of 25 feet between the residence and construction work area for a distance of 100 feet on either side of the residence, or follow site-specific construction plans where not feasible to maintain the 25 foot minimum;
- install temporary safety fencing for a distance of 100 feet on either side of residences within 50 feet of the construction workspace to control access and keep equipment and materials within the construction workspace;

- segregate at least 12 inches of topsoil in deep soils (more than 12 inches of topsoil) and make every effort to segregate the entire topsoil layer in soils with less than 12 inches of topsoil;
- install pipe as quickly as reasonably possible; and
- restore all lawn areas, landscaping, and disturbed areas in accordance with the FERC Plan and terms of individual easement agreements.

Based on landowner comments received to date, as well as proximity of construction work areas to the three residential structures listed above, **we recommend that:**

- **DCG should develop and implement an environmental complaint resolution procedure. The procedure should provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. Prior to construction, DCG should mail the complaint procedures to each landowner whose property would be crossed by the Project.**

  a. In its letter to affected landowners, DCG should:

  (1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;

  (2) instruct the landowners that if they are not satisfied with the response, they should call DCG's Hotline (the letter should indicate how soon to expect a response); and

  (3) instruct the landowners that if they are still not satisfied with the response from DCG's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

  b. In addition, DCG should include in its weekly status report a copy of a table that contains the following information for each problem/concern:

  (1) the identity of the caller and date of the call;

  (2) the location by MP and identification number from the authorized alignment sheet(s) of the affected property;

  (3) a description of the problem/concern; and

  (4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

Given the measures outlined above in conjunction with the site-specific plans and our recommendation, we conclude impacts on residences from construction of the Project would generally be short-term and minor. Depending on the specific vegetation affected and its ability to be restored to pre-construction conditions, some residences may experience long-term impacts associated with visual changes in the landscape. Compensation would be negotiated between individual landowners and DCG during the easement process.

Planned Development

We identified no planned residential, industrial, or commercial developments within 0.25 mile of the Project.

5.2 Public Land, Recreation, and Special Interest Areas

The Project would cross the Cowasee Basin, the Congaree River, a private recreational area, a Richland County Land Conservation area, two community properties (Wavering Place Plantation and St. Matthew's Baptist Church), and a conservation easement encompassing the Rainbow Plantation. We received several comments from landowners and state and local agencies regarding potential impacts on public land, conservation land, and recreational areas. We received comments as identified in section A.3, table A-1 pertaining to these lands, and address them in subsections below.

The Project would not cross or be within 0.25 mile of any national park, national forest, registered natural landmarks, National Park Service wilderness areas, or urban parks and recreation recovery areas. No national scenic and historic trails and no national or state scenic byways would be crossed by the Project.

Cowasee Basin

The Cowasee Basin is a 315,000-acre conservation partnership area identified by the riparian corridors of the Congaree and Wateree River basins from Columbia and Camden to upper Lake Marion (SCDNR, 2015). About 45 percent of the public and private land within the Congaree River Basin has been conserved through easements granted to private organizations and local, state, and federal agencies (Congaree Land Trust, 2015). The Project would cross the Cowasee Basin between approximate MPs 1.0 and 8.0. To minimize impacts on the Cowasee Basin, approximately 75 percent of the pipeline would be collocated with existing utility rights-of-way, and the greenfield portions would, to the extent practicable, cross previously cleared fields in open land and agricultural areas. DCG committed to coordinate construction activities with landowners to minimize effects to recreational land use within the Cowasee Basin. Temporary impacts on recreational land use could include disturbances due to noise and visual equipment during the anticipated 4 months of construction; however, operation of the pipeline would not impact recreational use within these areas. Visual impacts on the Cowasee Basin would occur due to the widening of the existing cleared utility rights-of-way in areas that would not be crossed by HDD and would be permanent. Impacts and mitigation on visual resources are discussed further in section B.5.4. We considered an alternative to the proposed route that would increase collocation with existing rights-of-way within the Cowasee basin (see section C.3); however, we determined this alternative would increase impacts on wetlands, waterbodies, and forest lands, and we concluded it did not provide a significant environmental advantage over the proposed route. Therefore, given the measures outlined above, as well as DCG's commitment to implement the FERC Plan and Procedures, we conclude impacts on the Cowasee Basin would not be significant.

Congaree River

Between MPs 2.1 and 2.2 the Project would cross the Congaree River, a major navigable waterbody known to be spawning habitat for two federally listed sturgeon species, as well as the Congaree Blue River Trail, an associated water trail at approximately Trail Mile 10 (NPS, 2015b). The Congaree River Blue Trail is an NPS-designated recreational paddling trail that runs from Columbia, South Carolina to the Congaree National Park, for a total length of about 50 miles. DCG proposed to avoid or minimize impacts on public land, recreational facilities, and federally listed species associated with the Congaree River crossing by passing under the waterbody using the HDD method from MPs 2.0

to 2.4. As discussed in section B.4.1, DCG would further avoid impacts on the two sturgeon species by crossing the Congaree River outside the species' spawning season. However, consultations with the USFWS and NMFS for these species is ongoing; therefore, we are recommending in section B.4.1 that FERC complete consultations with the agencies prior to any authorization for construction. Furthermore, the nearest aboveground Congaree River Blue Trail facilities (e.g., canoe launches, parking areas) are over 5 miles away from the crossing location (NPS, 2015b). Therefore, no closure of trail facilities would occur, but temporary disturbances due to noise and visual construction equipment at HDD entry and exit points could impact recreational use of the river for the duration of the HDD crossing, anticipated to be several days. HDD noise impacts are discussed in section B.8.2. Minor impacts on the Congaree River viewshed would occur due to improvements of the existing and temporary access roads near the crossing, as described in section B.5.4. Given the measures outlined above, in conjunction with our recommendation in section B.4.1, we conclude impacts on the Congaree River would be minor and temporary.

Belle Grove

Between MPs 5.7 and 7.6 the Project would cross Belle Grove, a privately owned hunting reserve and commercial silvicultural property. Since filing its application, DCG committed to reducing its proposed 90-foot-wide construction right-of-way to 75 feet in order to minimize impacts. Three proposed access roads cross this property: two are existing roads that would be permanently widened and improved, and the other is a new temporary access road that would be restored to original contours and land use once construction is complete (appendix C). DCG would minimize impacts on trees within the Belle Grove property by routing the pipeline through a series of open fields and replanting native species in temporary construction areas once construction is complete. As part of its negotiations, DCG has also committed to compensating the landowner of the Belle Grove property for construction-related crop loss. Based on Belle Grove LLC's Notice of Withdrawal of Protests and Comments dated December 23, 2015, we understand there are no outstanding landowner concerns. We considered an alternative to the proposed route that would increase collocation with existing rights-of-way within a portion of this property (see section C.3); however, we determined this alternative would increase impacts on wetlands, waterbodies, and forest lands, and we concluded it did not provide a significant environmental advantage over the proposed route. Given the measures outlined above, and the withdrawal of Belle Grove LLC's protests, we conclude impacts on this land would not be significant.

Richland County Conservation Land

Between MPs 12.2 and 14.1 the Project would cross conservation land owned by Richland County identified by the Richland County Conservation Commission as TMS-R24600-01-63. This 604-acre parcel was acquired by Richland County to provide wetland mitigation possibilities, protect the sensitive Cabin Branch waterbody, and create nature-based recreational amenities (RCCC, 2015). The proposed route leaves the utility right-of-way through this property from about MP 12.5 to 13.0 in order to reduce potential impacts on wetlands located along the existing rights-of-way. The route would cross 10 wetlands and 3 waterbodies on this property, all of which would be crossed using a trenchless construction method. Furthermore, the proposed route was designed to minimize removal of trees, as the agricultural land that would be crossed by the pipeline in this area has already been cleared by the landowner.

Wavering Place Plantation

Between MPs 16.0 and 17.0 the Project would cross the Wavering Place Plantation, a privately owned cultural site with a National Register of Historic Places-listed structure that dates to 1850. DCG coordinated with the landowner to determine a route that would minimize impacts on the property and

avoid impacts on the listed structure. The proposed pipeline route crosses the outer edge of the property and is collocated with the existing utility right-of-way. DCG would further minimize impacts by using the HDD construction method to cross the majority of the property except in an open field that would be crossed using conventional overland construction methods. Temporary and minor impacts due to noise and visual equipment could occur during construction.

St. Matthew's Baptist Church

At MP 18.9 the Project would cross the property of St. Matthew's Baptist Church, a local community property. DCG adopted the use of the HDD construction method at this location in order to avoid impacts on the church, its cemetery, and other structures located on the church's property; however, temporary and minor impacts due to noise and visual equipment could occur during construction. Specifically, the church would be impacted by the HDD noise from HDD-13, described in detail in section B.8.2, but the impacts before mitigation would not be considered significant, and the additional noise mitigation would reduce impacts even further.

Rainbow Plantation

Between MPs 20.0 and 21.0 the Project would cross the Rainbow Plantation, a private agricultural property located on a conservation easement that is also used for recreational hunting and fishing (SCDNR, 2015). Impacts on this property would be minimized by collocating the pipeline route with the existing utility right-of-way and avoiding wetlands through the use of the HDD method. DCG would minimize impacts on recreational use of the property during construction by coordinating construction activities with the landowners.

Grove Plantation House, St. Thomas Episcopal Church, McEntire Air National Guard Base

The Project would be within 0.25 mile of the Grove Plantation House, St. Thomas Episcopal Church, and the McEntire Air National Guard Base. The Project would not directly cross these locations and therefore would not result in any permanent impacts. However, temporary and minor noise and visual impacts during construction could occur. Additional information on impacts on noise sensitive areas is provided in section B.8.2.

5.3 Contaminated Sites

The Project would be within 0.25 mile of four previously contaminated sites:

- the South Carolina Recycling and Disposal, Inc. Bluff Road facility, which has been listed on the USEPA's Superfund Program National Priorities List since 1983 due to contaminated groundwater and soil resulting from operations at the site (USEPA, 2015a);
- the Westinghouse Electric facility, where known contaminants of chlorinated hydrocarbons, fluoride, nitrate, ammonia, alpha radionuclides and beta radionuclides are currently being monitored in natural attenuation (Tetra Tech, Inc., 2014);
- the Rosa Young Texaco facility, which is the site of a 1991 leak of petroleum hydrocarbons from an underground storage tank (SCDEH, 2015); and
- the DAK Americas, LLC facility, which is the site of a dry ash landfill and contaminated spray irrigation area currently being monitored in natural attenuation (EDR, 2015).

Because the Project would not directly cross these previously contaminated locations, no impacts on these lands would occur due to construction of the Project. However, if unanticipated contaminated materials are discovered during construction of the proposed Project, DCG would implement the contaminant discovery measures described in section B.1.2.

5.4 Visual Resources

The Project could alter existing visual resources in three ways:

- construction activity and equipment may temporarily alter the viewshed;
- lingering impacts along the right-of-way from clearing during construction could alter existing vegetation patterns; and
- permanent right-of-way and aboveground facilities would represent permanent alterations to the viewshed. The significance of these visual impacts primarily would depend on the quality of the viewshed, the degree of alteration of that view, the sensitivity or concern of potential viewers, and the perspective of the viewer.

The majority of land traversed by the proposed Project route consists of forested upland (55 percent), open land (21 percent), and agricultural land (20 percent). The Project would be in proximity to five residences, two of which DCG acquired through landowner negotiations, and crosses agricultural crop and pasture lands and forested properties that are privately owned. The Project would traverse the Cowasee Basin and include improvements to temporary and existing roads near the Congaree River. Some areas along the proposed pipeline route are either inaccessible or do not provide long-range unobstructed views from the roadways, but public viewpoints are present along some of the roadways in the area.

Impacts would be greatest during construction because of the cleared and graded workspaces needed for construction, displaced soils, and the presence of personnel and equipment. While vegetation would need to be cleared within the construction right-of-way, DCG would collocate the proposed pipeline with the existing cleared utility rights-of-way to the extent practicable, which would minimize impacts on the viewshed from the Project. After construction, temporary workspaces would be restored according to the FERC Plan and Procedures. Physical and visual obstructions to the viewshed during construction would primarily be temporary with the exception of the permanent conversion of forest land to open land within the permanent right-of-way. After construction, trees and shrubs would be allowed to regrow within the temporary construction work areas. Impacts of forest clearing on the viewshed in temporary construction areas would be temporary, but long-term as it could take 20 years or more for mature trees to re-establish. Open land would be returned to pre-construction contours, to the extent practicable. Agricultural lands are also expected to return to pre-construction conditions within one to two growing seasons. Permanent, but minor impacts on the viewshed in open and agricultural lands would occur due to construction of new aboveground facilities.

Visual impacts on the Cowasee Basin would occur due to the widening of the existing cleared utility rights-of-way in areas that would not be crossed by HDD, and would be permanent. Impacts on the Congaree River and its viewshed would also occur due to improvement of the existing and temporary access roads. DCG would implement the restoration and revegetation measures described in the FERC Plan and Procedures. Following construction, disturbed areas would be seeded in accordance with written recommendations for seed mixes, rates, and dates. In accordance with the FERC Plan, DCG would monitor disturbed areas to determine the post-construction revegetation success for a minimum of two growing seasons, or until revegetation is successful.

Based on DCG's plan to collocate the majority of the proposed Project with existing rights-of-way and the minimal new aboveground facilities that would be constructed, we anticipate visual impacts would be temporary and minimal for the majority of the Project.

6. Socioeconomics

The Project would primarily impact two counties in South Carolina: Calhoun and Richland (see section A.4). DCG estimates that two to three construction spreads would be required for the Project. A total temporary workforce of approximately 275 workers would be hired to construct the pipeline and associated facilities during the 4 months of proposed construction, as discussed in section A.6. The Project would serve the existing International Paper facility in Eastover, South Carolina, which currently employs over 600 hourly and salaried employees and approximately 100 contract employees. According to a letter sent to FERC by International Paper on December 16, 2015, it spends between $375 and $425 million on capital and other expenditures annually which boost the regional, state, and national economies. Operation of DCG's pipeline facilities would not require additional workers nor is International Paper expected to change its labor force as a result of the Project. Due to the limited number of workers anticipated for a short duration during construction, we have determined that a full socioeconomic analysis of the Project is not necessary.

During the scoping period we received a comment from Mr. John Grego, a representative of the Friends of the Congaree Swamp, which expressed concern about impacts on minority (specifically, African-American) communities crossed by the Project. Executive Order 12898 requires federal agencies to take appropriate steps to identify and address disproportionately high and adverse health or environmental effects of federal actions on minority and low-income populations. According to the Council on Environmental Quality (CEQ) environmental justice guidance under NEPA (CEQ 1997a), minorities are those groups that include American Indian or Alaskan Native; Asian or Pacific Island; Black, not of Hispanic origin; or Hispanic. Minority populations are defined where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. The CEQ guidance also directs low-income populations to be identified based on the annual statistical poverty thresholds from the U.S. Census Bureau. For the purpose of analysis in this EA, low-income populations are defined as those individuals with reported income below the poverty level. Table B-11 provides a summary of the minority or low-income percentage of county and census tract populations in the Project area.

Table B-11

Minority Populations and Poverty Levels in the Vicinity of the Project

County/Census Tract	Minority Populations as a Percentage of Total Population	Percent of the Population Below Poverty Level
Calhoun County	**45.6**	**18.7**
9501	33.7	13.9
Richland County	**53.7**	**17.2**
118	84.7	22.3
120	63.6	14.7

Source: U.S. Census Bureau, 2015. 2010-2014 American Community Survey 5-Year Estimates.

Placement of the proposed facilities, including the pipeline route, was based on proximity to existing rights-of-way between two fixed end points within census tracts 120 and 118, and was not driven by the socioeconomic status of the communities. The major alternative described in section C.3 would affect the same minority-majority census tracts, but impact more landowners and occupied structures. Because of this, although the Project area contains minority and low income populations, we find that the Project itself would not disproportionately affect these minority or low income populations.

7. Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires that the FERC take into account the effects of its undertakings on properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP) and afford the Advisory Council on Historic Preservation an opportunity to comment. DCG, as a non-federal party, is assisting the FERC in meeting our obligations under Section 106 and the implementing regulations at 36 CFR 800, by preparing the necessary information, analyses, and recommendations, as authorized by 36 CFR Part 800.2(a)(3).

7.1 Cultural Resources Investigations

DCG completed cultural resources investigations for the pipeline right-of-way, access roads, temporary workspaces, ATWS, aboveground facilities, and one contractor yard. The investigations included background research, archaeological survey, and architectural survey. The resulting *Phase I Cultural Resources Survey Report for Dominion Carolina Gas Columbia to Eastover Project, Calhoun and Richland Counties, South Carolina* (Phase I Report) was provided to the FERC and the South Carolina State Historic Preservation Office (SHPO). The archaeological survey area for the pipeline right-of-way was a 200-foot-wide corridor, a 50-foot-wide corridor for access roads (25 feet on each side of the access road centerline), 1.3 acres for aboveground facilities, and 9 acres for the contractor yard. Archaeological field survey methods included: pedestrian survey within powerline corridors and agricultural fields where the land exhibited good ground visibility, and shovel testing within areas which were covered by ground-obscuring vegetation. The architectural survey included areas within the line-of-sight of the survey corridor. The entire proposed Project area has been surveyed by DCG.

7.2 Survey Results

As a result of the Phase I survey, 18 cultural resources were identified within or adjacent to the proposed Project area (see table B-12). Of these resources, 10 archaeological sites (38CL103, 38CL104, 38RD262, 38RD1418, 38RD1420, 38RD1421, 38RD1422, 38RD1423, 38RD1426, and 38RD1427) were recommended as "not eligible" for the NRHP and no further work was recommended. Three of the resources consisting of one archaeological site (38RD1419) and two cemeteries (38RD1424 and 38RD1425 [St. Matthews Church Cemetery]) remained unevaluated because they were located outside the Project area and would be avoided. One of the resources, the St. Thomas Episcopal Church (139-81) is listed on the NRHP, and is located outside the Project area and would be avoided. Two of the resources, an archaeological site (38RD1428) and a cemetery (38RD1429), remained unevaluated because DCG eliminated certain Project components and would avoid these resources. The remaining two resources, an historic canal (171-3577) and an archaeological site (38RD1417) remained unevaluated because DCG would use the HDD construction method to avoid impacts on these resources. As one of the HDD work areas is in proximity to site 38RD1417, DCG would install protective fencing and signage, and has provided measures that would be implemented in the event of an inadvertent release of drilling fluid.

Table B-12

Cultural Resources Identified within or Adjacent to the Project

State Number	Site Type	Recommended NRHP Status	Comments/Recommendations
38CL103	Prehistoric	Not eligible	No further measures
38CL104	Prehistoric; 19th–20th century	Not eligible	No further measures
38RD392	Prehistoric; 19th–20th century	Unevaluated	Outside of Project area
38RD393	Prehistoric; 18th–19th century	Not eligible	No further measures
171-3577	Historic; canal	Unevaluated	Avoidance by HDD
38RD1417	18th–20th century	Unevaluated	Avoidance by HDD
38RD1418	Unknown historic	Not eligible	No further measures
38RD1419	20th century	Unevaluated	Outside of Project area
38RD1420	19th–20th century	Not eligible	No further measures
38RD1421	19th–20th century	Not eligible	No further measures
38RD1422	19th–20th century	Not eligible	No further measures
38RD1423	20th century	Not eligible	No further measures
38RD1424	2005–present; cemetery	Unevaluated	Outside of Project area
38RD1425	20th c.; St. Matthew's Church Cemetery	Unevaluated	Outside of Project area
38RD1426	20th c.	Not eligible	No further measures
139-81	19th c.; St. Thomas Episcopal Church	Listed	Outside of Project area
38RD262	19th–20th century	Pending	Pending
38RD1427	20th century	Not eligible	No further measures
38RD1428	19th century	Unevaluated	Avoidance by removal of Access Road 040 from Project
38RD1429	1885–1927; cemetery	Unevaluated	Avoidance by removal of Access Road 062 from Project

In a letter dated June 4, 2015, the SHPO concurred that sites 38CL103, 38CL104, 38RD1420, 38RD1421, 38RD1422, 38RD1423, 38RD1426, and 38RD1427 were not eligible for the NRHP; the Project would not affect the St. Thomas Episcopal Church, St. Matthew's Church Cemetery, and site 38RD1419; that site 38RD1428 was unassessed; and no further work was necessary for these resources. The SHPO also indicated that resource 38RD1424 was not eligible for the NRHP. However, the SHPO disagreed with the Phase I Report and indicated that site 38RD262 has been determined eligible for the NRHP, and also requested additional information on resources 171-3577, 38RD1417, 38RD1418, and 38RD1429, to be addressed in a revised draft report.

Subsequently, DCG completed cultural resource surveys for two reroutes and provided a *Phase I Archaeological Survey for Dominion Carolina Gas, Eastover 8-Inch Pipeline, Calhoun and Richland*

Counties, South Carolina Addendum I: Mill Creek and Bell Grove Reroutes, Richland County report (Addendum Report) to the FERC and SHPO. A previously recorded site, 38RD392, was revisited along a proposed reroute during the survey, and further evaluation was recommended if this reroute was chosen. However, no further action was required as DCG did not incorporate this reroute into the proposed route. Additionally, previously-recorded site 38RD393 was re-identified and recommended as "not eligible" for the NRHP (see table B-12). In a letter dated August 28, 2015, the SHPO concurred with the recommendations in the report, and requested the Addendum Report be included in the earlier requested revised draft report (see above). DCG provided a revised draft report addressing the SHPO's comments on the Phase I Report and Addendum Report, with the exception of the eligibility determination for site 38RD262, but has not yet filed the SHPO's comments on the revised draft report.

Chris Cloaninger, a landowner, and the Richland County Conservation Commission (RCCC) provided comments regarding one standing and three historical ruin servant's quarters on the Wade S. Cloaninger Jr. Credit Shelter Trust property. The land has been in the Bynum/Cloaninger family for over 150 years and was previously owned by President Martin Van Buren's daughter. While the original grand plantation home burned in the 1930s, the land still contains at least three historical ruin servant's quarters and has yielded many artifacts. The RCCC is also concerned about the Kensington Mansion, a kitchen, and additional servants' quarters. DCG confirmed that these areas are outside of the 200-foot-wide survey corridor and would not be affected by the Project; therefore, we are not recommending any additional plans or avoidance measures. In addition, we received comments on the Magnolia (Wavering Place) Plantation which includes a ca. 1850 NRHP-listed Greek Revival-style residence. This structure is located outside of the Project area and would, therefore, not be affected by the Project. See section B.5.2 for further discussion of the larger Plantation property.

Friends of the Congaree Swamp provided comments concerning site 38RD397, a previously recorded site in the vicinity of the Project, and requested a different pipeline route that would lessen the Project's effect on cultural resources sites, including 38RD397. DCG confirmed that this site is outside of the 200-foot survey corridor and would not be affected by the Project; therefore, we are not recommending any additional plans or avoidance measures.

7.3 Native American Consultation

On August 15, 2014, DCG provided Project information to two federally recognized Native American tribes, the Catawba Indian Nation and the Eastern Band of Cherokee Indians, and requested preliminary comments concerning cultural resources that may be affected by the Project. DCG did not receive any response to this outreach.

DCG re-contacted the two tribes on May 22, 2015, requesting their input regarding the Project to initiate the Section 106 review process. The letters requested confirmation that the Project would have "no effect" on known historic properties or resources. On June 26, 2015, DCG received a response from the Catawba Indian Nation, indicating the tribe had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the boundaries of the proposed Project area. However, the Catawba Indian Nation requested to be notified if Native American artifacts and/or human remains were located during ground disturbing activities. DCG has not received a response from the Eastern Band of Cherokee Indians.

On August 10, 2015, DCG submitted the Phase I Report and Addendum Report to the two tribes. DCG received a response from the Catawba Indian Nation (dated August 31, 2015) indicating the tribe had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the boundaries of the proposed Project area. However, the Catawba Indian Nation requested to be notified if Native American artifacts and/or human remains were located during

ground disturbing activities. DCG has not received any response from the Eastern Band of Cherokee Indians.

We sent our NOI and follow-up letters to the two tribes. No responses to our NOI or letters have been received to date from either the Catawba Indian Nation or the Eastern Band of Cherokee Indians.

7.4 Unanticipated Discovery Plan

DCG provided a *Plan and Procedures for the Unanticipated Discovery of Cultural Resources and Human Skeletal Remains*, to be implemented in the event that previously-unreported archaeological sites or human remains are encountered during construction. The plan provides for the notification of interested parties, including Native American tribes, in the event of any discovery. We requested revisions to the plan. DCG provided a revised plan which we find acceptable.

7.5 Compliance with the National Historic Preservation Act

DCG has not yet addressed the SHPO's comment regarding the NRHP eligibility of site 38RD262, or filed the SHPO's comments on the revised draft report. Therefore, we have not yet completed compliance with Section 106 of the NHPA. To ensure that FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

- **DCG should not begin construction or implementation of any avoidance/treatment plan until:**
  - **a. DCG addresses the SHPO's comments regarding the NRHP eligibility of site 38RD262, and files with the Secretary any necessary avoidance/treatment plan, and the SHPO's comments on any plan;**
  - **b. DCG files the SHPO's comments on the revised draft report;**
  - **c. the Advisory Council on Historic Preservation is afforded the opportunity to comment if historic properties would be adversely affected; and**
  - **d. staff reviews and the Director of the OEP approves any plan, and notifies DCG in writing that any avoidance/treatment plan may be implemented and/or construction may proceed.**

  All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "CONTAINS PRIVILEGED INFORMATION—DO NOT RELEASE."

8. Air Quality and Noise

8.1 Air Quality

Construction of the proposed Project could potentially have an effect on local and regional air quality. Federal and state air quality standards have been designed to protect human health and the environment from airborne pollutants. The USEPA has developed National Ambient Air Quality Standards (NAAQS) for criteria air pollutants such as nitrogen oxides (NO_x), carbon monoxide (CO), ozone, sulfur dioxide (SO_2), and inhalable particulate matter ($PM_{2.5}$ and PM_{10}). $PM_{2.5}$ includes particles with an aerodynamic diameter less than or equal to 2.5 microns, and PM_{10} includes particles with an aerodynamic diameter less than or equal to 10 microns.

States and municipalities are free to adopt standards more stringent than the NAAQS. The SCDHEC and Central Midlands Council of Governments have adopted all of the NAAQS as promulgated by the USEPA.

In addition to the NAAQS, there are certain national parks and wilderness areas that require additional Clean Air Act (CAA) protection to prevent negative impacts on visibility within these special locations. These areas are collectively referred to as Federal Class I areas. The closest Class I area to the Project is the Cape Romain National Wildlife Refuge on the coast of South Carolina approximately 86 miles (138 km) southeast of MP 28.0, which is outside a 100-km radius (62 miles) of the Project that would trigger further analysis.

On November 8, 2010, the USEPA signed a rule that finalizes reporting requirements for the petroleum and natural gas industry under 40 CFR 98. Subpart W of 40 CFR 98 requires petroleum and natural gas facilities that emit 25,000 metric tons or more of carbon dioxide equivalents (CO_2e) per year to report annual emissions of specified greenhouse gases (GHGs) from various processes within the facility.

Potential air quality impacts associated with the Project would be temporary because emissions are only associated with the construction phase of the Project, with the exception of minor fugitive emissions released at the MLVs, the pig launcher, and joint pig receiver and M&R station during operation. Operational fugitive emissions are expected to be well below 25,000 tons per year of CO_2e, the trigger for the GHG reporting rule. The Project would not require any new or modified state or federal air permits as there would be no other operational emissions from the facilities. Therefore, only the air quality impacts of the proposed construction are analyzed in this EA.

Existing Ambient Air Quality and Attainment Status

The USEPA has established Air Quality Control Regions (AQCRs) in accordance with Section 107 of the CAA of 1970, defined as contiguous areas considered to have relatively uniform ambient air quality, and treated as single geographical units for reducing emissions and determining compliance with the NAAQS.

Attainment with the NAAQS is determined based on whether or not measured ambient air pollutant concentrations are above or below the NAAQS and/or state ambient air quality standards. Each AQCR is required to develop an implementation plan identifying how applicable air quality standards are achieved and maintained. Table B-13 lists the AQCRs for the proposed Project area.

Table B-13

Summary of Air Quality Control Regions for the Project

MP	County	Air Quality Control Region
0.0 to 2.0	Calhoun	Augusta (Georgia)-Aiken (South Carolina) Interstate
2.0 to 28.0	Richland	Columbia Intrastate (South Carolina)

Source: USEPA 2015c

The USEPA designates the attainment status of an area for each criteria pollutant based on whether an area meets the NAAQS. Areas that meet the NAAQS are termed "attainment areas." Areas that do not meet the NAAQS are termed "nonattainment areas." Areas for which insufficient data are available to determine attainment status are termed "unclassified areas." Areas formerly designated as nonattainment areas that subsequently have reached attainment are termed "maintenance areas." All counties crossed by the Project are in attainment or unclassifiable status for the criteria pollutants (USEPA, 2015d).

Air Quality Impacts from Construction

Construction of the Project would result in temporary increases in emissions of some pollutants primarily due to the use of construction equipment powered by diesel engines. Construction activities would also result in the temporary generation of fugitive dust due to disturbance of the surface and other dust generating actions.

The quantity of fugitive dust generated depends on the size of the area disturbed and the intensity of construction activity, and also on the silt and moisture content of the soil, the wind speed, and the speed, weight, and volume of vehicular traffic. Conservative-case particulate matter emissions for PM_{10} and $PM_{2.5}$ (fugitive dust) were calculated based on USEPA AP-42 recommended emission factors for heavy construction activities along with estimates of the extent and duration of active surface disturbance. The use of the heavy construction emission factor from AP-42 is meant to be general in nature to cover a wide range of construction operations and may overestimate potential fugitive dust generated by the proposed construction. Estimated fugitive dust generated emissions are summarized in table B-14.

Table B-14

Estimated Emissions From Construction of the Project

Emission Source	Total Site Emissions (tons/year)							
	NO_x	VOC [a]	CO	SO_2	PM_{10}	$PM_{2.5}$	GHG [b]	HAPs [c]
Exhaust Emissions Non-Road Equipment	27.1	10.7	15.4	0.04	1.3	1.3	4400.8	0.09
Exhaust Emissions On-Road Vehicles	1.2	0.1	2.1	0.01	0	0	267.8	0.15
Fugitive Dust Emissions Work Site	-	-	-	-	8.5	1.3	-	-
Fugitive Dust Emissions Roads	-	-	-	-	4.2	0.4	-	-
Project Total	**28.3**	**10.9**	**17.5**	**0.05**	**14**	**3.1**	**4668.7**	**0.23**

HAP = hazardous air pollutants
VOC = volatile organic compounds

a VOC – non-methane/ethane volatile organic compounds.
b GHG – as carbon dioxide equivalents (CO_2e).
c HAPs – as aggregated total HAPs.

Exhaust emissions from diesel-fueled construction equipment and vehicle engines would be minimized by federal design standards imposed at the time of manufacture of the vehicles and would comply with USEPA mobile and non-road emission regulations (40 CFR Parts 85, 86, and 89). Emissions also would be controlled by purchasing commercial diesel fuel products whose specifications are controlled by federal and state air pollution control regulations applicable to fuel suppliers and distributors. Table B-14 presents these emission estimates by major construction activity for the proposed Project.

Fugitive dust would result from land clearing, grading, excavation, and vehicle traffic on paved and unpaved roads. The amount of dust generated would be a function of construction activities, soil type, moisture content, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. Soil types and susceptibility to wind erosion are discussed in detail in section B.1.2. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. DCG would minimize fugitive dust during construction by implementation of dust control measures as necessary, which would include application of water to construction areas and spoil storage piles.

Emissions would occur over the duration of construction activities and along the length of the Project. Construction equipment would generate emissions of criteria air pollutants (listed in table B-14) and construction activities could produce local elevated dust levels. However, these emissions would be temporary and minor, with impacts limited to the vicinity of the Project area. Operational emissions would consist of insignificant fugitive emissions and would not trigger federal or state permit requirements. Therefore, we conclude that impacts from construction and operation of the Project would be temporary and would not result in a significant impact on air quality.

8.2 Noise

The ambient sound level of a region is defined by the total noise generated within the specific environment, over varying land use types, and is usually comprised of natural and artificial sounds. The land use in the Project area is primarily agricultural land, open land, and forest interspersed with developed/industrial and residential. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions, the effect of seasonal vegetation cover, and human activities.

Two measurements used by federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level[5] containing the same sound energy as instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day, among other factors. The L_{dn} takes into account the duration and time the noise is encountered. Late night through early morning (10:00 p.m. to 7:00 a.m.) noise exposures are penalized +10 decibels (dB) to account for people's greater sensitivity to sound during nighttime hours. An L_{dn} of 55 dB on the A-weighted scale (dBA) is equivalent to a continuous L_{eq} noise level of 48.6 dBA. People's threshold for perception of a change in noise is considered to be 3 dB.

The USEPA has indicated that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impact from

[5] The A-weighted scale is used because human hearing is less sensitive to low and high frequencies than to mid-range frequencies.

operation of compressor facilities. We are not aware of any state or local noise regulations or ordinances applicable to the construction of the Project facilities.

Impacts are determined at receptors known as noise-sensitive areas (NSAs). NSAs include residences, schools, day-care facilities, hospitals, long-term care facilities, places of worship, libraries, and parks and recreational areas (e.g., wilderness areas) valued specifically for their solitude and tranquility.

The primary source of noise would be from construction, particularly from HDD drilling activities. Operational noise would result from the joint pig receiver and M&R station, MLVs, and intermittent maintenance traffic on a frequency in accordance USDOT Pipeline and Hazardous Materials Safety Administration (PHMSA) requirements as discussed in section B.9.1. DCG's contractor, Hoover & Keith, conducted a baseline sound survey of the Project area during October 28–29, 2015, and analysis to indicate which HDD entry points may be of concern, and what the effect of the continual operation of the permanent aboveground facilities would mean to nearby NSAs. No applicable statewide noise regulations or local noise ordinances were identified regarding schedules to conduct construction or operation activities.

Construction Noise

Pipeline Construction

Noise would affect the local environment during the construction period along the pipeline route, at aboveground facilities, and at the contractor yard. Construction activities would be performed with standard heavy equipment, such as track-excavators, backhoes, bulldozers, dump trucks, cement trucks, and drilling equipment.

Construction noise would vary according to equipment in use, but would be mitigated by the attenuating effect of distance and the intermittent and short-lived character. Construction is currently planned to occur during daytime hours; the longest (in distance) HDDs would require a total of 2 weeks for set-up but actual drilling time would be no longer than 5 days per HDD, assuming a successful drill. Most HDD entry sites would have active drilling operation times between 2 and 3 days. Table B-15 provides sound levels of construction equipment typical to pipeline construction.

Table B-15

General Pipeline Construction Noise Levels of Major Construction Equipment

Equipment Type	L_{max} at 50 feet
Trucks	85
Cranes	85
Rollers	85
Bulldozers	85
Pickup Trucks	55
Backhoes	80

Source: Federal Highway Administration Highway Construction Noise Handbook, 2006

As discussed in section B.5.1, five residences are within 50 feet of the proposed construction work areas but DCG acquired two of the properties in October 2015. Individuals at the three remaining locations would likely hear construction noise during the daytime, but the overall impact would be temporary as pipeline construction typically moves relatively rapidly along the corridor. During Project construction, area nighttime noise levels would normally be unaffected, as most construction would be limited to daylight hours. DCG developed site-specific construction plans for the three affected residences within 50 feet of proposed construction work areas, which are provided in appendix H.

Conventional Bore Construction

The Project would use the conventional bore construction method at 21 locations along the pipeline route as listed in appendix E. DCG would conduct drilling operations during daylight hours only and are anticipated to occur over a 1 to 3 day period. Associated noise increases from the conventional bore crossings would be short-term in duration and limited to daylight hours. Specific noise analyses for these crossings were not conducted.

HDD Construction

DCG would use the HDD construction method at 33 locations along the pipeline route; 28 of these are within 0.5 mile of an NSA such as a residence, church, or school. Each HDD is listed in appendix E and shown below in Figures 4a and b. DCG conducted baseline sound surveys of existing conditions at the nearest NSAs (within 0.5 mile) to the proposed HDD entry sites. Surveys were conducted to assess the ambient noise levels at these NSAs and to estimate the noise levels attributable to the drills at each NSA (Hoover and Keith, 2015). Table B-16 provides the estimated noise impacts at the nearest NSAs to the proposed HDD entry points, assuming only daytime drilling activities would be conducted and no noise mitigation measures would be implemented. HDDs 01, 12, 21, 22, and 23 are not listed in Table B-16 as they do not have any NSAs within 0.5 mile of the entry sites.

As shown in table B-16, the estimated noise attributable to daytime drilling at HDDs 10, 13, and 36 could exceed the 55 dBA L_{dn} criterion at nearby NSAs without use of noise mitigation measures. At these sites, the potential increase above ambient noise would range from 10.1 to 17.6 dB. As stated above, an increase of 3 dB is the threshold of noticeable difference for humans, 6 dB is clearly noticeable, and 9 dB would be perceived as twice the noise. Therefore, the noise levels due to HDD activities at the NSAs closest to these drill entry sites could be perceived as a doubling to quadrupling of noise without mitigation. DCG committed to implementing the mitigation measures recommended by Hoover & Keith in its November 2015 report ("Final" Acoustical Assessment of HDDs and associated IP Meter Station for the Project (Lower Richland County, South Carolina)"). For all three sites, these mitigation measures would include the following:

- temporary noise barrier (16 feet high, constructed of blanket material with minimum Sound Transmission Class 20–31 rating), described in site-specific detail in table B-17;
- residential–grade exhaust silencer employed on all engines for site equipment, such as generators, pumps and/or hydraulic power unit (20 to 25 dBA attenuation); and
- low-noise generator for the mud cleaning and mixing system.

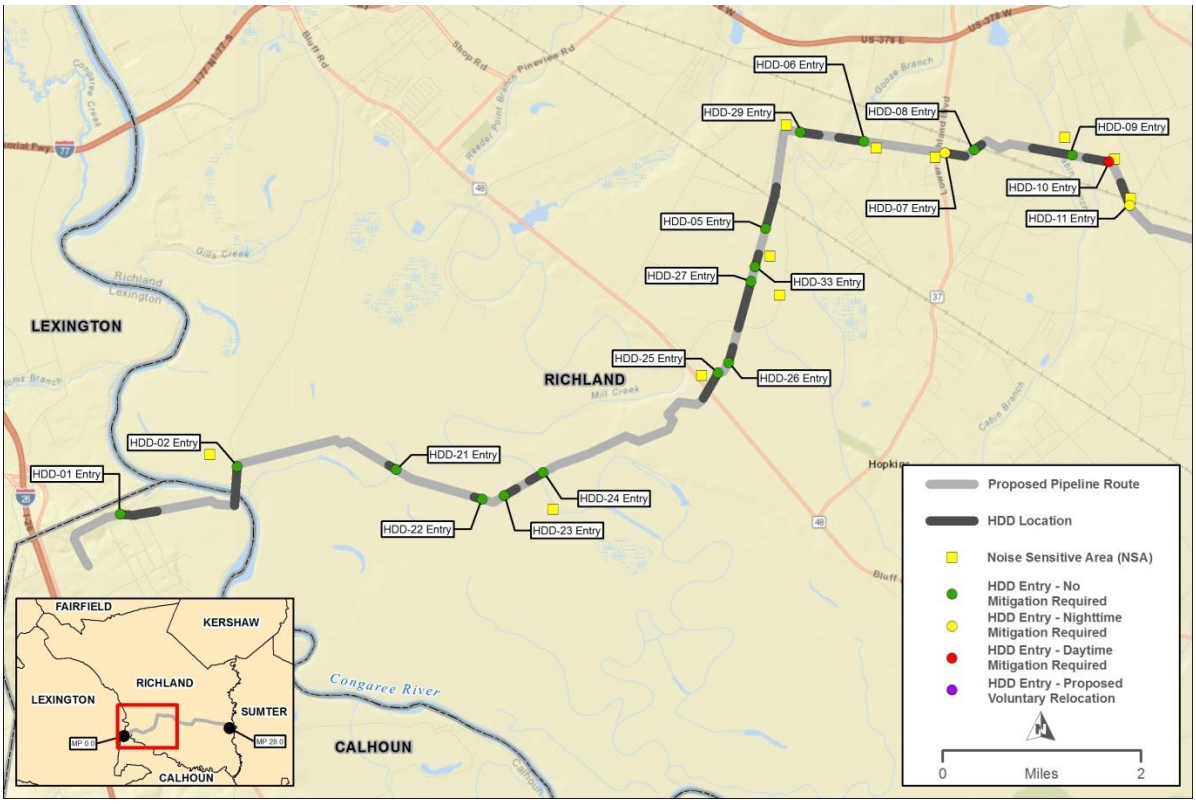


Figure 4a: HDD Locations along the Proposed Route (MP 0.0 to 15.0)

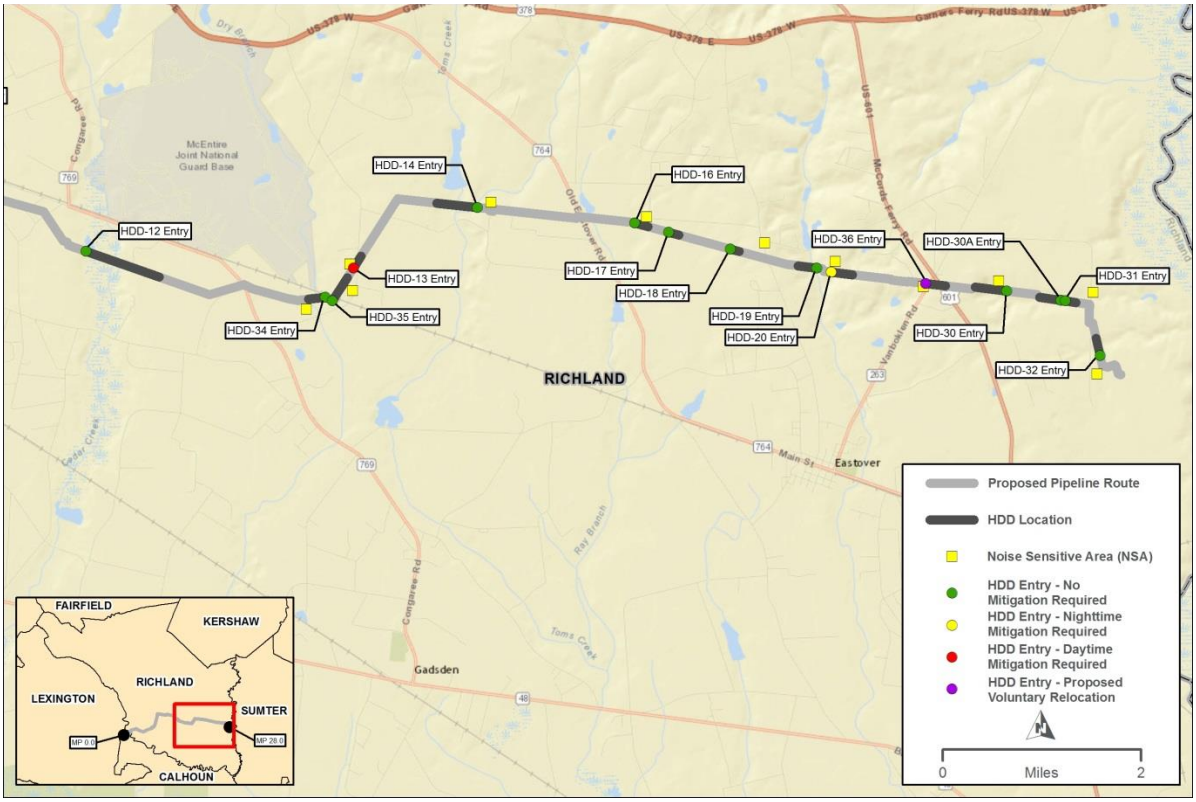


Figure 4b: HDD Locations along the Proposed Route (MP 15.0 to 28.0)

Table B-16

Estimated Sound Contribution of Daytime HDD Operations at NSAs [a]

HDD Reference Number	Crossing / MP	Distance (feet) and Direction of Closest NSA	Ambient L_{dn} (dBA)	Estimated Noise from HDD L_{eq} (dBA) [a]	L_{dn} of HDD + Ambient (dBA)	Increase Above Ambient (dB)
HDD-02	Congaree River at MP 2.0	1,550 W-NW	48.2	37.4	48.5	0.3
HDD-24	Wetlands at MP 5.7	2,000 S-SE	44.3	34.6	44.7	0.4
HDD-25	Bluff Road and wetlands at MP 7.8	725 W	47.0	45.1	49.2	2.2
HDD-26	Wetlands at MP 8.3	1,550 SW	47.0	37.4	47.4	0.4
HDD-27	Pincushion Road at MP 8.6	1,650 E-SE	40.7	35.7	41.9	1.2
HDD-33	Wetlands at MP 9.3	950 E	44.9	42.4	46.8	1.9
HDD-05	Railroad and Pincushion Road at MP 9.7	950 E	42.0	44.3	46.3	4.3
HDD-29	Wetlands at MP 10.9	650 W	44.1	48.1	49.6	5.5
HDD-06	Wetlands at MP 11.2	700 E-SE	43.0	47.4	48.7	5.7
HDD-07 [b]	Wetlands at MP 12.3	550 W-SW	45.5	51.1	52.2	6.7
HDD-08	Railroad and Air Base Road at MP 12.6	2,050 W	45.5	33.4	45.8	0.3
HDD-09	Wetlands at MP 13.3	1,050 N-NW	44.3	40.4	45.8	1.5
HDD-10 [c]	Wetlands at MP 13.9	350 E	46.6	56.3	56.7	10.1
HDD-11 [b]	Railroad, road, and wetlands at MP 14.3	400 N	42.1	52.8	53.1	11.0
HDD-34	Wetlands at MP 18.5	1,150 SW	42.4	40.5	43.6	2.2
HDD-35	CSX Railroad at MP 18.7	1,200 NE	42.4	40.0	44.4	2.0
HDD-13 [c]	Old Congaree Run Road at MP 19.1	250 NW	45.8	58.9	59.1	13.3
HDD-14	Several wetlands at MP 20.3	750 NE	40.9	44.8	46.3	5.4
HDD-16	Wetlands at MP 22.4	700 NE	47.5	47.4	50.4	2.9
HDD-17	Wetlands at MP 22.7	1,450 NW	47.5	38.1	48.0	0.5
HDD-18	Wetlands at MP 23.4	1,900 E	45.3	37.1	45.9	0.6
HDD-19	Ditch and wetlands at MP 24.1	1.050 NE	47.1	43.3	48.6	1.5
HDD-20 [b]	Waterbody and wetlands at MP 24.4	600 N	47.1	48.9	51.1	4.0
HDD-36 [c]	Vanboklen and McCords Ferry Roads at MP 25.4	150 SW	44.3	61.8	61.9	17.6
HDD-30	Wetlands at MP 25.9	700 NW	45.1	47.4	49.4	4.3

Table B-16

Estimated Sound Contribution of Daytime HDD Operations at NSAs [a]

HDD Reference Number	Crossing / MP	Distance (feet) and Direction of Closest NSA	Ambient L_{dn} (dBA)	Estimated Noise from HDD L_{eq} (dBA) [a]	L_{dn} of HDD + Ambient (dBA)	Increase Above Ambient (dB)
HDD-30A	Right-of-way and wetlands at MP 26.6	1,700 NE	44.8	36.4	45.4	0.6
HDD-31	Wetlands at MP 26.8	1,500 E-NE	44.8	37.7	45.6	0.8
HDD-32	Wetlands at MP 27.5	1,000 S	52.2	43.8	52.8	0.6

a Given drilling is assumed to occur during daytime, the noise exposure penalty is not applied (L_{dn} would equal L_{eq})
b Site where daytime noise impacts on NSAs could exceed noise criterion without mitigation measures.
c Site where noise impacts on NSAs could exceed noise criterion without mitigation measures in the event of nighttime drilling.

Source: Hoover and Keith, 2015.

Table B-17

Specific Noise Mitigation Measures for Daytime HDD Operations

HDD Reference Number	Description of Nearby NSAs	Proposed Location and Length of Temporary Noise Barriers	Estimated Sound Level from HDD L_{eq} (dBA) at Nearest NSA	
			Unmitigated	Mitigated
HDD-10	Three residences are to the east and northeast on Candlewood Drive. Only at the closest NSA could noise exceed criterion, but all three residences would benefit from mitigation.	Approximately 150 to 200 feet total length along the north and east sides of the HDD entry workspace.	56.3	48.8
HDD-13	Two residences to the west on Belle Rease Road are the closest NSAs; noise would exceed criterion at both without mitigation. Four additional residences to the east on Old Congaree Run Road would not be significantly affected, but would also benefit from the proposed noise mitigation measures.	Approximately 200 to 300 feet total length along the west, north and east sides of the HDD entry workspace.	58.9	50.5
HDD-36	A single residence directly southwest on Van Boklen Road would be most affected with noise levels over the criterion. Two additional residences are to the east on McCords Ferry Road and would benefit from mitigation, but would otherwise not be significantly affected.	Approximately 150 feet to 200 feet total length along the south and east sides of the HDD entry workspace.	61.8	53.4

If necessary, DCG may offer compensation or temporary relocation to the residents as an additional means of reducing HDD noise impact. DCG stated that compensation or temporary relocation may be employed in lieu of proposed noise mitigation measures at HDD 36 should it come to a voluntary agreement with the nearby residents.

Several HDD entry points are close enough to each other and associated nearby NSAs to warrant further analysis should they be drilled concurrently; specifically, at HDDs 07 and 08, and at HDDs 19 and 20. However, DCG does not propose to conduct drilling activities at these locations simultaneously; therefore, further analysis was not warranted as noise impacts would not occur at the same time.

Although DCG has proposed to conduct HDD drilling operations only during daylight hours, drilling activities could require nighttime or 24-hour drilling depending on the actual geological conditions and soils encountered during construction. Because of the potential for nighttime noise exposure penalty in an L_{dn}, the estimated attributable noise could exceed the 55 dBA L_{dn} criterion at nearby NSAs should conditions require DCG to continue drilling between 10:00 p.m. and 7:00 a.m. We expect that this nighttime noise criterion would be exceeded at HDDs 07, 11, and 20. In addition, the noise mitigation measures proposed for HDDs 10, 13, and 36 would not be sufficient for nighttime drilling. Therefore, to ensure that the nearest NSAs to the HDD entry sites are not exposed to excessive noise impacts during nighttime operations, **we recommend that:**

- **Prior to night time and/or 24-hour drilling activities at HDD 07 (MP 12.3), HDD 10 (MP 13.9), HDD 11 (MP 14.3), HDD 13 (MP 19.1), HDD 20 (MP 24.4), or HDD 36 (MP 25.4), DCG should file a night time noise mitigation plan for the review and written approval by the Director of the OEP. During any nighttime drilling operations, DCG should implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs.**

Construction activities associated with the Project would result in short-term, temporary increases in ambient noise levels. No additional compression is proposed as part of this Project; therefore, no significant operational impacts would occur. Based on DCG's commitment to limit HDDs to daytime hours, its proposed mitigation measures, and adherence to our recommendation, we conclude that adjacent landowners would not be significantly affected by construction-related noise. To provide residences with a specific avenue for resolving construction issues, we have included a recommendation in section B.5.1 of this EA that an environmental complaint resolution procedure be implemented during construction.

Operational Noise

The Project would have no significant impact from operational noise. The Project would not add to or modify the amount of compression at any compressor stations. Operational noise from the Project would largely be confined to the MLVs and joint pig receiver and M&R station. MLVs and piping would be below grade, which would inhibit sound transmission. DCG would perform occasional maintenance or repair activities at aboveground facilities and along the right-of-way during operation as discussed in section A.7.5. Maintenance and repair activities would be intermittent and would involve a limited number of vehicles and equipment.

Equipment at the joint pig receiver and M&R station could contribute to a long-term but minor noise level increase and include facilities such as a flow control skid with regulator valves, meter skid, and aboveground piping. Operational noise from the proposed joint pig receiver and M&R station was

modeled at the nearest NSA, described below in table B-18 (Hoover and Keith, 2015). During operation at full capacity, the NSA would experience an imperceptible increase of 0.5 dB above ambient noise.

Given the temporary nature of construction and the infrequent nature of maintenance and repair activities of these facilities, we conclude construction and operation noise impacts would not be significant.

Table B-18

Estimated Sound Contribution of Joint Pig Launcher and M&R Station Operations to NSA

Closest NSA Description	Distance (feet) and Direction	Ambient L_{dn} (dBA)	Estimated Sound Level from Station (dBA)	L_{dn} of Station + Ambient (dBA)	Increase Above Ambient (dB)
Residence	1,400 West	52.2	43.1	52.7	0.5

9. Reliability and Safety

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a major pipeline rupture. Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures.

The USDOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. For example, Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues, prescribes the minimum standards for operating and maintaining pipeline facilities, and incorporates compressor station design, including emergency shutdowns and safety equipment. Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials.

Facilities associated with DCG's Project must be designed, constructed, operated, and maintained in accordance with USDOT standards, including the provisions for written emergency plans and emergency shutdowns. DCG would provide the appropriate training to local emergency service personnel before the facilities are placed in service.

9.1 Class Areas

The USDOT also defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined below:

- Class 1 – Location with 10 or fewer buildings intended for human occupancy.
- Class 2 – Location with more than 10 but less than 46 buildings intended for human occupancy.
- Class 3 – Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period.
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For instance, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.2 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the Project have been determined based on the relationship of the pipeline centerline to other nearby structures and manmade features.

The proposed Project would be constructed through 25.9 miles of Class 1, 1.9 miles of Class 2, and 0.1 mile of Class 3 areas. No Class 4 areas would be crossed by the Project. Over the life of the pipeline, DCG would monitor population changes in the vicinity of the pipeline. If a subsequent increase in population density adjacent to the right-of-way results in a change in class location for the pipeline, DCG would reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness if required, to comply with the USDOT requirements for the new class location.

9.2 High Consequence Areas

The Pipeline Safety Improvement Act of 2002 required operators to develop and follow a written integrity management program that contained all the elements described in 49 CFR 192.911 and addressed the risks on each transmission pipeline segment. Specifically, the law establishes an integrity management program which applies to all high consequence areas (HCA).

The USDOT has published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for the USDOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method an HCA includes:

- current Class 3 and 4 locations;
- any area in Class 1 or 2 where the potential impact radius[6] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[7]; or
- any area in Class 1 or 2 where the potential impact circle includes an identified site.

An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days a week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

In the second method, an HCA includes any area within a potential impact circle which contains:

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The USDOT regulations specify the requirements for the integrity management plan at Section 192.911. DCG has identified one HCA (St. Matthew's Baptist Church) along the proposed pipeline route, between MPs 18.9 and 19.1.

9.3 Comments on Public Safety

We received letters regarding safety concerns where the proposed pipeline route crosses the St. Matthew's Baptist Church property, and where it would be located in proximity to the McEntire Joint National Guard Base.

In a letter dated July 6, 2015, Mr. Jamie M. Best, III expressed general concern for the safety of members of St. Matthew's Baptist Church, the church structure, and those interred in the church cemetery due to construction of the proposed Project. As stated above, DCG would comply with the USDOT pipeline safety standards which include regular monitoring and testing of the pipeline. Furthermore, St. Matthew's Baptist Church has been designated as an HCA along the proposed route. In accordance with USDOT regulations, DCG would apply the elements of its integrity management program to this area.

In a letter dated August 16, 2015, Lieutenant Colonel Michael T. Dotson expressed concern regarding the safety of military flights to and from the McEntire Joint National Guard Base due to the location of the proposed pipeline route within a designated "Clear Zone" adjacent to two airfield runways, as well as the close proximity of the temporary construction yard to the base's southern boundary. About 200 linear feet of the pipeline would be installed below ground surface within the designated Clear Zone. According to the 2009 Fort Jackson/McEntire Joint Land Use Study, construction of underground utilities within the airfield's Clear Zones is permitted. The temporary construction yard would be located at the site of a former manufacturing facility with an abandoned structure. Materials would be delivered and

[6] The potential impact radius is calculated as the product of 0.69 and the square root of the MAOP of the pipeline in psig multiplied by the square of the pipeline diameter in inches.

[7] The potential impact circle is a circle of radius equal to the potential impact radius.

stored to the south of the existing structure, outside the limits of the Clear Zone. Material delivery vehicles would use an access road north of the existing structure to return from the contractor yard to Congaree Road; however, the 2009 Fort Jackson/McEntire Joint Land Use Study specifically permits roadways within the Clear Zone. Furthermore, the contractor yard would not involve land use types that are known to attract bird and/or other wildlife species and, therefore, temporary operation of the yard would not be expected to increase strike hazards to aircraft conducting operations at the base. In an email dated October 13, 2015, Lieutenant Colonel Dotson confirmed the concerns regarding the McEntire Joint National Guard Base have been fully and adequately addressed.

DCG's aboveground facilities and pipeline construction and operation would represent a minimum increase in risk to the public and we are confident that with the options available in the detailed design of DCG's facilities, that they would be constructed and operated safely.

10. Cumulative Impacts

In accordance with NEPA and FERC policy, we evaluated the potential for cumulative effects of the Project in the context of the proposed action when added to other past, present, and reasonably foreseeable future activities. Cumulative impacts represent the incremental effects of a proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of the agency or party undertaking such other actions. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time.

This cumulative effects analysis generally follows the methodology set forth in relevant guidance (CEQ, 1997, 2005; USEPA, 1999) and focuses on potential impacts from the proposed Project on resource areas or issues where their incremental contribution would be potentially significant when added to the impacts of other actions. To avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, an action must first meet the following three criteria to be included in the cumulative analysis:

- affect a resource potentially affected by the Project;
- cause this impact within all, or part of, the Project area; and
- cause this impact within all, or part of, the time span for the potential impact from the Project.

Information regarding present and future planned developments was obtained through DCG's research as well as our own. DCG consulted sources including state and local agencies; permit applications and permits; and land use development plans.

Potential cumulative impacts associated with current, proposed, or reasonably foreseeable future projects or activities in the region of influence were identified and are listed in appendix I. Past projects are considered in the baseline environmental analysis discussed in section B of this EA; therefore, this cumulative analysis is focused on the projects listed in appendix I. A qualitative analysis of cumulative impacts is presented because of the general unavailability of quantitative data associated with the reasonably foreseeable actions. Projects identified in appendix I were assessed using available information; however, changes may be made to the projects over time during development and construction.

The region of influence varies for each resource and, therefore, different projects would influence the cumulative effects on different resources. The projects that were identified within the region of influence include seven transportation projects, three commercial projects, three residential projects, and

three non-jurisdictional electric utility projects associated with the proposed Project (as discussed in section A.8). Each project is associated with one or more region of influence in which it is located. The resource discussions below state the region of influence that was identified for cumulative impacts on that resource.

10.1 Geology and Soils

The region of influence considered for cumulative impacts on geology and soils is the 10 watersheds (at the HUC 12 level) which contain the proposed Project, as provided in table B-23. Disturbances on soils could include compaction, erosion, and modification of soils characteristics. Twelve projects were identified within the region of influence for geology and soils as included in appendix I. Three non-jurisdictional powerlines would coincide with construction of the proposed Project.

Table B-23

Watersheds Crossed by the Project (HUC 12 Level)

Name	Starting MP	Ending MP
Congaree River Watershed [a]		
Middle Congaree River	0.0	4.2
Mill Creek-Congaree River	4.2	8.5
Myers Creek	8.5	15.3
Cedar Creek-Congaree River	15.3	16.9
Dry Branch	16.9	18.9
Toms Creek	18.9	23.8
Toms Creek-Lower Congaree River	23.5	25.7
Wateree River Watershed [a]		
Wateree River	25.7	27.9
Beech Creek-Wateree River	27.9	27.9
Wateree River	27.9	28.0

a HUC 8 level, the larger watershed designation discussed in section B.2.2.

It is reasonable to expect that current, proposed, or reasonably foreseeable future projects would involve grading and other temporary ground disturbance activities associated with construction. The construction of these projects has the potential to affect near-surface geologic resources and soils through wind and water erosion and poor post-construction soil stabilization and restoration. Effects from the construction and operation of the proposed Project would be relatively short-term and minor. DCG would avoid or minimize effects by implementation of the FERC Plan, its construction mitigation plans, and adherence to our recommendations.

Impacts on near-surface geology and soils resulting from construction and operation of the non-jurisdictional powerlines would be similar but at a much smaller scale than those identified for the proposed Project; thus, no significant cumulative impacts would occur. In addition, we expect other potential projects such as the five roadway widening projects, two new industrial facilities, and one residential subdivision would disturb soils and increase impervious services. However, these projects

would be required to apply for similar federal and state permits that would require implementation of erosion and sediment control measures.

As described in section B.1, with implementation of the FERC Plan and Procedures, DCG's construction mitigation plans, and our recommendations, effects from the construction and operation of the proposed Project facilities would be relatively minor. Therefore, we conclude that the Project's minor contribution in additional to other current, proposed, or reasonably foreseeable future projects on geologic resources and soils would not be significant.

10.2 Water Resources and Wetlands

The region of influence considered for cumulative impacts on water (ground and surface) resources and wetlands is the ten watersheds (see table B-23 above), which contain the proposed Project. Impacts within waters or wetlands could migrate downstream within the watershed. The health of a water system and cumulative impacts are both traditionally assessed on a watershed level. Of the projects listed in appendix I, 12 were identified within the water resources and wetland region of influence.

We expect that current, proposed, or reasonably foreseeable future projects could involve grading and other ground-disturbing activities that have the potential to affect water and wetland resources within the watersheds crossed by the proposed Project. Construction of the proposed Project and other projects have the potential to affect water quality through increased turbidity or sedimentation due to direct impacts associated with waterbody or wetland crossings and potentially reintroducing buried contaminated sediments. The two replacement bridge projects currently under construction may have direct, temporary impacts on sensitive waterbodies from in-stream and riparian activities. Indirect impacts on water and wetland resources could also occur due to improper use of erosion control devices and/or chemical or petroleum spills during construction. During construction and through installation of impervious areas, current, proposed, or reasonably foreseeable future projects may exacerbate flash flooding, increase erosion of stream banks, and degrade water quality through point and nonpoint source pollution discharges to water and wetland resources.

Construction activities for the Project would not require the withdrawal or use of groundwater nor negatively affect overall water quality of local groundwater; thus, we do not anticipate any cumulative effects on groundwater, even if other projects in the region of influence do affect groundwater to some extent.

Construction of the Project may result in temporary impacts on waterbodies (see section B.2.2). The greatest potential for cumulative impacts would come from an increase in sediment loading from open-cut crossings and construction runoff, inadvertent release of drilling mud, and chemical or petroleum spills into waterbodies from construction equipment, if such impacts were to occur from both the proposed Project and other projects in the region of influence in the same watershed and about the same time. Construction of the non-jurisdictional powerlines and the industrial projects, described in appendix I, could result in such cumulative impacts.

Construction of the Project may result in temporary and minor impacts on wetlands (see section B.2.3). Cumulative impacts on individual wetlands could occur if multiple projects affect the same wetlands in the same general timeframe, which would encompass both the construction period and the time necessary for wetlands to restore to former functionality. No permanent impacts or fill are proposed within wetlands for the proposed Project, and DCG proposes to cross all wetlands with a trenchless construction method which would avoid most temporary impacts. Based on the available information for the projects identified in appendix I, only the three non-jurisdictional facilities may occur within the same surface water or wetland resources identified by the Project. We expect these and other current,

proposed, or reasonably foreseeable future projects would be required to apply for permits with the USACE if other jurisdictional resources would be directly affected, leading to potential avoidance, minimization or mitigation for impacts.

As described in section B.2, with implementation of the FERC Plan and Procedures, DCG's construction mitigation plans, and our recommendations, waterbody and wetland effects from the construction and operation of the proposed Project facilities would be relatively minor. Therefore, we conclude that the Project's minor contribution in additional to other current, proposed, or reasonably foreseeable future projects to cumulative impacts on water and wetland resources would not be significant.

10.3 Vegetation, Wildlife, and Aquatic Resources

The region of influence considered for cumulative impacts on vegetation and wildlife as well as aquatic resources is the ten watersheds (see table B-23 above), which contain the proposed Project. Twelve projects in appendix I are or would be within the region of influence. Each project is expected to require clearing of native vegetation communities, and may include impacts on wetland and waterbody habitats. As a result, these projects could contribute cumulative impacts on vegetation, wildlife, and aquatics when added to those associated with the proposed Project.

Vegetation and Wildlife

Cumulative impacts on vegetation could occur if current, proposed, or reasonably foreseeable future projects within the region of influence affect a large percentage of any existing vegetation type or cause a large amount of forest fragmentation, which could limit wildlife habitat. Cumulative impacts on wildlife would be most substantial if the projects were constructed at or near the same time (including the timeframe for habitat restoration) as the proposed Project and within proximity to one another. The primary impacts would be short-term due to removal of vegetation and the displacement of wildlife from construction areas. Temporary impacts are commonly associated with linear projects of this type, which include but are not limited to, impacts on food, cover, and water sources, and avoidance by mobile species of construction areas due to noise levels. In addition, the introduction or spread of non-native, invasive species or noxious weeds has the potential to cumulatively affect native plant populations.

Detailed vegetation impact information is not available for the projects in appendix I; however, the development of the Drayton Hall subdivision would clear existing forest land, thus adding to the deforestation within the watershed. This, as well as other projects within the region of influence, would potentially result in the cumulative loss of individuals of small mammal species, amphibians, reptiles, nesting birds, and non-mobile species from these areas. However, minimal forest fragmentation would occur from construction and operation of the proposed Project due to DCG's proposed HDDs and collocation of 75 percent of the proposed route with existing rights-of-way, which reduces the overall cumulative impact when adding the effects to other projects. Although forested areas would take years to fully restore, wildlife species typically return to disturbed areas following construction, particularly those species that are accustomed to or prefer open habitats or edge habitats.

Most soils in the proposed Project area have a high revegetation potential. Crops and native low-growing vegetation would be allowed to regrow within the rights-of-way and would recover within a couple of years. The three non-jurisdictional powerlines identified in appendix I would allow for regrowth of most vegetation within the easements. Conversely, the transportation road improvement, industrial, and residential projects would permanently remove and limit the regrowth of native vegetation. Although the original habitats and total footprints of these projects are not known, they may represent a

significant loss in the amount of vegetation and wildlife habitat when compared to that available within the watershed boundaries.

As described in sections B.3.1, B.3.3, and B.4, with implementation of the FERC Plan and Procedures, DCG's construction mitigation plans, and our recommendations, effects from the construction and operation of the proposed Project would be relatively minor; therefore, we conclude that the Project's contribution in additional to other current, proposed, or reasonably foreseeable future projects to cumulative impacts on vegetation and wildlife, including threatened, endangered, or other special status species, would not be significant.

Aquatic Resources

Cumulative impacts on aquatic resources could occur if current, proposed, or reasonably foreseeable future projects occur within the same segment of a waterbody as the proposed Project, and would be compounded if they have similar construction timeframes, which does not appear to be the case for the projects identified in appendix I. In addition to potential impacts from in-stream habitat alteration, destruction of stream cover, interruption of fish migration and spawning, water depletions, and entrainment or entrapment during construction, the greatest potential impacts are related to water quality degradation through sedimentation, turbidity, erosion, temperature increase, and accidental spills, as described above in the water resources section. Such temporary impacts are also expected from the construction of many of the projects listed in appendix I, as are permanent impacts from the increase in impervious surface in the watersheds. However, due to the separation in time between construction of the proposed Project and other projects, and the minimal impact expected from DCG's Project (due to trenchless construction methods and implementation of the FERC Procedures, DCG's construction mitigation plans, and our recommendations), we conclude that the Project's contribution to cumulative impacts on aquatic resources, including the endangered Atlantic Sturgeon and Shortnose Sturgeon, would not be significant.

10.4 Land Use and Visual Resources

The region of influence that was identified for cumulative impacts on land use and recreation is a 5 mile radius from the Project. Of the projects listed in appendix I, 13 projects were identified within the region of influence. The region of influence for visual resources is the distance at which the tallest feature at the planned facility would be visible from neighboring communities. All but the three non-jurisdictional powerlines would be over a mile from the Project; therefore, only those three could contribute to cumulative visual impacts. Long-term visual impacts from the Project would be minor, with the largest impacts related to a conversion of forested land to open land and eight small MLVs to be constructed along the right-of-way. The remainder of the aboveground facilities would be located with other existing aboveground facilities at either end of the pipeline and would, therefore, not result in additional visual impacts.

Construction and operation other current, proposed, and reasonably foreseeable future projects would result in both temporary and permanent cumulative impacts on land use and visual resources. Nearly half of the projects identified within appendix I identified within the region of influence are transportation projects which include bridge replacements that would not have a substantial impact on visual and land resources given that they would occur within or immediately adjacent to an existing transportation footprint. The Project area is in the suburbs of Columbia, South Carolina, and the industrial and residential projects contribute to a trend toward development, away from the historic dominance of agriculture and forest land (Land Design, 2014). The transportation road improvement, industrial, and residential projects may permanently convert forested or agricultural land to other land use types, although the total footprint of these projects is not known. The three non-jurisdictional facilities

could also have impacts due to a small conversion of forested land to open land. Some minor travel and convenience impacts related to increased traffic could also occur for projects occurring at the same time in the same general area as the proposed Project; however, the bridge replacements currently in construction may offset impacts from the addition of traffic in the area.

As described in section B.5, due to the minimal disturbance of previously undeveloped lands and with implementation of the FERC Plan and Procedures, DCG's construction mitigation plans, effects from the construction and operation of the proposed Project would be relatively minor. Therefore, we conclude that the Project's contribution to cumulative impacts on land use would not be significant.

10.5 Cultural Resources

Cumulative impacts would only occur if other projects were to affect the same cultural resources as the proposed Project. During surveys, a total of 20 cultural resources were identified with the 200-foot survey corridor as discussed in section B.7. Ten of the resources were found to be not eligible for the NRHP by the SHPO, and nine resources are either outside the Project area or would be avoided by using the HDD construction method. One resource is eligible for the NRHP. Based on the available information for the projects identified in appendix I, only the three non-jurisdictional facilities may have the potential to affect the same cultural resources identified by the proposed Project. The extent and exact location of these facilities is not known; therefore, their effect on cultural resources remains undetermined. However, through our Section 106 process, we are ensuring that impacts from the proposed Project would be minimal, either through avoidance of the feature or use of a treatment plan to mitigate any adverse effects on the resource. Therefore, the Project would not contribute to any significant cumulative effects on cultural resources.

10.6 Air Quality and Noise

The region of influence for cumulative impacts on air quality from construction is 0.5 mile from the proposed Project. For noise, the region of influence is the distance from the Project construction and operation at which there would no longer be a noticeable noise. Given the temporary nature of project construction, we consider construction-related air quality impacts to be highly localized, confined to the immediate area around the pipeline right-of-way, and occurring only during the estimated 4 months of construction. Operation of the Project would not result in substantial air emissions or noise and therefore would not contribute to cumulative impacts.

Realization of the Project would, however, result in positive cumulative impacts on air quality in the region by supplying natural gas to the existing International Paper Plant. International Paper would use the natural gas to fuel a boiler (proposed to be converted from coal to natural gas driven) and its existing natural gas fired kiln. The natural gas fired kiln currently receives compressed natural gas by an average of eight trucks a day (International Paper, 2015). Table B-24 provides the anticipated reduction of emissions expected from the modifications at the International Paper Plant.

The air quality impacts most likely to affect local residents would be fugitive dust from construction of projects within the region of influence. Three non-jurisdictional powerlines may be constructed at the same time as the proposed Project and could contribute to construction fugitive dust. If a project unidentified at this time were to occur in the same area and timeframe as the proposed Project it could temporarily add to the ongoing air quality effects of existing activities. These impacts may be minimized by mitigation measures, such as using properly maintained vehicles, using commercial gasoline and diesel fuel products with specifications to control pollutants, implementing fugitive dust control measures, and using erosion control devices to prevent erosion. However, the contribution of the proposed Project and any other project would be temporary and minimal, as effects would generally be

localized and other projects would be required to comply with the CAA and state air quality regulations. Based on this information, we conclude the Project would not contribute to any significant cumulative air quality impacts.

Table B-24

Anticipated Emissions Reduction from Boiler No.1 Modifications

Emission Type	Anticipated Emission Reduction (tons/year)
CO_2e	115,000
SO_2	980
NO_x	280
Hydrogen Chloride	160
PM (Filterable)	18
Sulfuric Acid	13

Source: Provided by DCG on FERC Docket No. CP15-504, Accession No. 20151203-5190

Similarly, noise impacts associated with the Project would mostly only occur during construction and would be greatest at NSAs near proposed HDDs during drilling. Noise impacts are highly localized and attenuate quickly as the distance from the noise source increases; therefore, cumulative impacts are unlikely, unless one or more of the other projects are constructed at the same time and location. Three non-jurisdictional powerlines may be constructed at the same time as the proposed Project and could contribute to construction noise in the immediate area; however, their construction would also occur during daylight and be intermittent rather than continuous. If any other projects in appendix I were to be constructed at the same time as the proposed Project, the distance between the projects would be sufficient to avoid cumulative impacts. Therefore, we conclude that the Project's contribution to cumulative noise impacts would not be significant due to the separation in time and space of other current, proposed, and reasonably foreseeable future projects.

10.7 Climate Change

Climate change is the change in climate over time and cannot be represented by single annual events or individual anomalies. For example, a single large flood event or particularly hot summer is not an indication of climate change, while a series of floods or warm years that statistically change the average precipitation or temperature over years or decades may indicate climate change.

The U.S. Global Change Research Program's report notes the following observations of environmental impacts that may be attributed to climate change in the Southeast region:

- more frequent days with temperatures above 95 degrees Fahrenheit;
- higher temperatures to reduce livestock and crop productivity;
- increase in very heavy precipitation events;
- decreased freshwater availability; and
- rising sea level.

GHG emissions are a primary cause of climate change (USEPA, 2014b). Of the GHGs emitted, carbon dioxide is the most prevalent, accounting for 82 percent of all U.S. emissions in 2012 (USEPA, 2014c). Methane is the second most prevalent, accounting for 9 percent of the total U.S. emissions (USEPA, 2014d). Between 1990 and 2012, natural gas and petroleum systems accounted for 29 percent of methane emissions in the United States. Although the amount of methane being emitted into the atmosphere is significantly less than that of carbon dioxide, the comparative impact of methane on climate change over a 100-year period is more than 20 times greater (USEPA, 2014e). Fugitive methane emissions are common in natural gas systems and can occur during natural gas production, transmission, storage, and distribution (USEPA, 2014f).

The minor fugitive emissions of GHGs from the proposed Project would not have any direct impacts on human health or the environment in the area on the local level (e.g., criteria pollutants). The GHG emissions from the construction and operation of the proposed Project are below the USEPA threshold for reporting GHG emissions. Burning natural gas results in less carbon dioxide emissions compared to other fuel sources (e.g., fuel oil or coal). The modifications and use of natural gas at the existing International Paper Plant would be a beneficial effect on regional area quality; however, it would not be significant reduction in global carbon dioxide emissions.

Currently there is no standard methodology to determine how the Project's relatively small incremental contribution to GHGs would translate into physical effects on the global environment. However, the emissions would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources, and contribute incrementally to climate change. Because the Project's contribution to GHG emissions would only be through construction equipment and minor fugitive emissions, the contribution to GHG emissions would not be significant.

10.8 Conclusion on Cumulative Impacts

We conclude impacts associated with the Project would be relatively minor, and would be further mitigated by our recommended additional measures to further reduce the environmental impacts associated with the Project. A majority of the cumulative impacts identified from other projects or activities in the region of influence would also be temporary and minor. None of the transportation or residential projects are expected to overlap in time with DCG's proposed Project; therefore, the temporary impacts from these projects would not be cumulative with the Project. The reduction of emissions through the modifications and use of natural gas at the existing International Paper Plant would be positive, but not significant on a global scale. We find that this Project would also result in mostly temporary and minor effects during construction and each current or foreseeable future project would also contribute small impacts on resources in the region of influence for this Project. We find the Project would have an insignificant contribution to cumulative impacts from all the listed projects in the regions of influence.

C. ALTERNATIVES

In accordance with NEPA and FERC policy, we evaluated alternatives to the Project to determine whether they would be reasonable and environmentally preferable to the proposed action. These alternatives included the no-action alternative, system alternatives, pipeline route alternatives, minor route variations, and aboveground facility site alternatives. The evaluation criteria used for developing and reviewing alternatives were:

- technical and economic feasibility and practicality;
- significant environmental advantage over the proposed action; and
- ability to meet the Project's stated objective, i.e., to deliver 18,000 Dt/d of natural gas to the International Paper plant.

Information used to evaluate alternatives to the Project included published studies, comments and suggestions from regulatory agencies, analyses prepared for similar projects, our reviews of the Project area and independent assessments, comments from the public, and data provided by DCG in its application and supplemental filings.

Each alternative was considered to the point where it was clear the alternative was not reasonable, would result in greater environmental impacts than those of the proposed Project, or it could not meet the Project objective.

It should be recognized that the routing of the proposed Project reflects modifications to the originally proposed route in DCG's application. Based on discussions with landowners, land managing agencies, Project engineers, and FERC staff's Environmental Information Requests, DCG incorporated route modifications into its proposed Project to avoid or minimize impacts on sensitive resources, reduce or eliminate engineering and constructability concerns, and/or avoid or minimize conflicts with existing land uses. The associated environmental consequences are included in our environmental analysis throughout section B of this EA.

In addition to these adopted route modifications, minor alignment shifts may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to construction, safety, engineering, landowner, and/or environmental concerns. All such alignment shifts would be subject to review and approval by FERC prior to construction, with the exception of minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

1. No-Action Alternative

If the Commission were to deny DCG's application, the Project would not be built and the environmental impacts identified in this EA would not occur. Under this alternative, DCG would not be able to provide the infrastructure to deliver natural gas as agreed to in its binding precedent agreements with the receipt customer (International Paper). As a result, the objectives of the Project would not be met and the customer's need to convert its facility boilers from coal and fuel oil to natural gas to comply with "Boiler MACT" air quality regulations and reduce facility air emissions would not be realized.

Under the no-action alternative, other natural gas transmission companies might propose to construct similar facilities to meet International Paper's request for new natural gas supply. Such actions could result in impacts similar to or greater than the proposed Project, and would likely not meet the

Project's purpose and need within the proposed timeframes. Therefore, we have concluded that the no-action alternative would not satisfy the Project objectives, and we are not recommending it.

2. System Alternatives

System alternatives would make use of existing, modified, or proposed pipeline systems to meet the stated objectives of the Project. Although some modifications or additions to existing or proposed pipeline systems may be required, implementation of a system alternative would deem it unnecessary to construct all or part of the Project. These modifications or additions could result in environmental impacts that are less than, similar to, or greater than those associated with construction and operation of the Project. The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the Project could be avoided or reduced by using another pipeline system, while still meeting the objectives of the Project.

The proposed Project is an expansion of DCG's existing pipeline system that collocates with other existing infrastructure, thereby minimizing environmental impacts. We evaluated the potential other existing or proposed natural gas systems that currently or could serve the purpose and need of the proposed Project. DCG is the primary natural gas transmission provider in central South Carolina which provides natural gas to the primary local distribution company (SCE&G) (USEIA, 2015). Based on federal maximum capacity limits in 49 CFR Part 192.621(a)(2), local distribution systems typically transport smaller volumes of natural gas at lower pressures; thus, local systems are not able to pressurize gas to an MAOP of 1,200 pounds per square inch gage to move the 18,000 dekatherms per day proposed for the Columbia to Eastover Project. The next closest transmission pipeline in the state is the Transcontinental Pipeline, which is more than 60 miles northwest of the proposed Project area (PHMSA, 2016; USEIA, 2015). There are currently no additional projects in this area filed with FERC that could meet the purpose and need of the proposed Project.

We received a comment that the International Paper facility is currently operating with CNG provided by truck and has the capability to receive natural gas via an existing rail line with a spur that terminates at the plant, as discussed in section A.2. International Paper is currently receiving eight truckloads of natural gas per day (50 miles round trip per truckload) to operate a single kiln that has already been converted to natural gas. We considered the use of surface transportation of natural gas as a system alternative to the proposed Project. In a letter dated December 17, 2015, International Paper stated it would need 15 to 39 additional truck deliveries per day to deliver sufficient natural gas to its plant, depending on peak needs, which would at least double the number of trucks. Rail delivery of CNG is not common in the United States and delivery of natural gas liquids or liquefied natural gas would require additional new facilities to process liquid for use at the plant. We determined surface transportation would not be preferable to the pipeline because of increased air emissions, traffic, and the potential for traffic-related spills and/or incidents. Furthermore, transmission of natural gas via pipeline is statistically safer than delivery through surface transportation methods, including rail (Congressional Research Service, 2014). Thus, we conclude that additional surface transportation at the scale necessary to meet the Project objective is not a viable or preferable system alternative to the proposed Project.

Because of pressure limitations of local distribution systems, distance to another transmission system, and increased impacts from surface transportation, no other existing, modified, or proposed systems were evaluated that have the ability to meet the needs of the Project.

3. Major Route Alternatives

A major route alternative is a deviation from a proposed pipeline alignment for a substantial length and distance. Major route alternatives are identified to determine if another alternative could avoid or reduce impacts on environmentally sensitive resources, such as large population centers, scenic areas,

or wildlife and natural habitat management areas that would be affected by the proposed pipeline. While the origin and delivery points of a major route alternative are generally the same as for the corresponding segment of a proposed pipeline, the alternative could follow routes significantly different from the proposed pipeline.

DCG's route for the proposed Project was selected to connect its existing system at the DAK facility in Calhoun County to the existing International Paper facility in Richland County, while maximizing collocation with existing rights-of-way where feasible. This would be preferable to constructing a new route through undisturbed areas and, by using parts of existing rights-of-way, would reduce construction and operational impacts. DCG considered several other route alternatives early in the development of the proposed Project and prior to the formal filing of the proposed route with the Commission in its application on May 29, 2015.

FERC staff identified and analyzed one major route alternative (Collocated Alternative) in response to several public comments that were received both during and after the scoping period. These comments requested the evaluation of a collocated route to utilize properties currently under utility agreements, and to potentially minimize new impacts on resources. Our evaluation of the Collocated Alternative considered the potential for impacts on sensitive environmental resources engineering/construction constraints, public concerns, Commission regulations, and concerns of federal and state resource agencies.

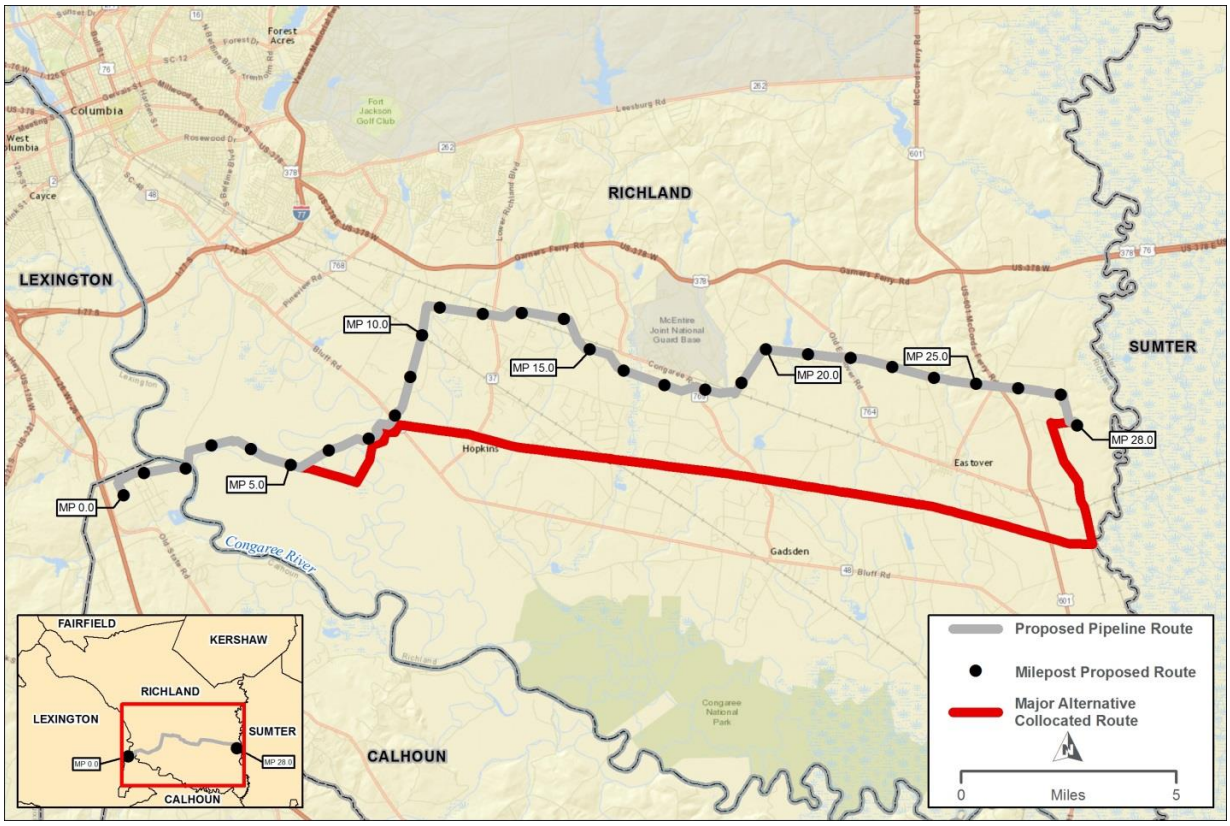


Figure 5: Collocated Alternative

We evaluated the Collocated Alternative to determine if impacts could be reduced by further collocating with other existing corridors. This alternative would be collocated for about 90 percent of its length with SCE&G's existing overhead powerline and natural gas pipeline corridors, compared to the proposed route which is about 75 percent collocated. The route alternative begins at approximate MP 8.3

of the proposed route and connects at approximate MP 28.0 to end at the proposed joint pig receiver and M&R station at the International Paper plant (see figure 5). The Collocated Alternative is within the same census tracts 120 and 118 as the proposed route. A comparison of the impacts of Collocated Alternative and the proposed route is presented in table C-1, using available desktop data. Resource categories not shown in the table are essentially the same for both routes.

Table C-1

Comparison of the Collocated Alternative to the Proposed Route [a c]

Environmental Factor	Proposed Route	Collocated Alternative
Total Length (miles)	28.0	29.0
Length Collocated (miles)	21.1	29.0
Percent Collocated	75%	100%
Total Construction Impacts (acres) [b]	254.5	316.3
Permanent Right-of-Way (acres)	169.7	175.6
Waterbodies Crossed (number) [d]	25	33
Construction Forest Impacts (acres) [e]	53.9	33.6
Construction Wetland Impacts (number) [f]	40	50
Roadways Crossed (number) [g]	33	36
Occupied Structures within 200-foot-wide Study Corridor (number)	21	23
Landowners Crossed (number)	171	208

a Impact numbers are rounded to the tenth for presentation purposes.

b Assumes a typical construction right-of-way width of 75 feet. Does not include avoided or minimized impacts for trenchless construction methods.

c For comparison purposes, the routes were evaluated using publicly available GIS data obtained from state and federal agencies. Thus, impacts presented in this table for the proposed route may not exactly match the impacts presented in section B in this EA.

d USGS National Hydrography Dataset, 2015

e USGS National Land Cover Database, 2011

f USFWS National Wetlands Inventory, 2015

g South Carolina Department of Transportation, 2015

The adoption of the Collocated Alternative would reduce forest and wetland impacts compared to the proposed route, but would increase impacts on streams, roadway crossings and residential properties. Nearly 75 percent of the currently proposed route is collocated with SCE&G's existing utility rights-of-way; however, due to the increased number of waterbody and wetland crossings, increased proximity to occupied structures, and increased number of landowners affected, we conclude the Collocated Alternative does not provide a significant environmental advantage over the proposed route.

4. Minor Route Alternatives

Minor route alternatives and variations are identified in response to specific local concerns and may not always clearly display an environmental advantage other than to reduce impacts on a localized level. Minor route alternatives and variations may be less than a few miles in length; most are relatively short and in proximity to the proposed route. We developed and evaluated two minor route alternatives based on comments received by the Commission. Several other minor alternatives and/or variations were

reviewed by DCG and either adopted into the Project design, or they otherwise did not require a comprehensive alternative assessment, as discussed in sections B.2.3, B.5, and B.7.

4.1 Minor Route Alternative 1

After the scoping period, we received several comments from the Friends of the Congaree Swamp and Belle Grove LLC to review an alternative to follow an existing corridor in order to minimize impacts on Mill Creek, avoid a cultural resource site (38RD397), and avoid removal of mature trees. Minor Route Alternative 1 starts at about MP 5.2 of the proposed route and ends near MP 7.6 (see figure 6).

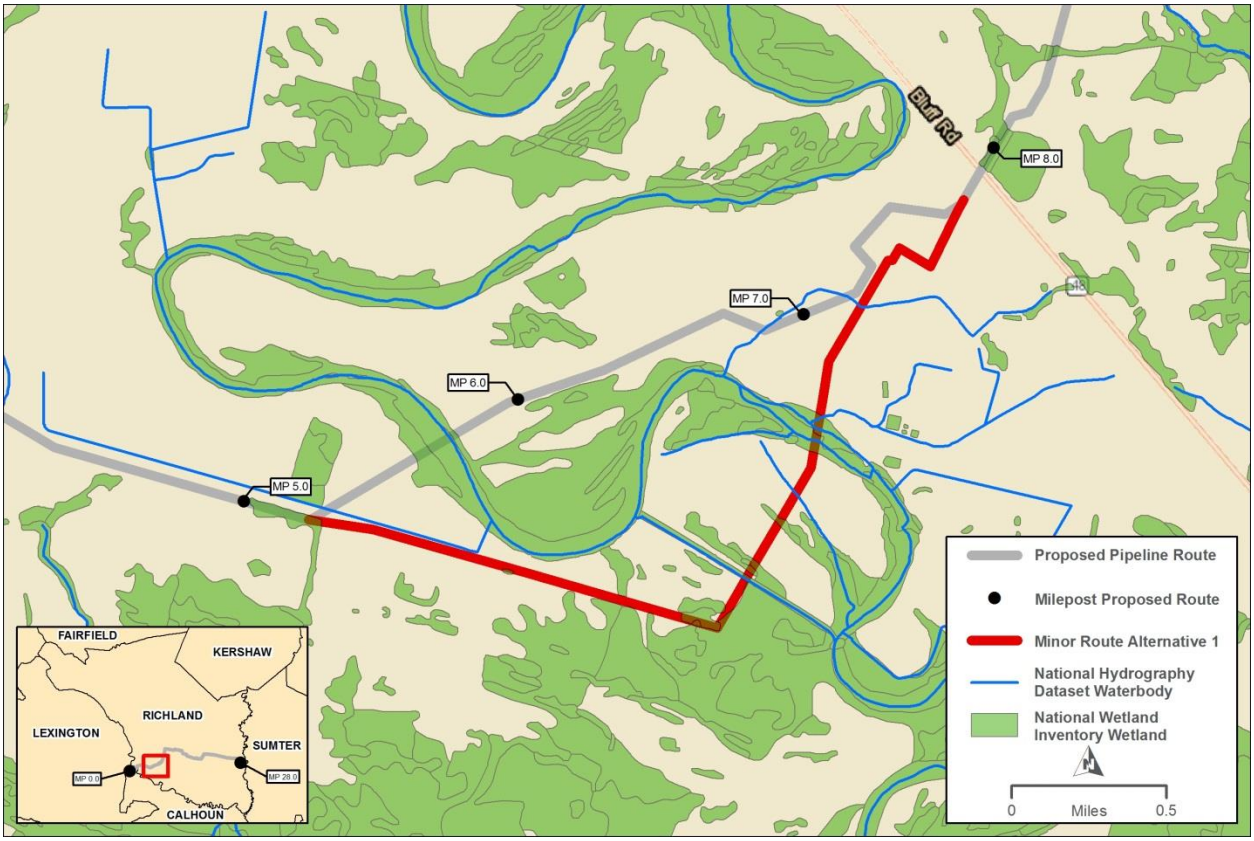


Figure 6: Minor Route Alternative 1

A comparison of the impacts of Minor Route Alternative 1 and the corresponding segment of the proposed route is presented in table C-2, using available desktop data. Resource categories not shown in the table are essentially the same for both routes. Neither route would avoid crossing Mill Creek. Minor Route Alternative 1 would increase the pipeline length by about 0.5 mile and would impact an additional five wetlands, six waterbodies, and 13.4 acres of forest. The alternative route would actually increase impacts on Mill Creek as it would also cross several channels of the creek. Impacts on mature trees would be similar, but total forest impacts would be less along the proposed route. Additionally, the increased length of the alternative would result in an increase of construction impacts by 8.2 acres and permanent right-of-way impacts by 3.4 acres compared to the proposed route. As discussed in section B.7, cultural resource site (38RD397) is not within the 200-foot study corridor of the proposed route. Therefore, we conclude this alternative does not provide a significant environmental advantage over the proposed route.

Table C-2

Comparison of the Minor Route Alternative 1 to the Proposed Route [a b c]

Environmental Factor	Proposed Route	Minor Route Alternative 1
Total Length (miles)	1.9	2.4
Length Collocated (miles)	0.0	2.4
Percent Collocated	0%	100%
Total Construction Impacts (acres) [b]	20.5	28.7
Permanent Right-of-Way (acres)	11.3	14.7
Construction Forest Impacts (acres) [d]	15.3	28.7
Wetlands Crossed (number) [e]	3	11
Waterbodies Crossed (number) [f]	4	6
Occupied Structures within 200-foot-wide Study Corridor (number)	0	0

a Impact numbers are rounded to the tenth for presentation purposes.

b Assumes a typical construction right-of-way width of 75 feet. Does not include avoided or minimized impacts for trenchless construction methods.

c For comparison purposes, the routes were evaluated using publicly available GIS data obtained from state and federal agencies. Thus, impacts presented in this table for the proposed route may not exactly match the impacts presented in section B in this EA.

d USGS National Land Cover Database, 2011

e USFWS National Wetlands Inventory, 2015

f USGS National Hydrography Dataset, 2015

4.2 Minor Route Alternative 2

We received a comment from the Friends of the Congaree Swamp to review an alternative to follow an existing corridor between MPs 17.4 and 18.7 (see figure 7). A comparison of the impacts of Minor Route Alternative 2 and the corresponding segment of the proposed route is presented in table C-3, using available desktop data. Resource categories not shown in the table are essentially the same for both routes.

While the alternative would increase collocation with an existing utility right-of-way, Minor Route Alternative 2 would increase the pipeline length by about 0.2 mile and would impact an additional three wetlands and 3.6 acres of mature forest. Additionally, the increased length of the alternative would result in an increase of construction impacts by 1.7 acres and permanent right-of-way impacts by 1.1 acres over the proposed route. Therefore, we conclude this alternative does not provide a significant environmental advantage over the proposed route.

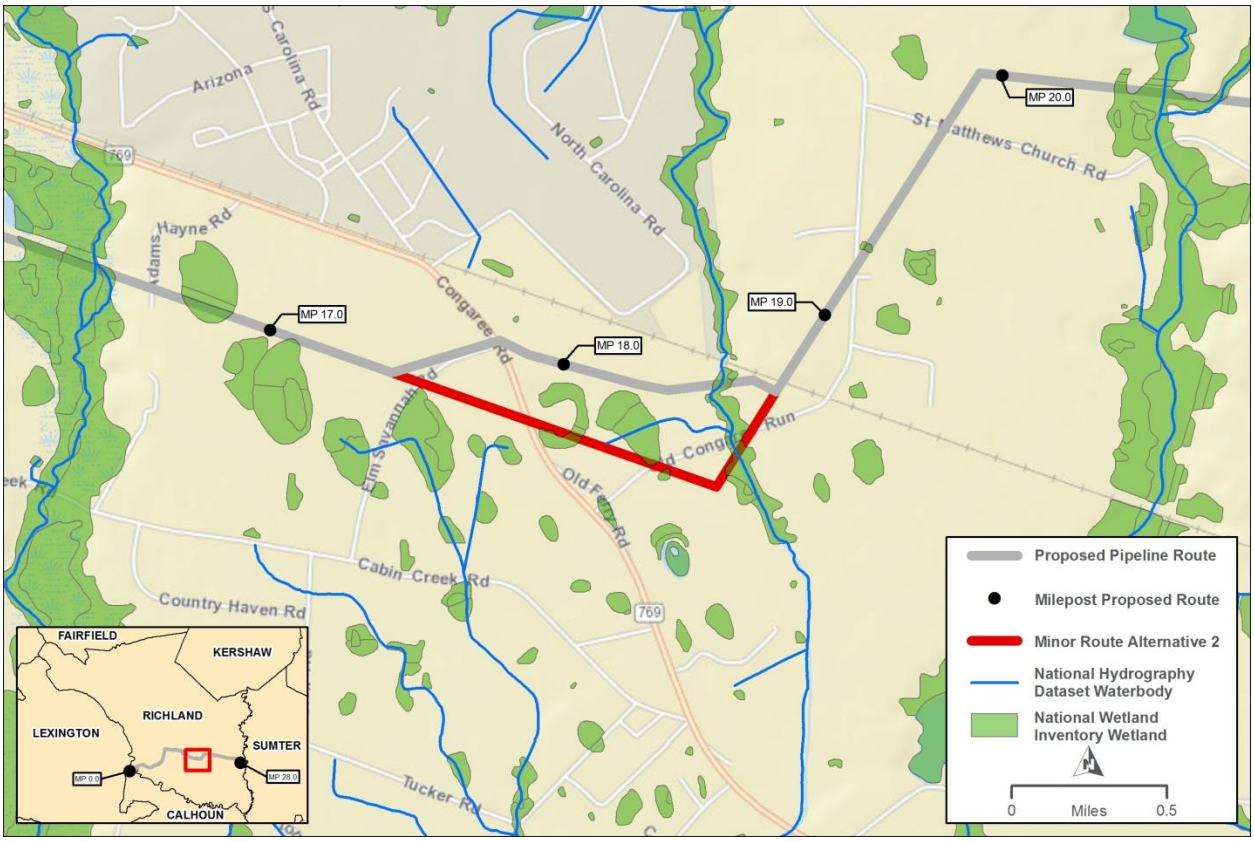


Figure 7: Minor Route Alternative 2

Table C-3

Comparison of the Minor Route Alternative 2 to the Proposed Route [a b c]

Environmental Factor	Proposed Route	Minor Route Alternative 2
Total Length (miles)	1.3	1.5
Length Collocated (miles)	0.0	1.5
Percent Collocated	0%	100%
Total Construction Impacts (acres) [b]	11.8	13.5
Permanent Right-of-Way (acres)	7.9	9.0
Construction Forest Impacts (acres) [d]	2.3	5.9
Wetland Crossed (number) [e]	2	5
Waterbodies Crossed (number) [f]	1	2
Occupied Structures within 200-foot-wide Study Corridor (number)	0	3

a Impact numbers are rounded to the tenth for presentation purposes.

b Assumes a typical construction right-of-way width of 75 feet. Does not include avoided or minimized impacts for trenchless construction methods.

c For comparison purposes, the routes were evaluated using publicly available GIS data obtained from state and federal agencies. Thus, impacts presented in this table for the proposed route may not exactly match the impacts presented in section B in this EA.

c USGS National Land Cover Database, 2011

d USFWS National Wetlands Inventory, 2015

e USGS National Hydrography Dataset, 2015

5. Aboveground Facility Site Alternatives

Because the Project would not involve the placement of a significant number or acreage of aboveground facilities, such as compressor stations, an evaluation of alternatives for these facilities was not warranted by FERC staff. The locations of these facilities, such as the pig launcher and joint pig receiver and M&R station, are determined by the location of the start and end points of the pipeline; thus, an analysis of alternative sites for these types of facilities was also not warranted. MLVs associated with the Project would be sited within or immediately adjacent to the proposed right-of-way to minimize impacts on environmental resources and would be placed in areas which are hydraulically appropriate and meet applicable safety standards. No additional alternative evaluations for these facilities were determined to be necessary. However, we have recommended in section B.1.1 that DCG determine applicable mitigation measures for the placement of MLV 25-95 at MP 5.2 within the FEMA Special Flood Hazard Area of the Congaree River.

D. CONCLUSIONS AND RECOMMENDATIONS

We conclude that approval of the Project would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the above environmental analysis, DCG's application and supplements, and implementation of DCG's *Spill Plan, Access Road Plan, Site-specific HDD Crossing Plans, Inadvertent Release Plan, SWPPP, Non-Native Invasive Species Management Plan, Alternating Current Mitigation Report/Plan, Residential Construction Plans, Plan and Procedures for the Unanticipated Discovery of Cultural Resources*, the FERC Plan and Procedures, and our recommended mitigation measures. We recommend that the Commission Order contain a finding of no significant impact and that the following mitigation measures be included as conditions of any Certificate the Commission may issue.

1. DCG shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. DCG must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of the OEP before using that modification.

2. The Director of the OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order; and

    b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from Project construction (and operation).

3. **Prior to any construction**, DCG shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, DCG shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

DCG's exercise of eminent domain authority granted under NGA section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. DCG's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas pipeline to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. DCG shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of the OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the FERC Plan and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.
   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

   c. recommendations by state regulatory authorities; and

   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the authorization and before construction begins**, DCG shall file an Implementation Plan with the Secretary for review and written approval by the Director of the OEP. DCG must file revisions to the plan as schedules change. The plan shall identify:

   a. how DCG will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;

   b. how DCG will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;

   c. the number of EIs assigned (per spread), and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate material;

e. the location and dates of the environmental compliance training and instructions DCG will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change);

f. the company personnel (if known) and specific portion of DCG's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) DCG will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:

(1) the completion of all required surveys and reports;

(2) the environmental compliance training of onsite personnel;

(3) the start of construction; and

(4) the start and completion of restoration.

7. Beginning with the filing of its Implementation Plan, DCG shall file updated status reports with the Secretary on a **weekly basis until all construction and restoration activities are complete**. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on DCG efforts to obtain the necessary federal authorizations;

b. the construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally-sensitive areas;

c. a listing of all problems encountered and each instance of noncompliance observed by the EI(s) during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;

e. the effectiveness of all corrective actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by DCG from other federal, state, or local permitting agencies concerning instances of noncompliance, and DCG's response.

8. **Prior to receiving written authorization from the Director of the OEP to commence construction of any Project facilities**, DCG shall file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

9. DCG must receive written authorization from the Director of the OEP **before placing the Project into service**. Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the Project are proceeding satisfactorily.

10. **Within 30 days of placing the authorized facilities in service**, DCG shall file an affirmative statement with the Secretary, certified by a senior company official:

    a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

    b. identifying which of the conditions in the Order DCG has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

11. **Prior to construction,** DCG shall file with the Secretary documentation of its consultation with the SCDHEC and Richland County regarding applicable mitigation measures and associated permits for operation of the MLV at MP 5.2 and Access Road 084 within a Special Flood Hazard Area.

12. **Prior to conducting blasting activities,** DCG shall file its blasting plan(s) with the Secretary for the review and written approval of the Director of the OEP.

13. **Prior to construction**, DCG shall file with the Secretary, for review and written approval by the Director of the OEP, a revised combined *Inadvertent Release Plan* and *HDD Contingency Plan*. The revised plan shall include:

    a. specific contact information for local, state, and federal agencies that would be contacted if an inadvertent release occurs and/or a contingent crossing method is required;

    b. details for the conditions and number of attempts that would be completed before an HDD is abandoned, a new HDD location is chosen, and when the use of an alternate crossing method may be required; and

    c. contingent crossing methods for each HDD location and a discussion of the regulatory authority and process that DCG would be required to follow if a trenchless construction method is not feasible.

14. **Prior to construction,** DCG shall file with the Secretary:

    a. the location, by milepost, of any previously unidentified private water wells within 150 feet of construction workspaces, as identified during remaining field surveys and landowner coordination; and

b. documentation indicating where testing plans would be implemented for any previously unidentified wells.

15. **Prior to the use of an alternative waterbody crossing method for the Congaree River HDD,** DCG shall develop an alternative site-specific crossing plan in consultation with the FERC and the USACE, NMFS, USFWS, and SCDHEC, as applicable. The final alternative crossing plan shall be filed for review and written approval from the Director of the OEP **prior to its implementation.**

16. **Prior to construction,** DCG shall file with the Secretary, for review and written approval by the Director of the OEP, a revised construction configuration to avoid PFO wetland WLRR-01 at MP 5.3, or provide justification for the workspace.

17. **Prior to construction,** DCG shall file with the Secretary consultation with the USFWS South Carolina field office regarding migratory birds to determine what, if any, additional minimization and mitigation measures would be appropriate for the Project.

18. **DCG shall not begin construction activities until**:

    a. FERC staff receives comments from the NMFS regarding the proposed action relative to the Atlantic sturgeon and shortnose sturgeon;

    b. FERC completes any necessary Section 7 consultation with the NMFS for the Atlantic sturgeon and shortnose sturgeon; and

    c. DCG has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.

19. **DCG shall not begin construction activities until**:

    a. surveys for the rough-leaved loosestrife are complete and the results and any comments from the USFWS have been provided to the Secretary for review;

    b. FERC completes any necessary Section 7 consultation with the USFWS for the rough-leaved loosestrife; and

    c. DCG has received written approval from the Director of the OEP that construction or use of mitigation measures may begin.

20. **Prior to construction**, DCG shall file with the Secretary, for the review and written approval of the Director of the OEP, revised site-specific plans that show evidence of landowner concurrence for each residence that would be located within 10 feet of construction work areas and fencing.

21. DCG shall develop and implement an environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the Project and restoration of the right-of-way. **Prior to construction**, DCG shall mail the complaint procedures to each landowner whose property would be crossed by the Project.

In its letter to affected landowners, DCG shall:

a. provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;

b. instruct the landowners that if they are not satisfied with the response, they should call DCG's Hotline (the letter should indicate how soon to expect a response); and

c. instruct the landowners that if they are still not satisfied with the response from DCG's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

In addition, DCG shall include in its weekly status report a copy of a table that contains the following information for each problem/concern:

a. the identity of the caller and date of the call;

b. the location by MP and identification number from the authorized alignment sheet(s) of the affected property;

c. a description of the problem/concern; and

d. an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

22. **DCG shall not begin construction or implementation of any avoidance/treatment plan until**:

a. DCG addresses the SHPO's comments regarding the NRHP eligibility of site 38RD262, and files with the Secretary any necessary avoidance/treatment plan, and the SHPO's comments on any plan;

b. DCG files the SHPO's comments on the revised draft report;

c. the Advisory Council on Historic Preservation is afforded the opportunity to comment if historic properties would be adversely affected; and

d. staff reviews and the Director of the OEP approves any plan, and notifies DCG in writing that any avoidance/treatment plan may be implemented and/or construction may proceed.

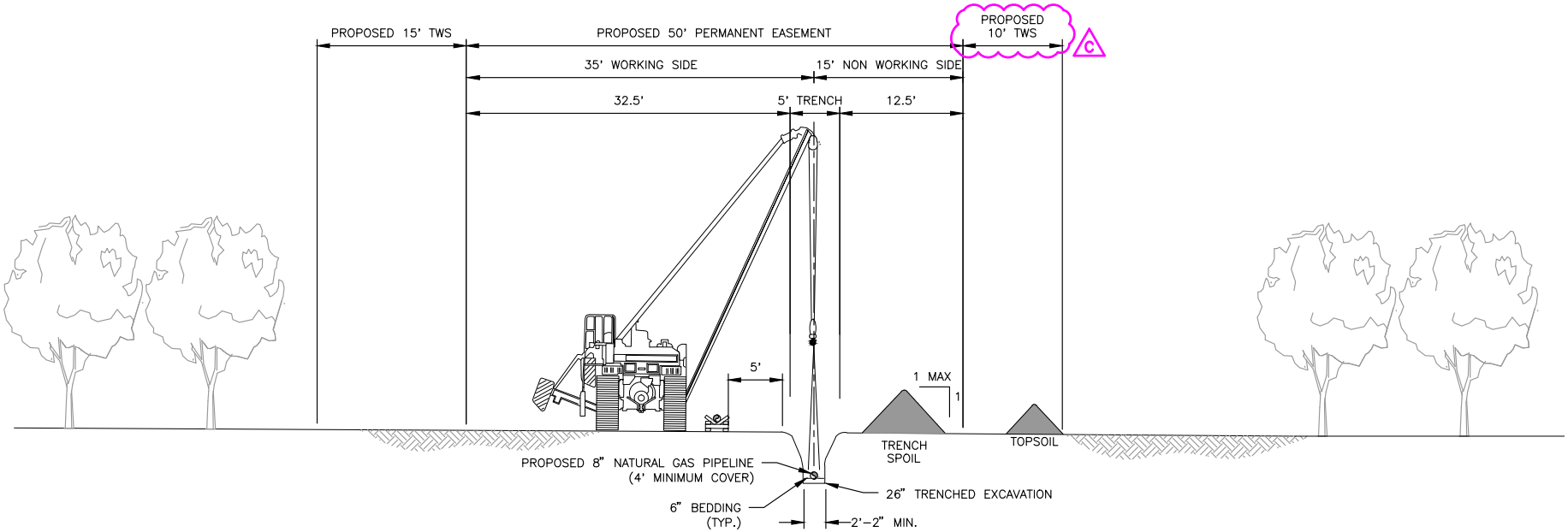
All materials filed with the Commission containing location, character, and ownership information about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION—DO NOT RELEASE."**

23. **Prior to night time and/or 24-hour drilling activities** at HDD 07 (MP 12.3), HDD 10 (MP 13.9), HDD 11 (MP 14.3), HDD 13 (MP 19.1), HDD 20 (MP 24.4), or HDD 36 (MP 25.4), DCG shall file a night time noise mitigation plan for the review and written approval by the Director of the OEP. During any nighttime drilling operations, DCG shall implement the approved plan, monitor noise levels, and make all reasonable efforts

to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs.

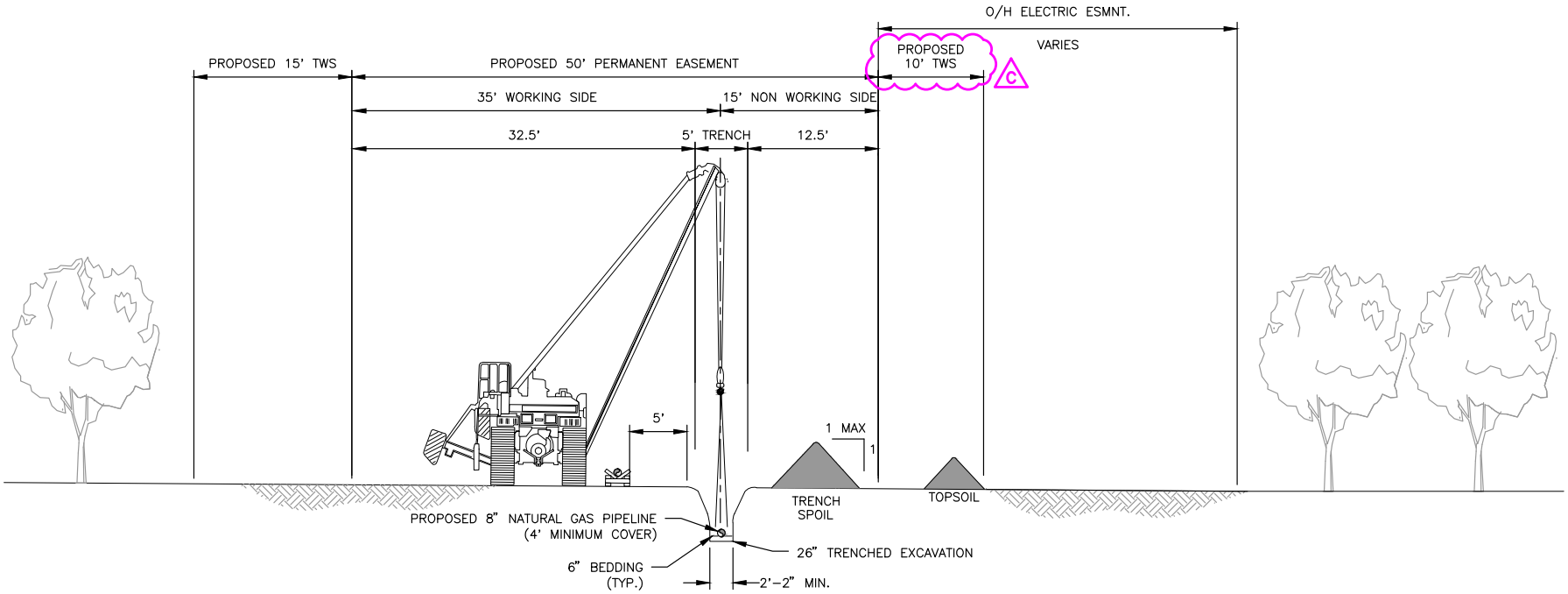
APPENDIX A

Typical Conventional Pipeline Construction



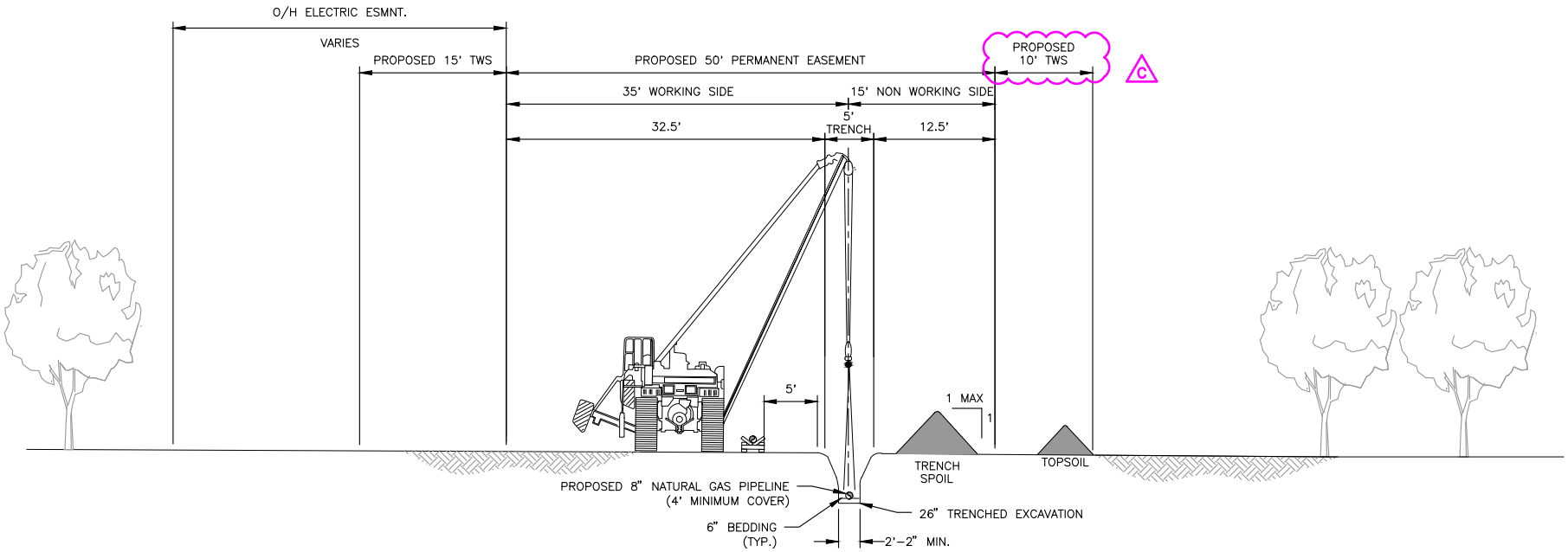
1 TYPICAL CONVENTIONAL PIPELINE CONSTRUCTION
15' TWS ON LEFT SIDE
10' TWS ON RIGHT SIDE

C



2 TYPICAL CONVENTIONAL PIPELINE CONSTRUCTION
15' TWS ON LEFT SIDE
10' TWS WITHIN O/H EASEMENT ON RIGHT SIDE

C



6 TYPICAL CONVENTIONAL PIPELINE CONSTRUCTION
15' TWS WITHIN O/H EASEMENT ON LEFT SIDE
10' TWS ON RIGHT SIDE

C

APPENDIX B

Additional Temporary Workspace for the Project

Appendix B

Additional Temporary Workspace for the Project

County	MP	Width (feet)	Length (feet)	Acres	Land Use Type	ATWS Justification
Calhoun	0.0	65	105	0.1	Forest, Open land	Staging area
	0.9	150	150	0.5	Industrial	HDD entry for wetland, waterbody, utility, and railroad crossing
	1.2	85	200	0.4	Forest	HDD exit for wetland, waterbody, utility, and railroad crossing
	2.0	40	1986	1.8	Forest	HDD exit for Congaree River crossing
	2.0	90	150	0.3	Forest	HDD pullback area for Congaree River crossing
Richland	2.4	100	150	0.3	Forest, Open land	HDD entry for Congaree River crossing
	4.1	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	4.2	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	4.5	65	125	0.2	Forest	Conventional bore for waterbody crossing
	4.6	65	125	0.2	Forest	Conventional bore for waterbody crossing
	4.8	65	125	0.2	Forest	Conventional bore for waterbody crossing
	4.9	65	125	0.2	Forest	Conventional bore for waterbody crossing
	5.0	90	150	0.3	Forest	HDD exit for wetland crossing
	5.1	90	150	0.3	Forest	HDD entry for wetland crossing
	5.3	90	150	0.4	Forest	HDD entry for wetland, waterbody, dirt road, and utility crossing
	5.5	90	150	0.4	Forest	HDD exit for wetland, waterbody, dirt road, and utility crossing
	5.7	75	150	0.4	Forest	HDD exit for wetland crossing
	5.8	75	150	0.4	Forest	HDD entry for wetland crossing
	7.1	50	125	0.1	Forest, Residential	Conventional bore for waterbody crossing
	7.2	50	125	0.1	Agricultural, Forest	Conventional bore for waterbody crossing
	7.4	50	125	0.1	Forest	Conventional bore for wetland crossing
	7.5	50	125	0.1	Forest	Conventional bore for wetland crossing
	7.7	40	1072	1.0	Forest	HDD pullback area for waterbody, utility, and Bluff Road crossing
	7.8	85	150	0.4	Forest	HDD exit for waterbody, utility, and road crossing
	8.1	– [a]	– [a]	0.2	Forest	HDD entry for waterbody, utility, and road crossing. The HDD drill would be within 50 feet of wetland WLRR-06 due to utility pole clearance requirements and limited upland space on the exit side because of an existing electric substation. [b]
	8.3	110	150	0.4	Forest	HDD entry for wetland crossing

Appendix B

Additional Temporary Workspace for the Project

County	MP	Width (feet)	Length (feet)	Acres	Land Use Type	ATWS Justification
Richland	8.4	110	150	0.4	Forest	HDD exit for wetland crossing
	8.6	100	150	0.3	Forest	HDD exit for wetlands, road, and utility crossing
	9.1	100	150	0.3	Forest	HDD entry for wetlands, road, and utility crossing
	9.3	100	150	0.3	Forest	HDD entry for wetland crossing
	9.4	100	150	0.3	Forest	HDD exit for wetland crossing
	9.7	100	150	0.3	Forest	HDD entry for wetland, waterbody, road, railroad, and utility crossing
	10.1	75	150	0.3	Forest	HDD exit for wetland, waterbody, road, railroad, and utility crossing
	10.6	65	125	0.2	Forest	Conventional bore for waterbody crossing
	10.7	65	175	0.3	Forest, Open land	Conventional bore for road, and utility crossing
	10.7	65	125	0.2	Forest	Conventional bore for road, and utility crossing
	10.8	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	11.0	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	11.2	90	150	0.3	Forest	HDD exit for waterbody crossing
	11.5	90	150	0.3	Agricultural	HDD entry for waterbody crossing
	11.6	65	125	0.2	Agricultural, Open land	Conventional bore for road and utility crossing
	11.7	50	125	0.1	Forest, Residential	Conventional bore for road and utility crossing
	11.8	65	125	0.2	Forest	Conventional bore for waterbody crossing
	11.9	65	125	0.2	Residential	Conventional bore for waterbody crossing
	11.9	65	125	0.2	Residential	Conventional bore for road and utility crossing
	12.0	65	125	0.2	Residential	Conventional bore for road and utility crossing
	12.2	65	125	0.2	Agricultural, Forest, Open land	Conventional bore for road and utility crossing
	12.3	65	125	0.2	Agricultural	Conventional bore for road and utility crossing
	12.3	90	150	0.3	Agricultural, Forest	HDD entry for wetland crossing
	12.5	150	150	0.5	Agricultural, Forest	HDD exit for wetland crossing
	12.5	40	470	0.4	Agricultural, Forest	HDD pullback area for wetland crossing
	12.6	80	150	0.3	Agricultural	HDD entry for road, railroad, and utility crossing
	12.7	80	150	0.3	Agricultural	HDD exit for road, railroad, and utility crossing
	12.8	40	135	0.1	Agricultural	HDD pullback area for road, railroad, and utility crossing

Appendix B

Additional Temporary Workspace for the Project

County	MP	Width (feet)	Length (feet)	Acres	Land Use Type	ATWS Justification
Richland	13.0	65	125	0.2	Agricultural	Conventional bore for wetland and waterbody crossing
	13.0	65	125	0.2	Forest	Conventional bore for wetland and waterbody crossing
	13.3	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	13.7	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	13.8	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	14.1	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	14.1	40	145	0.1	Forest, Open land	HDD pullback area for wetland and waterbody crossing
	14.3	80	150	0.3	Forest	HDD exit for wetland, waterbody, road, railroad, and utility crossing
	14.6	80	150	0.3	Forest	HDD entry for wetland, waterbody, road, railroad, and utility crossing
	14.9	50	125	0.1	Agricultural	Conventional bore for road and utility crossing
	14.9	50	125	0.1	Agricultural	Conventional bore for road and utility crossing
	15.5	50	125	0.1	Agricultural	Conventional bore for road and utility crossing
	15.5	50	125	0.1	Agricultural, Forest	Conventional bore for road and utility crossing
	16.1	90	125	0.3	Agricultural, Open land	HDD entry for wetland and waterbody crossing
	16.9	90	150	0.3	Agricultural, Forest, Open land	HDD exit for wetland and waterbody crossing
	17.7	35	222	0.2	Agricultural	Conventional bore for road and utility crossing
	17.8	50	125	0.1	Forest	Conventional bore for road and utility crossing
	18.3	40	318	0.3	Forest	HDD pullback area for wetland and waterbody crossing
	18.4	80	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	18.6	80	150	0.3	Agricultural	HDD entry for wetland and waterbody crossing
	18.7	150	150	0.5	Agricultural, Forest	HDD entry for railroad and utility crossing
	19.0	90	150	0.3	Forest	HDD exit for railroad and utility crossing
	19.1	90	150	0.3	Agricultural, Forest	HDD entry for road and utility crossing
	19.2	90	150	0.3	Open land	HDD exit for road and utility crossing
	19.7	65	125	0.2	Forest	Conventional bore for road and utility crossing
	19.7	65	125	0.2	Forest	Conventional bore for road and utility crossing
	19.9	40	50	<0.1	Agricultural	HDD pullback area for wetland, waterbody, road, and utility crossing

Appendix B

Additional Temporary Workspace for the Project

County	MP	Width (feet)	Length (feet)	Acres	Land Use Type	ATWS Justification
Richland	20.3	90	150	0.3	Forest, Open land	HDD exit for wetland, waterbody, road, and utility crossing
	20.7	90	150	0.3	Forest	HDD entry for wetland, waterbody, road, and utility crossing
	20.9	65	125	0.2	Forest, Open land	Conventional bore for road and utility crossing
	20.9	65	125	0.2	Agricultural	Conventional bore for road and utility crossing
	21.1	65	125	0.2	Agricultural	Conventional bore for road, waterbody, and utility crossing
	21.1	65	125	0.2	Agricultural	Conventional bore for road, waterbody, and utility crossing
	21.8	50	125	0.1	Forest, Open land	Conventional bore for road, waterbody, and utility crossing
	21.9	– [a]	– [a]	0.1	Forest	Conventional bore for road, waterbody, and utility crossing
	21.9	– [a]	– [a]	0.1	Forest, Open land	Conventional bore for waterbody crossing
	22.3	90	150	0.3	Agricultural	HDD entry for wetland crossing
	22.5	90	150	0.3	Forest	HDD exit for wetland crossing
	22.7	90	150	0.3	Forest, Open land	HDD entry for wetland crossing
	22.8	90	150	0.3	Forest	HDD exit for wetland crossing
	23.4	90	150	0.3	Forest	HDD entry for wetland crossing
	23.5	90	150	0.3	Forest	HDD exit for wetland crossing
	23.7	50	125	0.1	Forest	Conventional bore for waterbody, road, and utility crossing
	23.8	50	125	0.1	Open land	Conventional bore for waterbody, road, and utility crossing
	23.9	– [a]	– [a]	0.2	Open land	HDD pullback area for wetland and waterbody crossing
	24.1	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	24.3	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	24.4	90	150	0.3	Agricultural, Forest	HDD entry for wetland and waterbody crossing
	24.6	90	150	0.3	Forest	HDD exit for wetland and waterbody crossing
	25.4	90	150	0.3	Forest, Residential	HDD entry for waterbody, road, and utility crossing
	25.6	90	150	0.3	Agricultural	HDD exit for waterbody, road, and utility crossing
	25.7	40	1610	1.5	Agricultural	HDD pullback area for waterbody, road, and utility crossing

Appendix B

Additional Temporary Workspace for the Project

County	MP	Width (feet)	Length (feet)	Acres	Land Use Type	ATWS Justification
Richland	25.9	150	150	0.5	Agricultural	HDD exit for wetland and waterbody crossing
	26.2	90	150	0.3	Forest	HDD entry for wetland and waterbody crossing
	26.4	55	900	1.1	Forest	HDD pullback area for wetland crossing
	26.6	150	150	0.5	Forest	HDD exit for wetland crossing
	26.6	– [a]	– [a]	0.6	Forest, Open land	Spoil stockpile
	26.8	90	150	0.3	Forest	HDD entry for wetland crossing
	26.8	90	150	0.3	Forest	HDD exit for waterbody crossing
	26.9	90	150	0.3	Forest	HDD entry for waterbody crossing
	27.3	40	125	0.1	Forest	HDD pullback area for wetland crossing
	27.4	90	150	0.3	Forest	HDD exit for wetland crossing
	27.6	90	150	0.3	Forest	HDD entry for wetland crossing
	27.7	65	125	0.2	Forest	Conventional bore for road and utility crossing
	27.8	50	115	0.1	Industrial, Open land	Conventional bore for road and utility crossing
	27.9	– [a]	– [a]	4.5	Industrial, Open land	Staging area

ATWS = additional temporary workspace
HDD = horizontal directional drill
MP = milepost
a Dimension not included due to the irregular shape of the additional temporary workspace.
b The ATWS at MP 8.1 is the only ATWS that would occur within 50 feet of a wetland. We have approved this use.

APPENDIX C

Proposed Access Roads along the Project

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Calhoun /Lexington	0.7	AR-070 (K Avenue)	Existing Permanent	Asphalt road improved with light grading and minimal stone application in some areas.	Industrial land	30	7,392	5.1
Calhoun	0.0	AR-004	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 12" stone section. Would provide permanent access to the pig launcher site.	Open land	16	2,112	0.8
	0.0	AR-071	Existing Temporary	Gravel road improved with light grading and minimal stone application in some areas.	Industrial land	28	3,168	2.0
	0.9	AR-006	Existing Temporary	Dirt and gravel road improved with light grading and minimal stone application in some areas.	Industrial land	20	2,112	1.0
	0.9	AR-085	New Temporary	Gravel road constructed with light grading and stone application to be maintained during construction and restored back to original conditions after construction activities end.	Open land	16	475	0.2
	0.9	AR-008	Existing Permanent	Gravel and dirt road widened to 16 feet and improved with subbase grading and installation of up to 12" stone section.	Industrial land	16	6,864	2.5
	1.0	AR-005	Existing Permanent	Asphalt, gravel, and dirt road improved with light grading and minimal stone application in some areas.	Industrial land	30	3,168	2.2
	1.1	AR-007	Existing Permanent	Gravel and dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Industrial land	16	2,112	0.8
	1.3	AR-077	New Temporary	Gravel road constructed with subbase grading and installation of up to 6 inch stone section.	Industrial land	16	475	0.2
Richland	2.3	AR-009 (Beckham Swamp Road)	Existing Temporary	Asphalt and dirt road improved with light grading and minimal stone application in some areas.	Agricultural, forest, Open land	20	19,008	8.7
	2.5	AR-009B	Existing Permanent	Dirt road improved with subbase grading and installation of up to 6 inch stone section.	Open land	20	6,336	2.9
	3.5	AR-010	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading, and installation of up to 12 inch stone section.	Forest	16	6,336	2.3

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Richland	3.6	AR-010B	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Open land	16	1,584	0.6
	3.9	AR-011	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Forest	16	2,112	0.8
	3.9	AR-011B	Existing Permanent	Dirt road improved with subbase grading and installation of up to 12" stone section.	Open land	20	1,056	0.5
	4.2	AR-011C	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 12" stone section.	Open land	16	528	0.2
	4.3	AR-012	Existing Permanent	Dirt road improved with subbase grading and installation of up to 12" stone section.	Agriculture, forest, open land	24	14,784	8.1
	4.7	AR-012B	Existing Permanent	Dirt road improved with light grading and minimal stone application in some areas.	Open land	20	475	0.2
	5.2	AR-084	New Permanent	Gravel road constructed with subbase grading and installation of up to 12" stone section. Would provide permanent access to MLV 25-95.	Forest, Open land	16	475	0.2
	5.3	AR-083	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Forest	16	1,584	0.6
	6.0	AR-078	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Forest	16	475	0.2
	6.6	AR-082	New Temporary	Gravel road constructed with subbase grading and installation of up to 6 inch stone section.	Forest	16	475	0.2
	7.6	AR-075	Existing Permanent	Gravel and dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Forest	16	10,032	3.7
	7.8	AR-019	Existing Temporary	Gravel and dirt road improved with light grading and minimal stone application in some areas.	Open land	20	1,056	0.5
	8.1	AR-072	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Open land	16	1,056	0.4

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Richland	9.3	AR-073	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Open land	16	1,056	0.4
	9.7	AR-074	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Open land	16	1,584	0.6
	10.3	AR-024	Existing Permanent	Dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Forest, open land	16	475	0.2
	10.5	AR-025	Existing Temporary	Dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Open land	16	1,056	0.4
	10.6	AR-079	Existing Temporary	Dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Open land	16	475	0.2
	11.2	AR-026	Existing Permanent	Dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Forest	16	2,112	0.8
	11.2	AR-027	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Forest	16	2,112	0.8
	11.2	AR-027A	Existing Temporary	Dirt road improved with subbase grading and installation of up to 6 inch stone section.	Forest	35	475	0.4
	12.2	AR-029	Existing Permanent	Dirt road improved with subbase grading and installation of up to 12" stone section.	Agriculture	20	475	0.2
	12.5	AR-030	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 12" stone section. Would provide permanent access to MLV 25-102.	Agriculture, forest	16	528	0.2
	12.8	AR-080	New Permanent	Gravel road constructed with subbase grading and installation of up to 12" stone section. Would provide permanent access to MLV 25-109.	Forest	16	475	0.2
	12.8	AR-32C	Existing Temporary	Gravel and dirt road improved with light grading and minimal stone application in some areas.	Agricultural, forest	20	2,112	1.0
	13.0	AR-032	New Permanent	Gravel road constructed with subbase grading, installation of up to 12" stone section, and replacement of an existing 48 inch culvert where the road intersects AR-032B.	Agriculture, forest	22	3,696	1.9

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Richland	13.3	AR-032B	Existing Permanent	Gravel and dirt road improved with light grading and minimal stone application in some areas, and replacement of an existing 48 inch culvert where the road intersects AR-032.	Agriculture, forest	20	4,224	1.9
	13.7	AR-033	New Permanent	Gravel road constructed with subbase grading and installation of up to 12" stone section.	Forest	16	1,056	0.4
	14.1	AR-034 (Robertson Creek Road)	Existing Permanent	Dirt road improved with light grading and minimal stone application in some areas. Would provide permanent access to MLV 25-115.	Residential land	20	2,640	1.2
	14.5	AR-035	Existing Temporary	Dirt road improved with light grading and minimal stone application in some areas.	Residential land	10	475	0.1
	14.8	AR-036	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section. Would provide permanent access to MLV 25-123.	Agriculture	16	528	0.2
	15.9	AR-039	Existing Temporary	Gravel and dirt road improved with light grading and minimal stone application in some areas.	Agriculture	16	3,696	1.4
	16.7	AR-062	Existing Permanent	Dirt road improved with light grading and minimal stone application in some areas.	Agricultural, forest,	20	1,584	0.7
	17.8	AR-041	Existing Temporary	Asphalt road improved with light grading and minimal stone application in some areas.	Industrial land	60	5,280	7.3
	18.1	AR-041B	New Temporary	Gravel road constructed with subbase grading and installation of up to 6 inch stone section.	Industrial land	16	475	0.2
	18.7	AR-042	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section. Would provide permanent access to MLV 25-130.	Agriculture, forest	16	528	0.2
	18.8	AR-043	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Forest	16	1,056	0.4
	19.1	AR-081	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section. Would provide permanent access to MLV 25-137.	Residential	16	475	0.2

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Richland	19.5	AR-044	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Agriculture	16	1,056	0.4
	20.3	AR-047	Existing Temporary	Dirt road improved with light grading and minimal stone application in some areas.	Forest	20	528	0.2
	20.4	AR-048	Existing Temporary	Gravel and dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Open land	16	1,584	0.6
	20.6	AR-065	Existing Temporary	Gravel and dirt road widened to 16 feet and improved with light grading and minimal stone application in some areas.	Forest	16	5,808	2.1
	21.3	AR-050	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Agriculture, residential	16	1,056	0.4
	21.8	AR-051	Existing Permanent	Dirt road with asphalt apron widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section and maximum 10 foot culvert extension to the south. Rail car crossing provided during construction.	Open land, residential	16	1,584	0.6
	22.5	AR-052	Existing Permanent	Dirt road improved with subbase grading and installation of up to 12" stone section.	Forest	20	528	0.2
	23.3	AR-076	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 12" stone section.	Forest	16	1,056	0.4
	23.9	AR-055	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Residential	16	528	0.2
	24.4	AR-056	Existing Temporary	Dirt road improved with subbase grading and installation of up to 12" stone section.	Forest	20	1,584	0.7
	25.0	AR-057A	Existing Temporary	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Open land	16	1,584	0.6
	25.9	AR-059 (Jackie Drive)	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Agriculture, residential	16	2,640	1.0
	26.6	AR-061	Existing Permanent	Dirt road widened to 16 feet and improved with subbase grading and installation of up to 6 inch stone section.	Agriculture, Open land	16	6,336	2.3

APPENDIX C

Proposed Access Roads along the Project [a]

County	MP	ID	Access Road Type	Description	Land Use	Road Width (feet)	Road Length (feet)	Acres
Richland	27.8	AR-068 (Cotton Road)	Existing Permanent	Asphalt road improved with light grading and minimal stone application in some areas.	Industrial	30	1,056	0.7
	27.8	AR-069	Existing Permanent	Gravel and dirt road improved with light grading and minimal stone application in some areas. Would provide permanent access to pig receiver and meter and regulation station at the existing International Paper facility.	Industrial	30	1,056	0.7

AR = access road

MLV = mainline valve

a High-resolution aerial photographs were used to identify roads and land use types. Road surface type “dirt” may be gravel.

APPENDIX D

Waterbodies Crossed by the Project

APPENDIX D-1

Waterbodies Crossed by the Right-of-Way [a]

Waterbody ID	Stream Name	MP	Flow Type [b]	FERC Classification [c]	Width (feet)	Sensitive [i]	Proposed Construction Method (HDD Number)
ST01-01/ PS01-01	Unnamed	1.1	P	Minor	4	No	HDD (01)
ST02-01/S02-01	Congaree River	2.1	P	Major	475	Yes	HDD (02)
NJ02-01	Unnamed	2.3	E	Minor	4	No	HDD (02)
NJ02-04	Unnamed	2.4	E	Minor	3	No	Open-cut [f]
NJ03-02	Unnamed	3.0	E	Minor	3	No	Open-cut [f]
NJ03-03	Unnamed	3.6	E	Minor	6	No	Open-cut [f]
NJ04-01	Unnamed	4.1	E	Minor	3	No	HDD (21)
NJ04-04/ NJ04-05/NJ04-06	Unnamed	4.6	E	Minor	3	No	Conventional bore [g]
Ditch [d]	Unnamed	4.8	Unk	Minor	Unk	No	Open-cut
NJ04-11	Unnamed	4.8	E	Minor	4	No	Conventional bore [g]
NJRR-01	Unnamed	5.4	E	Minor	3	No	HDD (23)
NJRR-02	Unnamed	5.4	E	Minor	3	No	HDD (23)
NJRR-03	Unnamed	5.4	E	Minor	2	No	HDD (23)
Mill Creek [e]	Mill Creek	5.7	P	Intermediate	Unk	Yes	HDD (24)
NJRR-04	Unnamed	6.4	E	Minor	3	No	Open-cut [f]
NAF06-08	Unnamed	6.8	E	Minor	4	No	Open-cut [f]
NJ07-05	Unnamed	7.1	E	Minor	3	No	Conventional bore [g]
NJRR-06	Unnamed	7.4	E	Minor	Unk	No	Conventional bore [g]
NJRR-06	Unnamed	7.5	E	Minor	3	No	Open-cut [f]
NJRR-07	Unnamed	7.6	E	Minor	3	No	Open-cut [f]
NJRR-08	Unnamed	7.6	E	Minor	3	No	Open-cut [f]
NJ08-01/NJ08-02	Unnamed	7.8	E	Minor	4	No	HDD (25)
Ditch [d]	Unnamed	7.9	Unk	Minor	Unk	No	HDD (25)
NJ08-02	Unnamed	8.0	E	Minor	4	No	HDD (25)
NJ10-01	Unnamed	10.0	E	Minor	3	No	HDD (05)
NJ11-01/NJ11-02	Unnamed	10.6	E	Minor	3	No	Conventional bore [g]
ST11-01/ST11-05	Myers Creek	10.9	P	Minor	6	No	HDD (29)
ST11-02/St11-06	Goose Branch	10.9	P	Minor	8	No	HDD (29)
Ditch [d]	Unnamed	11.0	Unk	Minor	Unk	No	HDD (29)
ST11-07/ST11-10/ ST11-11	Unnamed	11.3	P	Minor	5	No	HDD (06)
ST11-08	Unnamed	11.3	P	Minor	5	No	HDD (06)
NJ12-02	Unnamed	11.9	E	Minor	4	No	Conventional bore [h]
NJ12-04	Unnamed	12.1	E	Minor	3	No	Open-cut [f]
NJ12-05 /NJ12-06	Unnamed	12.1	E	Minor	4	No	Open-cut [f]
NJ13-01	Unnamed	13.0	E	Minor	3	No	Conventional bore [h]
ST14-01	Cabin Branch	13.4	P	Minor	10	No	HDD (09)
ST14-03	Unnamed	13.9	P	Minor	3	No	HDD (10)
Ditch [d]	Unnamed	14.5	Unk	Minor	Unk	No	HDD (11)

APPENDIX D-1

Waterbodies Crossed by the Right-of-Way [a]

Waterbody ID	Stream Name	MP	Flow Type [b]	FERC Classification [c]	Width (feet)	Sensitive [i]	Proposed Construction Method (HDD Number)
Ditch [d]	Unnamed	14.5	Unk	Minor	Unk	No	HDD (11)
Ditch [d]	Unnamed	14.5	Unk	Minor	Unk	No	HDD (11)
Ditch [d]	Unnamed	14.5	Unk	Minor	Unk	No	HDD (11)
NJ15-01/NJ15-02	Unnamed	14.6	E	Minor	3	No	Open-cut [f]
ST16-01/PS16-01	Cedar Creek	16.4	P	Intermediate	25	Yes	HDD (12)
SS18-01/SS18-02	Dry Branch	18.5	I	Minor	8	No	HDD (34)
Ditch [d]	Unnamed	19.7	Unk	Minor	Unk	No	Conventional bore
Ditch [d]	Unnamed	20.5	Unk	Minor	Unk	No	HDD (14)
Ditch [d]	Unnamed	20.5	Unk	Minor	Unk	No	HDD (14)
SS21-01	Toms Creek	20.7	I	Minor	6	Yes	HDD (14)
Ditch [d]	Unnamed	21.1	Unk	Minor	Unk	No	Conventional bore
Ditch [d]	Unnamed	21.8	Unk	Minor	Unk	No	Conventional bore
PS22-01/ST22-01	Ray Branch	21.9	P	Minor	8	No	Open-cut [f]
Ditch [d]	Unnamed	21.9	Unk	Minor	Unk	No	Open-cut
Ditch [d]	Unnamed	23.8	Unk	Minor	Unk	No	Conventional bore
Ditch [d]	Unnamed	24.1	Unk	Minor	Unk	No	HDD (19)
Ditch [d]	Unnamed	24.2	Unk	Minor	Unk	No	HDD (19)
PS24-01/ST24-01	Griffins Creek	24.2	P	Minor	4	No	HDD (19)
ST25-01	Unnamed	24.5	P	Minor	4	No	HDD (20)
Ditch [d]	Unnamed	25.5	Unk	Minor	Unk	No	HDD (36)
OW26-01	Unnamed	26.0	OW	Intermediate	96	No	HDD (30)
Ditch [d]	Unnamed	26.3	Unk	Minor	Unk	No	Open-cut
PS27-02	Unnamed	26.8	P	Minor	5	No	HDD (31)

Unk = Unknown/not identified

a All waterbodies classified as warmwater fisheries. No impaired waterbodies would be crossed by the project.

b P = Perennial: stream that typically has flow year-round.

I = Intermittent: streams having flow for extended periods of time seasonally, but gradually reach a state where there are either isolated pools of water that are not hydrologically connected by sub-surface flow, or a dry channel.

E = Ephemeral: stream that flows only after precipitation.

c Major: Waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

Intermediate: Waterbodies greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing.

Minor: Waterbodies that are less than or equal to 10 feet wide at the water's edge at the time of crossing. Waterbody identified from alignment sheet analysis; flow type, waterbody width, and impairment status were not available.

d Waterbody identified from alignment sheet analysis; flow type, waterbody width, and impairment status were not available.

e Waterbody identified during field surveys, but not delineated due to flooding conditions. National Hydrography Dataset data were used to identify waterbody.

f DCG stated that waterbody would be crossed by the HDD method; however, this was not reflected in the alignment sheets nor has the requisite workspace to conduct an HDD been requested. Therefore, we determined the crossing to be an open cut. Open-cut methods could include dry crossing methods (i.e., flume or dam-and-pump) or wet open cuts as discussed in section A.7.2.

APPENDIX D-1

Waterbodies Crossed by the Right-of-Way [a]

Waterbody ID	Stream Name	MP	Flow Type [b]	FERC Classification [c]	Width (feet)	Sensitive [i]	Proposed Construction Method (HDD Number)

g DCG stated that waterbody would be crossed by the HDD method; however, this was not reflected in the alignment sheets and the requested workspace was justified for a conventional bore, not an HDD. Therefore, we determined the crossing to be a conventional bore.

h DCG stated that waterbody would be crossed by the HDD method; however, the alignment sheets specify a conventional bore and the requested workspace was justified for a conventional bore. Therefore, we determined the crossing method to be a conventional bore.

i Waterbody identified by the SCDNR or USFWS as supporting sensitive fish species.

APPENDIX D-2

Waterbodies Crossed by Access Roads [a]

Waterbody ID	Stream Name	MP/Access Road [b]	Flow Type [c]	FERC Classification [d]	Width (feet)	Sensitive [e]	Proposed Crossing Method
ST01-01	Unnamed	1.1/AR-007	P	Minor	4	No	Existing culvert
ST01-01	Unnamed	1.1/AR-008	P	Minor	4	No	Existing culvert
NJ02-02	Unnamed	2.4/AR-009	Unk	Minor	6	No	Existing culvert
NJ02-07	Unnamed	2.4/AR-009	Unk	Intermediate	11	No	Existing culvert
NJ03-04	Unnamed	2.4/AR-009	Unk	Minor	9	No	Existing culvert
NJ03-05	Unnamed	2.4/AR-009	Unk	Minor	5	No	Unknown [f]
NJ03-09	Unnamed	2.4/AR-009	Unk	Minor	6	No	Existing culvert
NJ02-04	Unnamed	2.5/AR-09B	E	Minor	6	No	Existing culvert
NJ03-02	Unnamed	3.0/AR-09B	E	Minor	9	No	Timber mat
NJ03-03	Unnamed	3.5/AR-09B	E	Minor	7	No	Existing culvert
NJ04-04	Unnamed	4.6/AR-012	E	Minor	5	No	Existing culvert
NJ08-01	Unnamed	7.8/AR-019	E	Minor	5	No	Existing culvert
NJ13-03	Unnamed	12.8/AR-032	Unk	Minor	4	No	Replace existing culvert
NJ21-01	Toms Creek	20.8/AR-065	I	Minor	0	No	Existing culvert
ST22-01	Ray Branch	21.9/AR-051	P	Minor	8	No	Extend existing culvert 10 feet

AR = access road

Unk = Unknown/not identified

a All waterbodies classified as warmwater fisheries. No impaired waterbodies would be crossed by the project.

b Nearest MP to the waterbody crossing from the proposed access road.

c P = Perennial: stream that typically has flow year-round.

I = Intermittent: streams having flow for extended periods of time seasonally, but gradually reach a state where there are either isolated pools of water that are not hydrologically connected by sub-surface flow, or a dry channel.

E = Ephemeral: stream that flows only after precipitation.

d Major: Waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

Intermediate: Waterbodies greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing.

Minor: Waterbodies that are less than or equal to 10 feet wide at the water's edge at the time of crossing.

e Waterbody identified by the SCDNR or USFWS as supporting sensitive fish species.

f Waterbody crossed by Access Road 9 (Beckham Swamp Road), an existing dirt road. Crossing method was unable to be determined.

APPENDIX E

Trenchless Design Crossings for the Project

APPENDIX E

Trenchless Design Crossings for the Project

Crossing ID [a]	Type of Crossing	Crossing Location (MP)	Length of Crossing (feet) [b]	Resources Crossed
N/A	Conventional bore	0.7	100	K Avenue, 2 underground telephone lines
HDD-01	HDD	0.9	1,962	Stream ST01-01/PS01-01, AR-005, AR-006, AR-007 and AR-008, 7 CSX railroad tracks, 5 overhead power lines, 2 underground power lines, underground telephone line, 4 underground water lines, 2 existing pipelines
HDD-02	HDD	2.0	2,064	Congaree River (ST02-01/PS02-01), Stream NJ02-01, 3 overhead power lines
HDD-021	HDD	4.1	472	Wetlands WL04-01 and WL04-02, Stream NJ04-01
N/A	Conventional bore	4.6	120	Stream NJ04-04/NJ04-05/NJ04-06
N/A	Conventional bore	4.8	140	Stream NJ04-11
HDD-022	HDD	5.0	431	Wetlands WL05-01 and WL05-02
HDD-023	HDD	5.4	757	Streams NJRR-01, NJRR-02 and NJRR-03, Wetland WLRR-02, unnamed road
HDD-024	HDD	5.7	850	Wetland WLRR-03, Mill Creek
N/A	Conventional bore	7.1	240	Stream NJ07-05
N/A	Conventional bore	7.4	140	Stream NJRR-06
HDD-025	HDD	7.8	1,534	Streams NJ08-01 and NJ08-02, unnamed ditch, Wetland WLRR-06, Bluff Road, 2 overhead power lines, underground telephone line, 2 underground water lines, existing pipeline
HDD-026	HDD	8.3	871	Wetland WL08-04
HDD-027	HDD	8.6	2,570	Wetlands WL09-03, WL09-04 and WL09-06, Pincushion Road, overhead power line, underground telephone line
HDD-033	HDD	9.3	701	Wetland WL09-08
HDD-05	HDD	9.7	2,285	Wetland WL10-01, Stream NJ10-01, Pincushion Road, Norfolk Southern railroad track, overhead power line, underground telephone line
N/A	Conventional bore	10.6	160	Stream NJ11-01/NJ11-02
N/A	Conventional bore	10.7	100	Old Hopkins Road, underground telephone line
HDD-029	HDD	10.9	995	Wetland WL11-02, Streams ST11-01/ST11-05 and ST11-02/ST11-06, unnamed ditch
HDD-06	HDD	11.2	1,350	Wetland WL11-04, Streams ST11-07/ST11-10/ST11-11 and ST11-08
N/A	Conventional bore	11.7	100	Willow Wind Road, overhead power line, 2 underground power lines, 2 underground telephone lines

APPENDIX E

Trenchless Design Crossings for the Project

Crossing ID [a]	Type of Crossing	Crossing Location (MP)	Length of Crossing (feet) [b]	Resources Crossed
N/A	Conventional bore	11.9	120	Stream NJ12-02
N/A	Conventional bore	11.9	100	Willow Wind Lane, 3 underground telephone lines
N/A	Conventional bore	12.2	120	Lower Richland Boulevard, overhead power line, 2 underground telephone lines, 2 existing gas pipelines
HDD-07	HDD	12.3	1,074	Wetlands WL12-02 and WL12-03
HDD-08	HDD	12.6	500	Air Base Road, CSX railroad track, overhead power line, 4 underground telephone lines
N/A	Conventional bore	13.0	160	Wetland WL13-02, Stream NJ13-01
HDD-09	HDD	13.3	2,170	Wetlands WL14-01 and WL14-02, Stream ST14-01
HDD-010	HDD	13.9	1,209	Wetlands WL 14-05 and WL14-06, Stream ST14-03
HDD-011	HDD	14.3	1,326	Wetland WL14-07, 4 unnamed ditches, Air Base Road, Horrell Hill Road, CSX railroad track, overhead power line, 5 underground telephone lines
N/A	Conventional bore	14.9	110	Minervaville Road, overhead powerline, underground telephone line
N/A	Conventional bore	15.5	100	James Crossing Road, underground telephone line
HDD-012	HDD	16.1	4,130	Wetlands WL16-02, WL16-03, WL16-05, and WL17-02, Stream PS16-01/ST16-01
N/A	Conventional bore	17.8	120	Congaree Road, overhead power line, 4 underground telephone lines
HDD-034	HDD	18.5	885	Wetland WL18-01, Stream SS18-01/SS18-02
HDD-035	HDD	18.7	1,454	CSX railroad track, 2 underground telephone lines
HDD-013	HDD	19.1	750	Old Congaree Run Road, 2 overhead power lines, underground power line, 4 underground telephone lines
N/A	Conventional bore	19.7	100	St. Matthew Church Road, 2 unnamed ditches, overhead power line, underground telephone line
HDD-014	HDD	20.3	2,161	Wetlands WL20-02, and WL21-02, Stream SS21-01, 3 unnamed ditches, unnamed road
N/A	Conventional bore	20.9	100	Mid East Road, overhead power line
N/A	Conventional bore	21.1	120	Mid East Road, unnamed ditch, overhead power line, underground telephone line
N/A	Conventional bore	21.8	120	Old Eastover Road, overhead power line, underground telephone line, unnamed ditch
HDD-016	HDD	22.4	746	Wetland WL22-02
HDD-017	HDD	22.7	575	Wetland WL23-01

APPENDIX E

Trenchless Design Crossings for the Project

Crossing ID [a]	Type of Crossing	Crossing Location (MP)	Length of Crossing (feet) [b]	Resources Crossed
HDD-018	HDD	23.4	500	Wetland WL23-04
N/A	Conventional bore	23.7	120	Chain Gang Road, overhead power line, 3 underground telephone lines, unnamed ditch
HDD-019	HDD	24.1	986	Wetlands WL24-02, Stream ST24-01/PS24-01, 2 unnamed ditches
HDD-020	HDD	24.4	1,150	Wetland WL24-03, Stream ST25-01
HDD-036	HDD	25.4	1,050	Van Boklen Road, McCords Ferry Road, 3 overhead power lines, 5 underground telephone lines, underground fiber optic line, unidentified ditch
HDD-030	HDD	25.9	1,680	Wetland WL26-1A, Open Water OW26-01
HDD-030A	HDD	26.6	1,136	Wetland WL27-01, 3 overhead power lines
HDD-031	HDD	26.8	565	Stream PS27-02
HDD-032	HDD	27.5	950	Wetland WL27-05
N/A	Conventional bore	27.7	180	Cotton Road, unnamed Road, 3 overhead power lines, underground telephone line

AR = access road
ID = Identification
HDD = horizontal directional drill
MP = milepost
a IDs are as noted on DCG's alignment sheets filed under CP15-504-000.
b Approximate length

APPENDIX F

Wetlands Crossed by the Project

APPENDIX F

Wetlands Crossed by the Project

Wetland ID	MP/ Access Road [a]	Cowardin Classification [b]	Crossing Length (feet) [c]	Temporary Impacts (acres)	Permanent Impacts (acres)	Proposed Construction Method (HDD Number)
Pipeline						
WL04-01	4.1	PFO	N/A	0.0	0.0	HDD (21)
WL04-02	4.1	PFO	N/A	0.0	0.0	HDD (21)
WL04-03	4.1	PEM	0.0	0.0	0.0	N/A
OW04-01	4.1	Open Water	0.0	0.0	0.0	N/A
RD011BOW01	4.1	Open Water	0.0	0.0	0.0	N/A
WL05-01	5.0	PFO	N/A	0.0	0.0	HDD (22)
WL05-02	5.0	PEM	N/A	0.0	0.0	HDD (22)
WLRR-01	5.3	PFO	0.0	<0.1	0.0	N/A
WLRR-02	5.4	PFO	N/A	0.0	0.0	HDD (23)
WLRR-03	5.7	PFO	N/A	0.0	0.0	HDD (24)
WL07-01	7.5	PEM	0.0	0.2	0.0	N/A
WLRR-05	7.7	PEM	0.0	0.1	0.0	N/A
WLRR-06	8.0	PFO	N/A	0.0	0.0	HDD (25)
WL08-02	8.0/AR-72	PEM	0.0	0.4	0.0	N/A
WL08-03	8.3	PEM	0.0	0.0	0.0	N/A
WL08-04	8.4	PFO	N/A	0.0	0.0	HDD (26)
WL09-02	8.7	PEM	0.0	0.0	0.0	N/A
WL09-03	8.7	PFO	N/A	0.0	0.0	HDD (27)
WL09-04	9.0	PFO	N/A	0.0	0.0	HDD (27)
WL09-05	9.0	PEM	0.0	0.0	0.0	N/A
WL09-06	9.1	PFO	N/A	0.0	0.0	HDD (27)
WL09-07	9.1	PEM	0.0	0.0	0.0	N/A
WL09-08	9.3	PFO	N/A	0.0	0.0	HDD (33)
WL09-09	9.2/AR-73	PEM	0.0	0.3	0.0	N/A
WL10-01	9.8	PFO	N/A	0.0	0.0	HDD (05)
WL10-02	9.8/AR-74	PEM	0.0	0.4	0.0	N/A
WL10-03	10.1	PEM	0.0	0.0	0.0	N/A
RD025WL01	10.6/AR-25	PEM	0.0/27.9	<0.1	0.0	N/A
WL11-02	10.9	PFO	N/A	0.0	0.0	HDD (29)
WL11-03	10.9	PEM	0.0	0.0	0.0	N/A
WL11-04	11.3	PFO	N/A	0.0	0.0	HDD (06)
WL11-05	11.3	PEM	0.0	0.0	0.0	N/A
WL12-01	11.9	PSS	0.0	<0.1	0.0	Conventional bore [d]
WL12-02	12.4	PEM	N/A	0.0	0.0	HDD (07)
WL12-03	12.4	PFO	N/A	0.0	0.0	HDD (07)
WL13-01	12.7	PFO	0.0	0.0	0.0	N/A
WL13-02	13.0	PFO	N/A	0.0	0.0	Conventional bore [d]
WL14-01	13.5	PFO	N/A	0.0	0.0	HDD (09)

APPENDIX F

Wetlands Crossed by the Project

Wetland ID	MP/ Access Road [a]	Cowardin Classification [b]	Crossing Length (feet) [c]	Temporary Impacts (acres)	Permanent Impacts (acres)	Proposed Construction Method (HDD Number)
WL14-02	13.5	PEM	N/A	0.0	0.0	HDD (09)
WL14-03	13.9	PEM	0.0	0.0	0.0	N/A
WL14-06	13.9	PFO	N/A	0.0	0.0	HDD (10)
WL14-04	14.0	PEM	0.0	0.0	0.0	N/A
WL14-05	14.0	PFO	N/A	0.0	0.0	HDD (10)
WL14-07	14.4	PFO	N/A	0.0	0.0	HDD (11)
WL14-08	14.5	PFO	0.0	0.0	0.0	N/A
WL16-01	16.2	PEM	0.0	0.0	0.0	N/A
WL16-02	16.2	PFO	N/A	0.0	0.0	HDD (12)
WL16-03	16.4	PSS	N/A	0.0	0.0	HDD (12)
WL16-04	16.4	PEM	0.0	0.0	0.0	N/A
WL16-05	16.4	PFO	N/A	0.0	0.0	HDD (12)
WL17-01	16.7	PEM	0.0	0.0	0.0	N/A
WL17-02	16.7	PFO	N/A	0.0	0.0	HDD (12)
WL18-01	18.5	PFO	N/A	0.0	0.0	HDD (34)
WL20-01	20.4	PEM	0.0	0.0	0.0	N/A
WL20-02	20.4	PFO	N/A	0.0	0.0	HDD (14)
WL21-02	20.7	PFO	N/A	0.0	0.0	HDD (14)
WL21-03	20.7	PEM	0.0	0.0	0.0	N/A
WL22-01	22.4	PEM	0.0	0.0	0.0	N/A
WL22-02	22.4	PFO	N/A	0.0	0.0	HDD (16)
WL23-01	22.8	PFO	N/A	0.0	0.0	HDD (17)
WL23-02	22.8	PEM	0.0	0.0	0.0	N/A
OW23-01	22.8	Open Water	0.0	0.0	0.0	N/A
WL23-04	23.4	PFO	N/A	0.0	0.0	HDD (18)
WL24-01	24.2	PEM	0.0	0.0	0.0	N/A
WL24-02	24.2	PFO	N/A	0.0	0.0	HDD (19)
WL24-03	24.5	PFO	N/A	0.0	0.0	HDD (20)
WL24-04	24.5	PEM	0.0	0.0	0.0	N/A
WL26-01	26.0	PEM	0.0	0.0	0.0	N/A
WL26-1A	26.0	PFO	N/A	0.0	0.0	HDD (30)
OW26-01	26.1	Open Water	N/A	0.0	0.0	HDD (30)
WL26-03	26.2	PEM	0.0	0.0	0.0	N/A
WL27-01	26.7	PFO	N/A	0.0	0.0	HDD (30A)
WL27-04	27.5	PEM	0.0	0.0	0.0	N/A
WL27-05	27.5	PFO	N/A	0.0	0.0	HDD (32)

APPENDIX F

Wetlands Crossed by the Project

Wetland ID	MP/ Access Road [a]	Cowardin Classification [b]	Crossing Length (feet) [c]	Temporary Impacts (acres)	Permanent Impacts (acres)	Proposed Construction Method (HDD Number)
Access Roads						
RD056WL01	AR-56	PEM/PFO	8.0	<0.1	0.0	Timber mats
RD056BWL03	AR-56	PEM	12.2	<0.1	0.0	Timber mats
RD056BWL04	AR-56	PEM	8.5	<0.1	0.0	Timber mats

AR = access road
HDD = horizontal directional drill
N/A = not applicable
MP – milepost

a Nearest milepost to the wetland crossing.
b PEM – Palustrine emergent wetland
PSS – Palustrine scrub-shrub wetland
PFO – Palustrine forested wetland
PUB – Palustrine unconsolidated bottom wetland
c Crossing length shown as N/A due to proposed construction method.
d Wetland proposed to be crossed by the HDD method; however the requisite workspace was stated as a conventional bore, not an HDD, and shown on the alignment sheets as conventional bore. We determined the crossing method to be conventional bore.

Note: Where crossing length is shown as 0.0, the wetland is not crossed by the pipeline, but is within proposed workspace. Where crossing method is shown as N/A, the wetland is not crossed by the pipeline, but is within proposed workspace. Timber mats would be used to reduce impacts to wetlands by equipment in workspace and along access roads.

APPENDIX G

Federally-Listed, State-Listed, and Other Special Status Species Potentially Occurring in the Project Area

Appendix G

Special Status Species Potentially Occurring in the Project Area

Species [a]	County	Federal Status [b]	State Status [b]	Habitat Description	Effect Determination
Mammals					
Rafinesque's big-eared bat (*Corynorhinus rafinesquii*)	Richland	---	E	Roosts in buildings and tree cavities near water. Hibernates in caves, wells, and similar habitats from early winter to early spring. Gives birth May through June and feeds almost exclusively on moths (SCDNR, 2015b)	Not likely to adversely impact
Birds					
Red-cockaded woodpecker *(Picoides borealis)*	Richland Calhoun	E	E	A non-migratory species that lives in groups. Mature, longleaf pine forests are the preferred foraging and nesting habitat, but other pine species may be used. They excavate nest cavities in living mature pine trees that are at least 80 years old and suffer from red heart disease (USFWS, 2015a).	*Not likely to adversely affect* USFWS concurrence from June 30, 2015
Wood stork *(Mycteria americana)*	Calhoun	T	E	A large wading bird that feeds in flocks and nests in rookeries. Typically forage in freshwater and estuarine wetlands and nest in cypress or mangrove swamps (USFWS, 2015b).	*Not likely to adversely affect* USFWS concurrence from June 30, 2015
Bald eagle *(Haliaeetus leucocephalus)* [c]	Richland Calhoun	—	T	Large raptors that live near open water and feed primarily on fish. Typically nest in large trees, but can also nest on cliffs or on the ground in areas without trees (USFWS, 2007).	*Not likely to adversely affect* USFWS concurrence from June 30, 2015
Amphibians					
Chamberlain's dwarf salamander (*Eurycea chamberlaini*)	Richland Calhoun	ARS	---	Small salamander found in wet areas. Typically found in seepages near cypress ponds, small streams, and wetlands with closed canopies (SCDNR, 2015c).	Not likely to cause a trend toward federal listing
Reptiles					
Southern hognose snake (*Heterodon simus*)	Richland	ARS	SC [d]	Typically found in herbaceous habitats with well-drained, sandy, or sandy-loam soils. Also found in old fields and river floodplains. Generally found buried in the sand (IUCN, 2015).	Not likely to cause a trend toward federal listing

Fish					
American eel (*Anguilla rostrata*)	Richland Calhoun	ARS	---	The only species of freshwater eel found in North America, found along the east coast of the U.S. and inland to the Mississippi River. Spawn each winter in the North Atlantic Ocean and return to freshwater for the remainder of the year (USFWS, 2015c).	Not likely to cause a trend toward federal listing
Atlantic sturgeon (*Acipenser oxyrinchus*)	Richland Calhoun	E	---	Found in shallow estuarine and marine waters the majority of the year. Returns to freshwater February – March each year to spawn in rivers with moderate flows. Feeds primarily on benthic invertebrates (NOAA, 2015a).	*Not likely to adversely affect*
Blueback herring (*Alosa aestivalis*)	Richland Calhoun	ARS	---	Small marine fish that feed in schools offshore and overwinter near ocean bottoms offshore. In late spring, they migrate back to shore to spawn (NOAA, 2009).	Not likely to cause a trend toward federal listing.
Robust redhorse (*Moxostoma robustum*)	Richland Calhoun	ARS	---	A member of the redhorse sucker family, feeds primarily on bivalves, such as the Asiatic clam. Until a population was found in Georgia in 1991, was thought to be extinct. Historically found in large Atlantic slope rivers and a recovery effort is underway in Georgia (USFWS, 2015d).	Not likely to cause a trend toward federal listing.
Shortnose sturgeon (*Acipenser brevirostrum*)	Richland Calhoun	E	E [d]	Smallest of the sturgeon species found in North America. Typically found in shallow estuarine and marine waters along the east coast of the U.S. Return to freshwater each year March – May to spawn. Feed primarily on mollusks and large crustaceans (NOAA, 2015b).	*Not likely to adversely affect*
Invertebrates					
Broad River spiny (Little River) crayfish (*Cambarus spicatus*)	Richland	ARS	---	Found only in the Broad River basin and limited to three counties in South Carolina, including Richland County. May prefer large river habitats, but little is known about the species. Usually found in or beneath debris (SCDNR, 2015d).	Not likely to cause a trend toward federal listing
Savannah lilliput (*Toxolasma pullus*)	Richland Calhoun	ARS	---	A small mussel historically found from North Carolina to Georgia. Prefers shallow water in streams, rivers, and lakes with muddy or silty sand substrates (SCDNR, 2015e).	Not likely to cause a trend toward federal listing

Plants					
Bog spicebush (*Lindera subcoriacea*)	Richland	ARS	SC	Deciduous shrub found from Virginia to Florida in the coastal plain. Prefer scrub-shrub seepage wetlands and open bogs surrounded by pine forest with acidic soils (USFS, 2015).	Not likely to cause a trend toward federal listing
Canby's dropwort (*Oxypolis canbyi*)	Richland	E	SC	A perennial herb found sparingly from Delaware south to Georgia. Prefer open bays or ponds that are continuously wet year-round and have little canopy cover. Has also been found in a variety of other wetlands with minimal canopy cover (USFWS, 2015e).	*Not likely to adversely affect* USFWS concurrence from June 30, 2015
Carolina-birds-in-a-nest (*Macbridea caroliniana*)	Richland Calhoun	ARS	SC	A perennial herb found only in North Carolina, South Carolina, and Georgia. It is found mostly in wetlands along the coastal plains of the Atlantic seaboard (USDA, 2015).	Not likely to cause a trend toward federal listing
Cileate-leaf tickseed (*Coreopsis integrifolia*)	Richland	ARS	---	A perennial herb found from South Carolina south to Florida. Typically found in forested wetlands or riparian habitats in semi-shaded areas (NatureServe, 2009a).	Not likely to cause a trend toward federal listing
Georgia aster (*Symphyotrichum georgianum*)	Richland	C	SC [d]	A perennial herb found in a few counties across southern North Carolina, northern South Carolina, northern Georgia, and northern Mississippi. Historically found in post oak savanna/prairie communities that were maintained by fire. Currently found in woodlands or piedmont prairies containing mostly native species and that have acidic soils (USFWS, 2014b).	Not likely to cause a trend toward federal listing
Purple balduina (*Balduina atropurpurea*)	Richland	ARS	---	A perennial herb typically found in wetlands, such as seepage slopes, pitcherplant bogs, and wet pine flatwoods. Found throughout the coastal plain from North Carolina south to Florida (GADNR, 2010).	Not likely to cause a trend toward federal listing
Rough-leaved loosestrife (*Lysimachia asperulaefolia*)	Richland	E	SC	A perennial herb found in North and South Carolina coastal plains and sandhills. Generally found in the transition zones between longleaf pine uplands and pond pine pocosins, which are maintained by fire (USFWS, 2015f).	*Not likely to adversely affect* USFWS concurrence pending field surveys
Smooth coneflower (*Echinacea laevigata*)	Richland	E	SC [d]	A perennial herb found in wooded and open areas on soils containing high levels of magnesium and calcium associated with diabase or marble. Prefer sites with plenty of sunlight (USFWS, 2015g).	*Not likely to adversely affect* USFWS concurrence from June 30, 2015

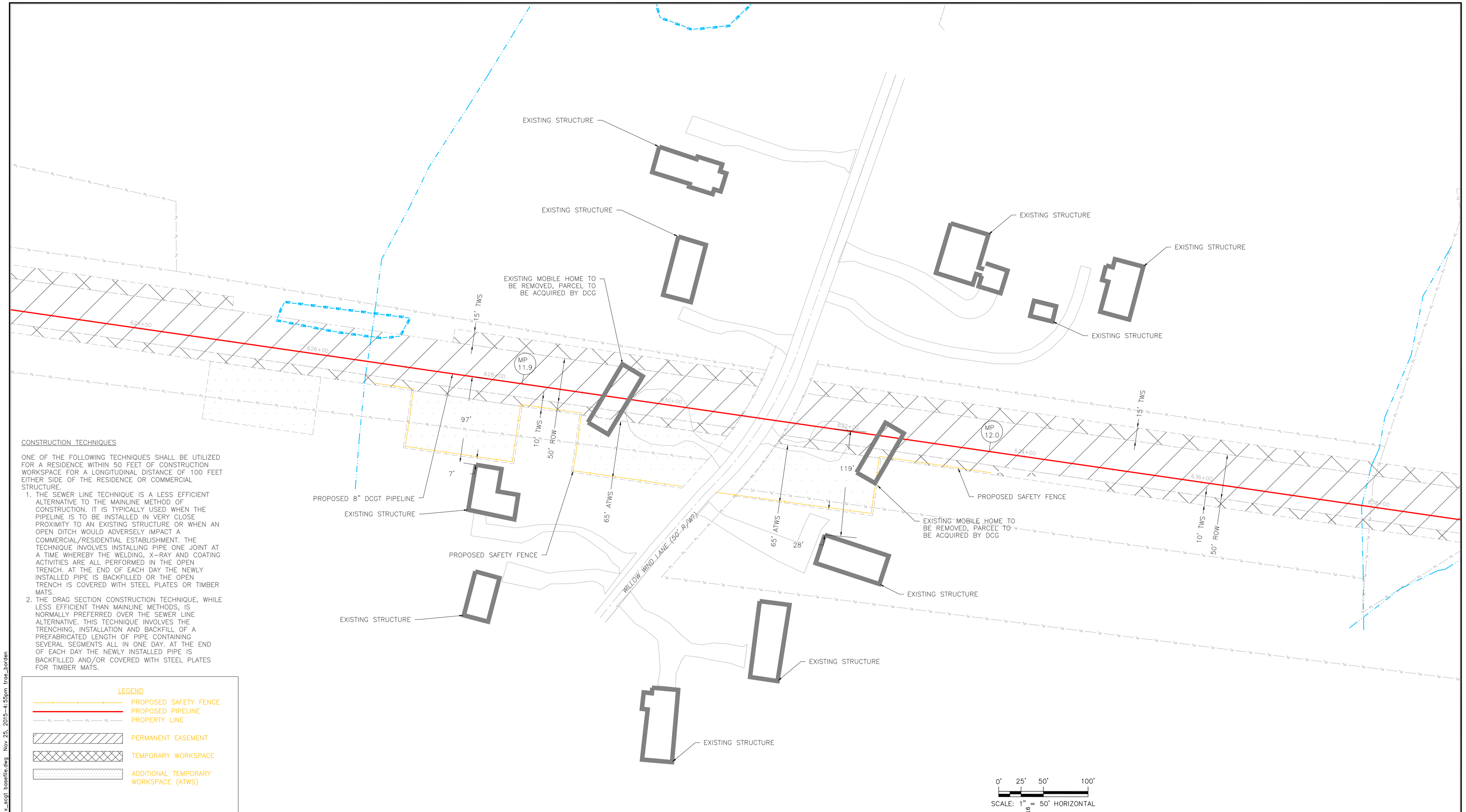
Spathulate seedbox (*Ludwigia spathulata*)	Richland	ARS	SC [d]	A perennial herb found in a few counties in South Carolina, Georgia, Alabama, and Florida. Typically found in open herbaceous wetlands, and less frequently in uplands, and is often not found during periods of low water (NatureServe, 2009b).	Not likely to cause a trend toward federal listing

a Sources for species list: SCDNR, 2014; SCDNR, 2015a; USFWS, 2014a.
b T = threatened; E = endangered; C = candidate; SC = species of concern; ARS = at-risk species
c Protected under the Bald and Golden Eagle Protection Act (BGEPA); therefore, USFWS provided a determination concurrence.
d Not found within 1 mile of the proposed Project; therefore, not on the SCDNR list provided October 24, 2014.

Sources:
GADNR, 2010; IUCN, 2015; NatureServe, 2009a; NatureServe, 2009b;NOAA, 2009; NOAA, 2015a; NOAA, 2015b; SCDNR, 2015a;SCDNR, 2015b; SCDNR, 2015c; SCDNR, 2015d; SCDNR, 2015e; USDA, 2015; USFS, 2015; USFWS, 2007; USFWS, 2014b; USFWS, 2015a; USFWS, 2015b; USFWS, 2015c; USFWS, 2105d; USFWS, 2015e; USFWS, 2105f; USFWS, 2015g

APPENDIX H

Site-specific Construction Plans for Residences within 50 feet of the Project



CONSTRUCTION TECHNIQUES

ONE OF THE FOLLOWING TECHNIQUES SHALL BE UTILIZED FOR A RESIDENCE WITHIN 50 FEET OF CONSTRUCTION WORKSPACE FOR A LONGITUDINAL DISTANCE OF 100 FEET EITHER SIDE OF THE RESIDENCE OR COMMERCIAL STRUCTURE.

1. THE SEWER LINE TECHNIQUE IS A LESS EFFICIENT ALTERNATIVE TO THE MAINLINE METHOD OF CONSTRUCTION. IT IS TYPICALLY USED WHEN THE PIPELINE IS TO BE INSTALLED IN VERY CLOSE PROXIMITY TO AN EXISTING STRUCTURE OR WHEN AN OPEN DITCH WOULD ADVERSELY IMPACT A COMMERCIAL/RESIDENTIAL ESTABLISHMENT. THE TECHNIQUE INVOLVES INSTALLING PIPE ONE JOINT AT A TIME WHEREBY THE WELDING, X-RAY AND COATING ACTIVITIES ARE ALL PERFORMED IN THE OPEN TRENCH. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED OR THE OPEN TRENCH IS COVERED WITH STEEL PLATES OR TIMBER MATS.
2. THE DRAG SECTION CONSTRUCTION TECHNIQUE, WHILE LESS EFFICIENT THAN MAINLINE METHODS, IS NORMALLY PREFERRED OVER THE SEWER LINE ALTERNATIVE. THIS TECHNIQUE INVOLVES THE TRENCHING, INSTALLATION AND BACKFILL OF A PREFABRICATED LENGTH OF PIPE CONTAINING SEVERAL SEGMENTS ALL IN ONE DAY. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED AND/OR COVERED WITH STEEL PLATES FOR TIMBER MATS.

LEGEND

- PROPOSED SAFETY FENCE
- PROPOSED PIPELINE
- PROPERTY LINE
- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE (ATWS)

NOTES

NOTES:
1. SAFETY FENCE WILL BE INSTALLED AT THE EDGE OF THE LIMIT OF DISTURBANCE (L.O.D.) FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE OR BUSINESS.
2. STRUCTURES WITHIN L.O.D. WILL BE REMOVED, RELOCATED OR PROTECTED PER LAND OWNER AGREEMENT.
3. STRUCTURES ARE FROM CURRENT AERIAL IMAGERY, WITH FIELD VERIFICATION.

REFERENCE DRAWINGS

DRAWING NO.	TITLE

REVISIONS

NO.	DATE	DESCRIPTION	ENG.	DRAWN	CHK.
A	11/25/15	ISSUED FOR FERC DATA REQUEST	JJ	TB	BT

SIGNATURE

DATE

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URS Corporation - South Carolina
South Carolina License # C00934

URS JOB NO. 46423463
CLIENT JOB NO.

11/25/15
DATE
JENNIFER JORDAN
PROJECT ENGINEER

Dominion

COLUMBIA TO EASTOVER PROJECT
RESIDENTIAL CONSTRUCTION TECHNIQUES
FIGURE 8.2-1a
RICHLAND COUNTY, SOUTH CAROLINA

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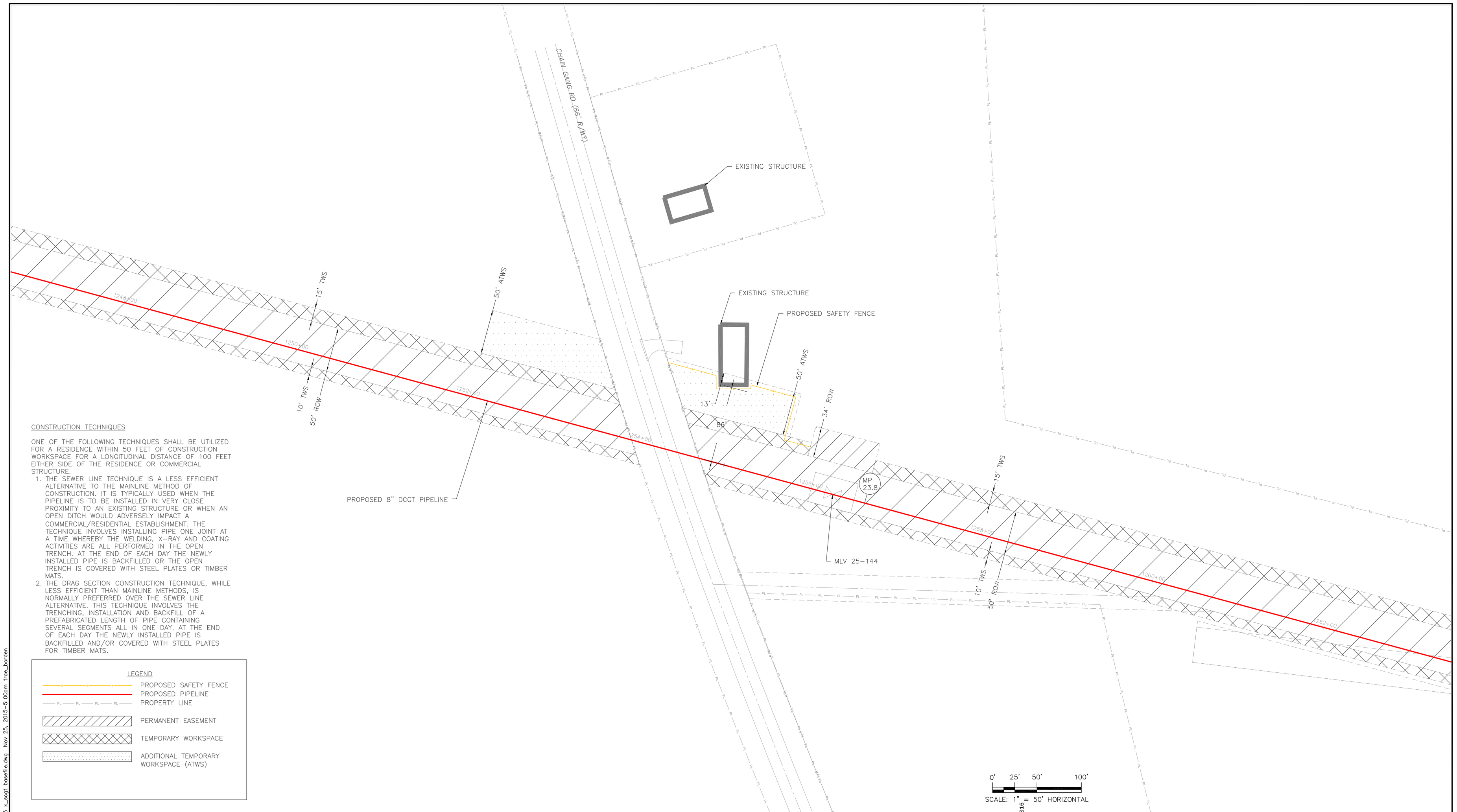

CONSTRUCTION TECHNIQUES

ONE OF THE FOLLOWING TECHNIQUES SHALL BE UTILIZED FOR A RESIDENCE WITHIN 50 FEET OF CONSTRUCTION WORKSPACE FOR A LONGITUDINAL DISTANCE OF 100 FEET EITHER SIDE OF THE RESIDENCE OR COMMERCIAL STRUCTURE.

1. THE SEWER LINE TECHNIQUE IS A LESS EFFICIENT ALTERNATIVE TO THE MAINLINE METHOD OF CONSTRUCTION. IT IS TYPICALLY USED WHEN THE PIPELINE IS TO BE INSTALLED IN VERY CLOSE PROXIMITY TO AN EXISTING STRUCTURE OR WHEN AN OPEN DITCH WOULD ADVERSELY IMPACT A COMMERCIAL/RESIDENTIAL ESTABLISHMENT. THE TECHNIQUE INVOLVES INSTALLING PIPE ONE JOINT AT A TIME WHEREBY THE WELDING, X-RAY AND COATING ACTIVITIES ARE ALL PERFORMED IN THE OPEN TRENCH. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED OR THE OPEN TRENCH IS COVERED WITH STEEL PLATES OR TIMBER MATS.
2. THE DRAG SECTION CONSTRUCTION TECHNIQUE, WHILE LESS EFFICIENT THAN MAINLINE METHODS, IS NORMALLY PREFERRED OVER THE SEWER LINE ALTERNATIVE. THIS TECHNIQUE INVOLVES THE TRENCHING, INSTALLATION AND BACKFILL OF A PREFABRICATED LENGTH OF PIPE CONTAINING SEVERAL SEGMENTS ALL IN ONE DAY. AT THE END OF EACH DAY THE NEWLY INSTALLED PIPE IS BACKFILLED AND/OR COVERED WITH STEEL PLATES FOR TIMBER MATS.

LEGEND

- PROPOSED SAFETY FENCE
- PROPOSED PIPELINE
- PROPERTY LINE
- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ADDITIONAL TEMPORARY WORKSPACE (ATWS)

NOTES

NOTES:
1. SAFETY FENCE WILL BE INSTALLED AT THE EDGE OF THE LIMIT OF DISTURBANCE (L.O.D.) FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE OR BUSINESS.
2. STRUCTURES WITHIN L.O.D. WILL BE REMOVED, RELOCATED OR PROTECTED PER LAND OWNER AGREEMENT.
3. STRUCTURES ARE FROM CURRENT AERIAL IMAGERY, WITH FIELD VERIFICATION.

REFERENCE DRAWINGS

DRAWING NO.	TITLE

REVISIONS

NO.	DATE	DESCRIPTION	ENG.	DRAWN	CHK.
A	11/25/15	ISSUED FOR FERC DATA REQUEST	JJ	TB	BT

SIGNATURE

DATE

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South Carolina License # C00934

URS JOB NO. 46423463
CLIENT JOB NO.

11/25/15
DATE
JENNIFER JORDAN
PROJECT ENGINEER

Dominion

COLUMBIA TO EASTOVER PROJECT
RESIDENTIAL CONSTRUCTION TECHNIQUES
FIGURE 8.2-1b
RICHLAND COUNTY, SOUTH CAROLINA

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TB	BT	BT	1"=50'

DATE: 11/25/2015 | DRAWING NO: 8.2-1b | SHEET 2 OF 2 | E

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APPENDIX I

Present and Reasonably Foreseeable Future Actions

Appendix I

Present and Reasonably Foreseeable Future Actions

Project Type/Name	Description	Distance to Project (miles)	Closest MP	Common Watershed	Resources Potentially Cumulatively Affected *	Anticipated Construction (date)
Transportation						
US Highway 76 EB Bridge over Mill Creek [a]	Bridge replacement over Mill Creek from east of Old Garners Ferry Road to 500 feet west of Trotter Road (State Highway 222)	1.0	11.0	Mill Creek-Congaree River Myers Creek	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	Under construction
US Highway 601 Bridge [a]	Bridge replacement over Congaree River	5.5	28.0	Beech Creek-Wateree River Toms Creek-Lower Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife	Under construction
Atlas Road Widening [b]	The proposed project would widen Atlas Road to three lanes between Bluff Road and Shop Road and five lanes between Shop Road and Garners Ferry Road	3.4	11.0	Mill Creek-Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	Spring 2018
Lower Richland Boulevard Widening [b]	Proposed widening to five lanes between Rabbit Run Road and Garners Ferry Road	1.2	12.0	Myers Creek	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	Preliminary Engineering in 2018
Pineview Drive Widening [b]	Proposed widening between Bluff Road and Garners Ferry Road	2.0	11.0	Mill Creek-Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	2019
Leesburg Road Widening [b]	Proposed widening between Fairmont Road and Lower Richland Blvd	4.3	12.0	Mill Creek-Congaree River; Cedar Creek-Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	2017

Appendix I

Present and Reasonably Foreseeable Future Actions

Project Type/Name	Description	Distance to Project (miles)	Closest MP	Common Watershed	Resources Potentially Cumulatively Affected *	Anticipated Construction (date)
Southeast Richland Neighborhood Master Plan Proposed Improvements [b]	Proposed Rabbit Run Connector, new road from Rabbit Run to Garners Ferry Road	1.1	11.0	Myers Creek	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	2017
Industrial						
County Industrial Park [c]	Planned industrial park development	4.0	0.0	N/A [d]	Land Use; Air Quality & Noise	2016
Fitts Company Manufacturing Plant [c]	Development of 17 acre parcel to include 70,000-square-feet office and manufacturing facility	4.0	0.0	N/A [d]	Land Use; Air Quality & Noise	2016
International Paper Plant Modifications [e]	Conversion of one boiler from coal to natural gas driven. Use of pipeline delivered gas rather than compressed natural gas delivered by trucks.	0.0	28.5	Beech Creek-Wateree River; Wateree River	Air Quality	2016
Residential/Recreation						
New Community Space at Pinewood Lake Park [c]	Establishment of outdoor recreational space in the Lower Richland Community, Richland County.	1.0	11.0	Mill Creek-Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	Phase 1 complete, Phase 2 pending
Drayton Hall Subdivision [c]	Residential subdivision of 48 lots	2.5	0.5	Middle Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use	Under construction

Appendix I

Present and Reasonably Foreseeable Future Actions

Project Type/Name	Description	Distance to Project (miles)	Closest MP	Common Watershed	Resources Potentially Cumulatively Affected *	Anticipated Construction (date)
Power						
South Carolina Electric and Gas (SCE&G) electric powerline [e]	Proposed non-jurisdictional 3,280-foot powerline to service the proposed pig launcher	0.0	0.0	Middle Congaree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use & Visual Resources, Noise; Cultural Resources	2016
SCE&G electric powerline [e]	Proposed non-jurisdictional 1,500-foot powerline to service the Eastover Project MLV-25-109	0.0	13.0	Myers Creek	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use & Visual Resources, Noise; Cultural Resources	2016
SCE&G electric powerline [c]	Proposed non-jurisdictional 875 foot powerline to service the joint pig receiver and M&R station	0.0	28.0	Beech Creek-Wateree River; Wateree River	Geology & Soils; Water & Wetlands; Aquatics; Vegetation & Wildlife; Land Use & Visual Resources, Noise; Cultural Resources	2016

MP = milepost

N/A = not applicable

* Based on potential impacts of the future action and its distance to the proposed Project.

a Source: SCDOT, 2015a

b Source: Richland County Transportation Improvement Program, 2015

c Source: Provided by DCG in FERC Docket No. CP15-504 Accession No. 20151203-5190.

d No common watershed

e Source: International Paper, 2015

APPENDIX J

References

APPENDIX J
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APPENDIX K

List of Preparers

APPENDIX K
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