Federal Energy Regulatory Commission

Office of Energy Projects

April 2019

Eastern Shore Natural Gas Company **Docket No. CP18-548-000**

Del-Mar Energy Pathway Project

Environmental Assessment

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 1
Eastern Shore Natural Gas Company
Del-Mar Energy Pathway Project
Docket No. CP18-548-000

TO THE INTERESTED PARTY:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Del-Mar Energy Pathway Project, proposed by Eastern Shore Natural Gas Company (Eastern Shore) in the above-referenced docket. Eastern Shore requests authorization to construct and operate new natural gas pipelines and meter and delivery (M&R) stations in Kent and Sussex Counties, Delaware, and Wicomico and Somerset Counties, Maryland.

The EA assesses the potential environmental effects of the construction and operation of the Del-Mar Energy Pathway Project in accordance with the requirements of 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 proposed Del-Mar Energy Pathway Project includes the following new facilities:

Woodside Loop:[1] Kent County, Delaware

- 4.9 miles of 16-inch-diameter pipeline looping its existing pipeline.

East Sussex Extension: Sussex County, Delaware

- 7.39 miles of 8-inch-diameter mainline extension to the Eastern Shore's existing Milford Line;

[1] A pipeline loop is a segment of pipe constructed parallel to an existing pipeline to increase capacity.

- one aboveground pig launcher and one receiver,[2] and aboveground mainline valve; and
- one delivery M&R station at the East Sussex Extension terminus.

Millsboro Pressure Control Station Upgrade: Millsboro, Sussex County, Delaware

- 0.35 mile of 10-inch-diameter pipeline extension between the existing Millsboro Pressure Control Station and the existing Milford Line; and
- a dual run pressure control addition to the existing Millsboro Pressure Control Station with modifications to the existing piping, valves, and associated electronic transmitters.

Somerset Extension: Wicomico and Somerset Counties, Maryland

- 6.83 miles of 10-inch-diameter pipeline extension to the Eastern Shore's existing Parkesburg Line;
- one aboveground pig launcher and one receiver, and aboveground mainline valve; and
- one delivery M&R station at the Somerset Extension terminus.

The Commission mailed a copy of the *Notice of Availability* to federal, state, and local government representatives and agencies; elected officials; Native American tribes; potentially affected landowners and other interested individuals and groups, including commenters; and newspapers and libraries in the project area. The EA is only available in electronic format. It may be viewed and downloaded from FERC's website (www.ferc.gov), on the Environmental Documents page (https://www.ferc.gov/industries/gas/enviro/eis.asp). In addition, the EA may be accessed by using the eLibrary link on the FERC's website. Click on the eLibrary link (https://www.ferc.gov/docs-filing/elibrary.asp), click on General Search, and enter the docket number in the "Docket Number" field, excluding the last three digits (i.e. CP18-548). 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.

Any person wishing to comment on the EA may do so. Your comments should focus on the EA's disclosure and discussion of 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 the Commission has the opportunity to consider your comments prior to making its decision

[2] A "pig" is a tool that the pipeline company inserts into and pushes through the pipeline for cleaning the pipeline, conducting internal inspections, or other purposes.

on this project, it is important that we receive your comments in Washington, DC on or before 5:00 pm Eastern Time on **May 1, 2019.**

For your convenience, there are three methods you can use to file your comments with the Commission. The Commission encourages electronic filing of comments and has staff available to assist you at (866) 208-3676 or FercOnlineSupport@ferc.gov. Please carefully follow these instructions so that your comments are properly recorded.

(1) You can file your comments electronically using the eComment feature located on the Commission's website (www.ferc.gov) under the link to Documents and Filings. This is an easy method for submitting brief, text-only comments on a project;

(2) You can also file your comments electronically using the eFiling feature on the Commission's website (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 must select the type of filing you are making. If you are filing a comment on a particular project, please select "Comment on a Filing"; or

(3) You can file a paper copy of your comments by mailing them to the following address. Be sure to reference the project docket number (CP18-548-000) with your submission: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Room 1A, Washington, DC 20426.

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 Code of Federal Regulations [CFR] 385.214). Only intervenors have the right to seek rehearing or judicial review of the Commission's decision. The Commission may grant affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but 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. 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 www.ferc.gov/docs-filing/esubscription.asp.

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

TECHNICAL ACRONYMS AND ABBREVIATIONS

AC	Administrative Code
ATWS	additional temporary workspace
AQCR	Air quality control regions
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
Commission	Federal Energy Regulatory Commission
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DGS	Delaware Geological Survey
DNREC	Delaware Department of Natural Resources and Environmental Control
dBA	decibels on the A-weighted scale
DOT	Department of Transportation
EA	environmental assessment
ESA	Endangered Species Act
EI	environmental inspector
EPA	Environmental Protection Agency
ESC Plan	Erosion and Sediment Control Plan
FERC	Federal Energy Regulatory Commission
ft	Feet
g	Gravity
GHG	greenhouse gas
HAP	hazardous air pollutant
HDD	horizontal directional drill
HUC	Hydrologic Unit Code
IR	Inadvertent Return of Drilling Fluid to the Ground Surface
L_{eq}	24-hour equivalent sound level
L_{dn}	day-night sound level
LDC	local distribution companies
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MP	Milepost
M&R	meter and regulator
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGA	Natural Gas Act
NHPA	National Historic Preservation Act

NOI	*Notice of Intent to Prepare an Environmental Assessment for the Proposed Del-Mar Energy Pathway Project, Request for Comments on Environmental Issues, Notice of Public Scoping Session, and Notice of Onsite Review*
NO_x	nitrogen oxides
NRCS	Natural Resources Conservation Service
NSA	noise sensitive area
OEP	Office of Energy Projects
Order	FERC's Order Issuing Certificate
PAR	permanent access road
PEM	palustrine emergent
PFO	palustrine forested
PGA	peak ground acceleration
Plan	FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*
Procedures	FERC's *Wetland and Waterbody Construction and Mitigation Procedures*
Project	Del-Mar Energy Pathway Project
Secretary	Secretary of the Commission
SHPO	State Historic Preservation Office
SEMS	Superfund Enterprise Management System
SO_2	sulfur dioxide
SPCC Plan	Spill Prevention, Containment, and Countermeasures Plan
TAR	temporary access road
tpy	tons per year
UDCMP	Unanticipated Discovery of Contaminated Materials Plan
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
DOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds

A. PROPOSED ACTION

1.0 INTRODUCTION

On September 14, 2018, Eastern Shore Natural Gas Company (Eastern Shore) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) in Docket No. CP18-548-000 for authorization under Section 7(c) of the Natural Gas Act (NGA)[1] to construct and operate new natural gas pipelines and delivery meter and regulator (M&R) stations in Kent and Sussex Counties, Delaware, and Wicomico and Somerset Counties, Maryland. Eastern Shore's proposed natural gas pipeline project is referred to as the Del-Mar Energy Pathway Project (Project).

We[2] prepared this environmental assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's regulations for implementing NEPA (Title 40 Code of Federal Regulations [CFR], Parts 1500-1508 [40 CFR 1500-1508]), and the Commission's regulations for implementing NEPA (18 CFR 380). The assessment of environmental impacts is an important and integral part of the Commission's decision-making process. As such, we prepared this EA to assess the environmental impacts that would likely occur as a result of the proposed Project. We have developed and incorporated measures into this EA that we believe would appropriately and reasonably avoid, minimize, or mitigate environmental impacts associated with the Project activities. Eastern Shore proposes to construct and operate the following new Project components:

Woodside Loop:[3] Kent County, Delaware

- 4.9 miles of 16-inch-diameter pipeline looping its existing pipeline.

East Sussex Extension: Sussex County, Delaware

- 7.39 miles of 8-inch-diameter mainline extension to Eastern Shore's existing Milford Line;
- one aboveground pig launcher and one pig receiver,[4] and aboveground mainline valve; and
- one delivery M&R station (Hollymount M&R Station).

---

1 See Natural Gas Code 15 of the U.S. Code, Chapter 15B.

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

3 A pipeline loop is a segment of pipe constructed parallel to an existing pipeline to increase capacity.

4 A "pig" is a tool that the pipeline company inserts into and pushes through the pipeline for cleaning the pipeline, conducting internal inspections, or other purposes.

Millsboro Pressure Control Station Upgrade: Millsboro, Sussex County, Delaware

- 0.35 mile of 10-inch-diameter pipeline extension between Eastern Shore's existing Millsboro Pressure Control Station and its existing Milford Line; and
- a dual run pressure control addition to the existing Millsboro Pressure Control Station with modifications to the existing piping, valves, and associated electronic transmitters.

Somerset Extension: Wicomico and Somerset Counties, Maryland

- 6.83 miles of 10-inch-diameter pipeline extension to Eastern Shore's existing Parkesburg Line;
- one aboveground pig launcher and one pig receiver, and aboveground mainline valve; and
- one delivery M&R station (Eden M&R Station) at the Somerset Extension terminus.

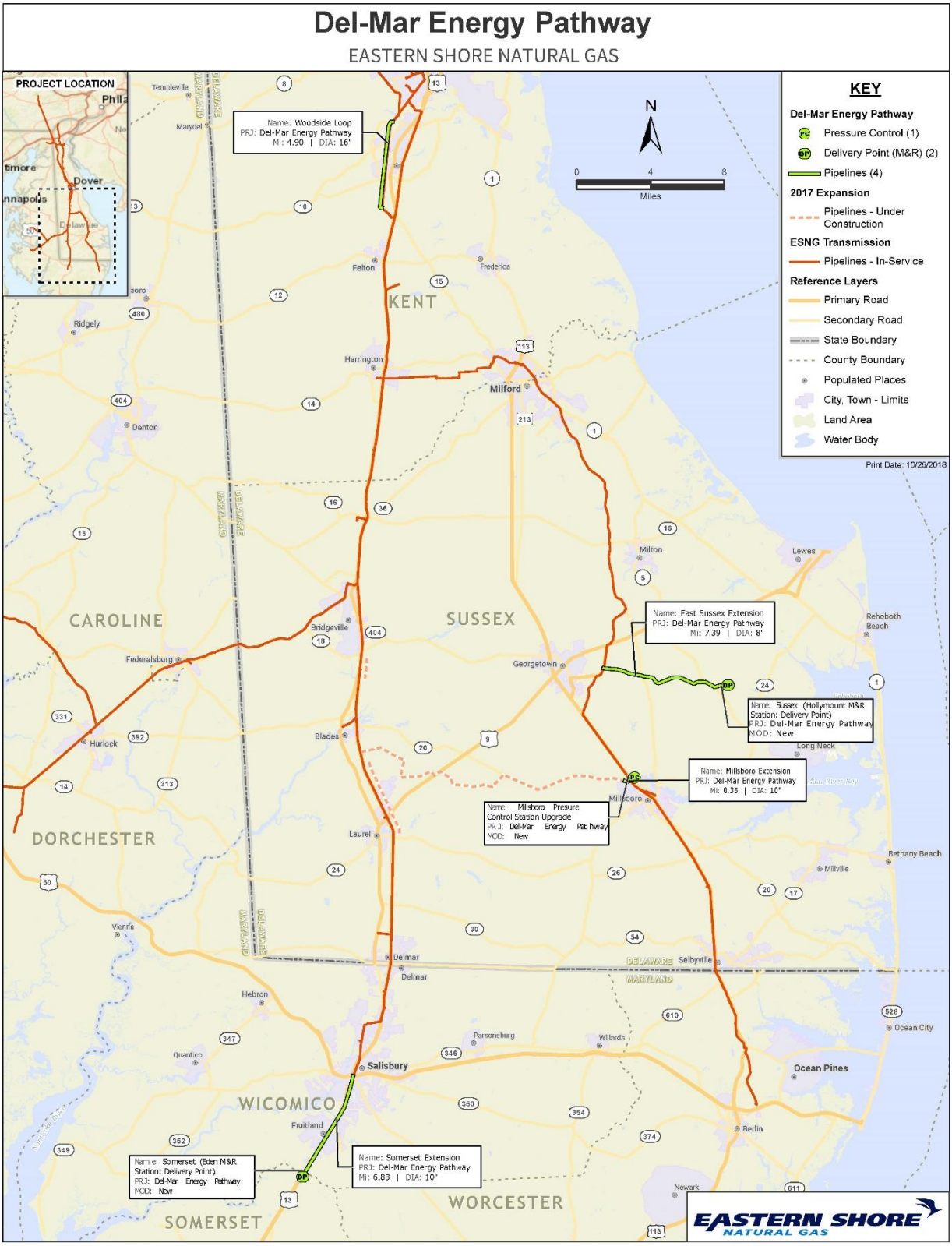
The general Project area is shown in figure 1.

2.0 PROJECT PURPOSE AND NEED

Eastern Shore states that the construction and operation of new natural gas pipelines and appurtenant facilities would provide about 11.8 million cubic feet per day of additional natural gas firm transportation service and 2.5 million cubic feet of off-peak transportation service to three local distribution companies (Chesapeake Utilities Corporation – Delaware Division; Chesapeake Utilities Corporation – Maryland Division; and Sandpiper Energy) and one industrial shipper (Valley Proteins, Inc.). Eastern Shore has experienced significant growth on its system over the past decade and continues to respond to the market need in the Delmarva Peninsula region.

The Commission is an independent regulatory agency and conducts a complete independent review of project proposals, including an environmental review of the proposed facilities. Under section 7(c) 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 of Public Convenience and Necessity to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a project.

Figure 1 Project Overview Map



3.0 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The topics addressed in this EA include geology, soils, groundwater, surface waters, wetlands, fisheries, wildlife, vegetation, species of special concern, land use, recreation, visual impacts, cultural resources, air quality, noise, reliability and safety, cumulative impacts, and alternatives. This EA describes the affected environment as it currently exists and the environmental consequences of the Project, and compares the Project's potential impact with that of various alternatives. This EA also presents our recommended mitigation measures.

As the lead federal agency for the Project, FERC is required to comply with section 7 of the Endangered Species Act, as amended (ESA) and section 106 of the National Historic Preservation Act (NHPA). These statutes have been considered in the preparation of this EA. In addition to FERC, other federal, state, and local agencies may use this EA in approving or issuing permits for all or part of the Project. Permits, approvals, and consultations for the Project are discussed in section A.9 and table B-1 in appendix B of this EA.

4.0 PUBLIC REVIEW AND COMMENT

On November 2, 2018, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed Del-Mar Energy Pathway Project, Request for Comments on Environmental Issues, Notice of Public Scoping Session, and Notice of Onsite Review* (NOI). The NOI was sent to affected landowners; federal, state, and local government agencies; elected officials; environmental and public interest groups; Native American tribes; other interested parties; and local libraries and newspapers. Comments were requested from the public on specific concerns about the Project or environmental issues that should be considered during the preparation of the EA. The Commission invited the public to attend the public scoping session held by FERC staff in the Project area on November 14, 2018. Additionally, FERC staff held an onsite environmental review open to the public on November 14 and 15, 2018. No comments were received from the public during the public scoping session or the onsite environmental review.

In response to the Notice of Application, the Commission received one comment from an abutting land owner. In response to the NOI, the Commission received comments from one landowner (directly affected by the Project), the U.S. Fish and Wildlife Service (USFWS) Chesapeake Bay Field Office, and Teamster National Pipeline Labor Management Cooperation Trust. Comments are summarized below and addressed in the applicable sections of this EA.

The landowner comments included concerns regarding: the location of a proposed mainline valve and staging area (see section C.3); potential stormwater impacts on

agricultural lands (see section B.4.2); the abutters concerns regard environmental, safety, aesthetic, and wetland impacts (see section B, B. 3.3, B.5, and B.9).

The Teamster National Pipeline Labor Management Cooperation Trust stated its support for the Project. The USFWS Chesapeake Bay Field Office submitted a summary table of potential threatened or endangered species, migratory birds, national wildlife refuge lands, and an inventory of wetlands in the counties listed in the Project area (see section B.4.4).

5.0 LAND REQUIREMENTS

Construction of the Project would affect about 217.5 acres of land during construction and about 28.9 acres of land during operation. Eastern Shore would restore the remaining 188.6 acres to pre-construction conditions.

Table 1 summarizes the land requirements for construction and operation of the Project components. The specific locations and dimensions of the construction workspace, additional temporary workspace (ATWS), access roads, and staging areas for the pipeline are shown on the maps and topographic alignment sheets provided in appendix A.

Table 1
Land Requirements for Project Activities

Project Component	County, State	Land Affected during Construction (acres)	Land Affected during Operation (acres)
Woodside Loop	Kent, Delaware	56.9	23.7
East Sussex Extension	Sussex, Delaware	84.5	4.5
Somerset Extension	Wicomico and Somerset, Maryland	69.7	0.7
Millsboro Pressure Control Station Extension	Sussex, Delaware	6.4	--
Total		**217.5**	**28.9**

Note: Total Project acreage values may differ minimally due to rounding.

5.1. PIPELINE FACILITIES

The Project includes the construction of four segments of buried natural gas pipeline totaling approximately 19.5 miles and miscellaneous appurtenances; modifications to an existing pressure control station; and construction of two new delivery M&R facilities. Eastern Shore would co-locate 90 percent of the proposed pipeline facilities within adjacent transportation or utility corridor rights-of-way, such as roads, railroads, power lines, or pipelines. The construction right-of way widths vary for

the four pipeline segments of the Project due to the location of the pipelines within and adjacent to existing road and railroad rights-of-way and the proximity to other utility infrastructure. Table 2 summarizes the proposed construction and permanent rights-of-way for each segment of the Project where new right of way would be required.

Table 2
Construction and Permanent Rights-of-way not within existing Rights-of-Way

Begin Milepost	End Milepost	Construction Right-of-way width (feet)	Permanent Right-of-Way width (feet)
Woodside Loop (16-inch-diameter pipeline)			
0.3	2.7	55-75	50
2.7	2.8	55-75	20
3.4	4.9	55-75	50
East Sussex Extension (8-inch-diameter pipeline)			
0.8	1.3	45-70	25
4.1	4.1	45-70	40
5.9	7.2	45-70	25
7.3	7.3	45-70	65
Somerset Extension (10-inch-diameter pipeline)			
0.0	0.1	25-75	1-22 (varies)
0.1	0.2	25-75	25 (varies)
3.7	3.7	25-75	1-25 (varies)
Millsboro Pressure Control Station Extension (10-inch-diameter pipeline)			
-	-	60-75	-

Note: The Millsboro Pressure Control Station Extension pipeline has no permanent easement, but rather would utilize existing road easement. For pipeline segments not listed (e.g. Woodside Loop: MP 2.8 – MP 3.4; East Sussex Extension: MP 0.0 – MP 0.8, MP 4.1 – MP 5.9; Somerset Extension: MP 0.2 – MP 3.7, MP 3.7 – MP 6.8) Eastern Shore would have no permanent easements as Eastern Shore would construct solely within existing road and railroad easements. In cases where the pipeline is installed within road and railroad rights-of-way and has no permanent easement, the respective permitting authority would issue an occupancy permit.

Eastern Shore requested construction right-of-way widths greater than 75 feet, at multiple locations for various reasons, such as to support staging of equipment and support vehicles; for trenchless pipe installation; to provide mitigation for areas where adjacent construction corridors are reduced due to constraints; for topsoil segregation; and to follow existing rights-of-way used to establish the construction workspace. A summary of milepost (MP) locations for each instance where the construction right-of-way widths greater than 75 feet are proposed is listed in table 3.

Table 3 Construction Right-of-way Greater Than 75 feet		
Begin MP	**End MP**	**Length (ft)**
Woodside Loop		
N/A	N/A	N/A
East Sussex Extension		
0.95	1.30	1,845
6.63	7.15	2,750
Millsboro Controller Upgrade		
0.06	0.18	525
Somerset Extension		
0.6	0.7	340
0.9	0.9	38
1.0	1.0	206
1.7	1.8	428
1.9	1.9	134
1.9	2.0	63
2.1	2.2	242
3.0	3.1	348
3.3	3.3	148
3.5	3.5	343
3.7	4.0	1,596
4.0	4.5	2,761
Note: Areas above do not include ATWS areas.		

Eastern Shore would require ATWS of varying widths adjacent to the construction workspace in certain locations for specialized construction methods, such as pipeline crossovers and road or railroad crossings. Project construction would require about 74 acres of ATWS predominately for staging of equipment and material storage to facilitate specialized construction procedures; in areas where topsoil segregation is required; at road crossings, waterbodies, or wetland crossings; or at the beginning and end of pipeline segments for contractor mobilization and demobilization. Table C-1 in appendix C summarizes the ATWS needed for construction of the Project components.

5.2. ABOVEGROUND FACILITIES

Eastern Shore proposes to construct two new pigging facilities, two new mainline valve assemblies, and two new delivery M&R stations for the East Sussex Extension and Somerset Extension. The Woodside Loop would not require any new aboveground facilities. Eastern Shore proposes to upgrade its existing aboveground facility, the Millsboro Pressure Control Station, and construct a new pipeline from this facility to its existing Milford Line. Because the upgrades to the Millsboro Pressure Control Station are within its existing facility, no new land would be disturbed for construction or operation. Construction upgrades at this facility, however, would disturb about 6.4 acres

within the existing facility site. Table 4 summarizes the land requirements for construction and operation of proposed aboveground facilities.

Eastern Shore's easement negotiations for five proposed aboveground facilities (East Sussex Extension's pigging facility, mainline valve, Hollymount M&R Station; Somerset Extension's mainline valve and Eden M&R Station), have outstanding easement negotiations and are not anticipated to conclude until April 15, 2019.

Table 4
Proposed Aboveground Facilities

Facility Type	County, State	MP	Land disturbed during construction (acres)	Land disturbed during operation (acres)[1]
East Sussex Extension				
Pigging Facility	Sussex, Delaware	0.00	0.4	0.1
Mainline Valve	Sussex, Delaware	4.20	0.5	0.2
Hollymount M&R Station	Sussex, Delaware	7.39	1.5	0.1
Somerset Extension				
Pigging Facility	Wicomico, Maryland	0.00	0.5	<0.1
Mainline Valve	Wicomico, Maryland	3.71	0.5	<0.1
Eden M&R Facility	Somerset, Maryland	6.83	1.5	0.1
Totals			**4.9**	**0.6**

[1] Acreage values may differ minimally due to rounding.

5.3. ACCESS ROADS

Eastern Shore would use existing state, county, and local roads to access Project components. In addition, Eastern Shore identified three existing temporary access roads for pipeline facilities and three new permanent access roads to access aboveground facilities. The new permanent access roads would be short entrance driveways used for access and maintenance of the aboveground facilities. Improvements (for example, grading, adding gravel) may be conducted where necessary to facilitate ingress and egress of equipment and vehicles, and widening may be necessary to accommodate the turning radius of some trucks. No other modifications are currently proposed by Eastern Shore on existing access roads. When existing public roadways are used for access purposes, Eastern Shore would notify the appropriate agency, when applicable, of its intent to haul oversized loads over the road. Public roadways would be kept clean of soil and sediment. Eastern Shore would restore temporary access roads to pre-construction conditions or according to landowner agreements. Table 5 summarizes non-public access roads proposed for the Project.

Table 5 Non-Public Access Roads Proposed for the Project								
Access Road ID	**MP**	**County, State**	**Use (PAR or TAR)**	**Existing Condition**	**Existing / New Access**	**Upgrade Required/ Proposed Modifications**	**Construction Impact (acres)**	**Operation Impact (Acres)**
Woodside Loop								
TAR-WS-1	0.13	Kent, DE	TAR	Pavement / Gravel	Existing	None Expected	0.6	0.00
TAR-WS-2	2.15	Kent, DE	TAR	Pavement / Gravel	Existing	None Expected	0.9	0.00
TAR-WS-3	3.51	Kent, DE	TAR	Pavement / Gravel	Existing	None Expected	2.1	0.00
East Sussex Extension								
PAR-SE-1	0.00	Sussex, DE	PAR	Crop / Grass	New	Clear, Grade, Apply Geotextile and Stone	<0.1	<0.1
PAR-SE-2	4.19	Sussex, DE	PAR	Crop / Grass	New	Clear, Grade, Apply Geotextile and Stone	<0.1	<0.1
PAR-SE-3	7.38	Sussex, DE	PAR	Crop / Grass	New	Clear, Grade, Apply Geotextile and Stone	<0.1	<0.1
Subtotal							**<0.1**	**<0.1**
Somerset Extension								
-	-	-	-	-	-	-	-	-
Millsboro Pressure Control Station Extension								
-	-	-	-	-	-	-	-	-
Total							**3.7**	**<0.1**
Note: TAR= Temporary Access Road; PAR= Permanent Access Road								

6.0 CONSTRUCTION SCHEDULE

Based upon Eastern Shore's anticipated schedule, construction would begin by September 2019 and last approximately 12 months. Eastern Shore anticipates placing the facilities into service by September 2020.

7.0 CONSTRUCTION AND OPERATION PROCEDURES

Eastern Shore would design, construct, test, operate, and maintain the proposed facilities to conform with or exceed federal, state, and local requirements, including the U.S. Department of Transportation's (DOT) Minimum Safety Standards in 49 CFR 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*, and 18 CFR 380.15, *Siting and Maintenance Requirements*.

During construction and restoration of the Project, Eastern Shore would implement the measures contained in the following plans, in addition to other federal, state, and local permit requirements:

- FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan);[5]
- FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures);[6]
- Spill Prevention, Containment, and Countermeasures (SPCC) Plan;
- Unanticipated Discovery of Contaminated Materials Plan (UDCMP);
- Plan for the Unanticipated Discovery of Historic Properties and Human Remains During Construction;
- Environmental Complaint Resolution Plan;
- Fugitive Dust Control Plan;
- Erosion and Sediment Control Plan (ESC Plan); and
- Horizontal Directional Drilling Inadvertent Return and Contingency Plan.

FERC's Plan and Procedures are baseline construction and mitigation measures developed in collaboration with other federal and state agencies and the natural gas pipeline industry to minimize the potential environmental impacts of construction on upland areas, wetlands, and waterbodies. Eastern Shore does not propose any modifications to FERC's Plan and Procedures.

Eastern Shore would employ an environmental inspector (EI) to oversee and document environmental compliance. All Project-related construction personnel would be informed of the EI's authority and would receive job-appropriate environmental training prior to commencement of work on the Project. Depending on the progress of the construction, additional EIs may be added as necessary. FERC staff would also conduct inspections of the Project facilities during construction and restoration to determine compliance with any conditions attached to FERC's *Order Issuing Certificate* (Order).

Prior to commencement of any construction-related activities, survey crews would stake the limits of the construction work areas and access roads. Eastern Shore would avoid sensitive areas by flagging or fencing the resource, as appropriate. Eastern Shore would contact the national "one-call" system to identify and mark buried utility lines prior to ground disturbance. Construction work areas would be cleared of existing vegetation and graded, as necessary, to create level surfaces for the movement of

[5] The FERC Plan can be viewed on the FERC website http://www.ferc.gov/industries/gas/enviro/plan.pdf.
[6] The FERC Procedures can be viewed on the FERC website https://www.ferc.gov/industries/gas/enviro/procedures.pdf.

construction vehicles. In accordance with the FERC Plan, temporary erosion and sediment control measures would be installed following initial ground disturbance.

Eastern Shore would operate and maintain the proposed facilities in compliance with the Commission's guidance in 18 CFR 380.15, and the maintenance requirements in the FERC's Plan and Procedures. Project facilities would be marked and identified in accordance with applicable regulations. In accordance with 49 CFR 192, the pipeline would be inspected for leaks as part of scheduled operations and maintenance. Eastern Shore would participate in the local One Call system and would inspect, maintain, and replace pipeline markers and signs to ensure that the pipeline location is visible from the ground. These standards are in accordance with the *National Pipeline Safety Act of 1968*, as amended.

7.1. GENERAL PIPELINE CONSTRUCTION SEQUENCE

Eastern Shore would install the pipeline facilities below ground using conventional construction methods. This typically consists of a sequential process of surveying, staking, clearing, grading, excavating, pipe stringing and bending, pipe assembly, welding, lowering-in and backfilling, hydrostatic testing, cleanup, and restoration. Crews working on each stage of construction generally proceed along the pipeline right-of-way in one continuous operation. The entire process would be coordinated to minimize the total time a tract of land would be disturbed and, therefore, exposed to erosion and temporarily precluded from normal use. The activities at any single point would last about 3 to 4 weeks.

In accordance with the FERC Plan, following construction, Eastern Shore would grade the disturbed temporary work areas to match pre-construction contours and drainage patterns, and reseed the areas within six working days of final grading. Eastern Shore would leave temporary erosion control measures in place or replace them with interim erosion control measures until sufficient vegetative cover has re-established.

7.2. SPECIAL CONSTRUCTION PROCEDURES

In addition to the standard pipeline construction methods discussed above, Eastern Shore would implement special construction procedures due to site-specific conditions and to reduce overall Project impacts. These special construction techniques are described below.

Trenchless Techniques- Horizontal Directional Drill and Guided Bore Methods

Eastern Shore proposes to use trenchless construction techniques, which include bores and horizontal directional drills (HDD). Trenchless methods allow the installation

of the pipeline with minimal impacts or disturbance to surficial features. Boring techniques involve drilling a horizontal shaft below the surficial feature through which the pipe would pass. First, a vertical bore pit is excavated on one side of the feature and a receiving pit excavated on the other. The bore pit is excavated to a depth equal to the depth of the borehole and is graded such that the bore would follow the grade of the pipe. A boring machine is lowered to the bottom of the bore pit and placed on supports. The machine drills a horizontal shaft under the feature using a cutting head mounted on an auger. After the pipe is installed, the boring machine is removed and the bored pipe is tied-in to the pipeline.

An HDD is generally accomplished by setting up a drilling rig to drill a small-diameter pilot hole along a prescribed profile. Once the pilot hole is completed, it is enlarged using reaming tools to provide access for the pipe. The reaming tools are attached to the drill string at the exit point of the pilot hole and then rotated and drawn back to the drilling rig, thus progressively enlarging the pilot hole with each pass. During this process, drilling fluid consisting primarily of bentonite clay and water is continuously pumped into the hole to remove cuttings and maintain the integrity of the hole. Once the hole has been sufficiently enlarged, a prefabricated segment of pipe is attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole to the drill rig, completing the crossing.

The HDD method would be used at 36 locations to minimize impacts on roads, agricultural lands, wetlands, and waterbodies by avoiding ground surface disturbance between the drill entry and exit points. Table C-2 in appendix C lists the HDD crossing locations, lengths, and specific features that would be avoided by each crossing. For proposed HDDs on the Somerset and East Sussex Extensions, a track mounted self-contained HDD drill rig would be utilized. Feasibility for HDD crossings are discussed in greater detail under section B.1.

Road and Railroad Crossings

The Project would cross 1 railroad at 3 locations and 38 public roads. The crossings would be completed in accordance with DOT requirements (49 CFR 192) and the requirements of road crossing permits obtained for the Project. Road crossings would be completed using open-cut or trenchless techniques, depending upon site-specific conditions. No railroads are proposed for open cut. Table C-7 in appendix C lists proposed road crossings and section B.5 discusses proposed railroad crossings (all trenchless crossings) for the Project, along with the anticipated crossing technique.

Eastern Shore would use appropriate safety procedures, including traffic warning signs, detour signs, and other traffic control devices, as applicable. Eastern Shore would maintain vehicle access to residences and commercial properties during construction and

may utilize traffic detouring measures if approved in advance by applicable jurisdictional agencies such as the DOT. At least one lane of traffic would typically be kept open when constructing an open-cut crossing of residential streets. During the brief period when a road is open cut, Eastern Shore would have steel plates available onsite to cover the open area to permit travel by emergency vehicles. Traffic lanes and residential access would be maintained except for the temporary periods essential for installing the pipeline. Following pipeline installation at open-cut roadways, Eastern Shore would backfill the trench and restore the roadbed.

Residential Areas

Eastern Shore would use specialized methods, such as stovepipe and/or drag section construction, in order to minimize the impacts of construction in residential and commercial areas. Stove pipe construction involves installing one joint of pipe at a time. The welding, weld inspection, and coating activities are performed in the open trench. At the end of each work day, after the pipe is installed, the trench is backfilled and/or covered with steel plates. Drag section construction involves the trenching, installation, and backfill of a prefabricated length of pipe containing several pipe joints pulled into the trench in one work day. At the end of each day, after the pipe is installed, the trench is backfilled and/or covered with steel plates or timber mats. Further information on impacts on residential land is detailed in section B.5 of this EA.

Active Croplands

Prior to construction, Eastern Shore would consult with landowners in agricultural areas to identify existing drain tile locations.[7] Known drain tiles would be noted on the construction alignment sheets and marked with highly visible flagging at each right-of-way edge and the centerline of the pipe, where applicable. Eastern Shore would also flag previously undocumented drain tile discovered during grading or trenching at each edge of the construction workspace. Eastern Shore would repair or replace damaged, cracked, or broken drain tile to pre-construction conditions using qualified specialists. Repairs would be inspected prior to backfilling the trench area.

Construction in agricultural areas would be conducted in accordance with the FERC's Plan. To conserve topsoil, Eastern Shore would either use full right-of-way or trench and spoil-side topsoil removal in actively cultivated and rotated cropland and improved pasture and other areas requested by the landowner. A minimum of 12 inches of topsoil would be segregated in areas where the topsoil is 12 inches or greater. Where the existing topsoil is less than 12 inches, Eastern Shore would remove and segregate the

[7] Agricultural drain tile systems are used to improve drainage in areas where the water table is high and/or the soil characteristics inhibit proper drainage. Drain tile systems in agricultural areas are typically designed to remove water from the top 3 to 4 feet of soil to improve soil productivity and crop yield.

actual depth of the topsoil to the extent practicable. The topsoil and subsoil would be segregated on the non-working side of the construction workspace and Eastern Shore proposes to use a 6-inch layer of weed-free straw as a barrier between subsoil and topsoil to prevent mixing of the segregated topsoil and subsoil.

Following construction, Eastern Shore would replace topsoil over subsoil; remove excess rock in cultivated cropland, pastures, and hayfields; and test topsoil and subsoil for compaction. Further information regarding soils and agricultural land is presented in sections B.1 and B.5.

Waterbody Crossings

Eastern Shore would cross waterbodies using an HDD method or guided bore method. However, although not anticipated, trenchless crossing methods may fail at the time of construction. If this occurs, Eastern Shore would need to propose a variance from its certificated construction method to modify its crossing technique, which Eastern Shore states would likely be a flume crossing or dam-and-pump crossing method. Flume crossing or dam-and-pump crossing methods involve isolating the construction work area from the stream flow. The primary objectives of these methods are to reduce turbidity in the waterbody and minimize downstream sedimentation and related impacts on aquatic resources when compared to an "open-cut" crossing method.

To facilitate pipeline construction across waterbodies, ATWS would be needed for the waterbody HDD or guide bore for construction equipment, to assemble and fabricate the length of pipe necessary to complete the crossing, and store spoil removed during the trenchless technique. ATWS would be at least 50 feet from waterbodies. In addition, Eastern Shore would store spoil at least 50 feet away from stream banks in cleared areas (except in actively cultivated or rotated agricultural lands and other disturbed areas), or as otherwise approved by FERC. Further details regarding waterbody crossing impacts and mitigation are discussed in section B.3.2.

Wetland Crossings

Eastern Shore would cross wetlands in accordance with FERC's Procedures and applicable state and federal permits. Eastern Shore would segregate the topsoil up to 12 inches in depth in unsaturated wetlands where hydrologic conditions permit. When wetland soils are inundated or saturated to the surface, the pipeline trench would be excavated across the wetland by equipment supported on wooden mats to minimize the disturbance on wetland soils. Trees would be cut to grade on most of the right-of-way, but stumps would be removed directly over the trenchline or where safety concerns dictate otherwise. This would allow existing vegetation to recover more rapidly in the

remainder of the right-of-way once the equipment mats and spoil piles have been removed.

Eastern Shore would adhere to the measures specified in the FERC Procedures, including limiting the amount of equipment in wetlands, cutting vegetation above ground level and leaving the existing root system in place, restoring topsoil to its original location after backfilling, permanently stabilizing areas after construction, and monitoring wetlands post-construction to ensure successful revegetation. ATWS would be needed adjacent to specific wetlands to facilitate the pipeline crossing; however, these work areas would be at least 50 feet from the wetland edge, topographic and other site-specific conditions permitting.

Upon completion of construction through wetlands, Eastern Shore would restore the right-of-way, and maintain a 10-foot-wide strip centered on the pipeline in an herbaceous state during operation. Further details regarding wetland crossings are discussed under section B.3.3.

7.3. ABOVEGROUND FACILITY CONSTRUCTION

Aboveground facilities would be constructed within new or existing permanent easement or Eastern Shore fee-owned property. Construction of the aboveground facilities would include general activities such as clearing and grading, foundation installation, erection of aboveground facilities, installation of piping equipment, testing of equipment, and timely cleanup and restoration of the Project area. Eastern Shore would install and maintain erosion and sediment control devices in accordance with its ESC Plan and the FERC Plan.

Upon completion of construction, Eastern Shore would restore the Project area in accordance with applicable state and federal permits, landowner agreements, and plans. Final grading would be completed, permanent workspaces would be graveled or paved with asphalt. Eastern Shore would install a security fence and property fences around the permanent aboveground facilities.

8.0 NON-JURISDICTIONAL FACILITIES

Under Section 7 of the NGA, the Commission is required to consider, as part of the decision to approve facilities under its jurisdiction, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities, such as a power plant at the end of a jurisdictional pipeline, or they may be minor, non-integral components of the facilities under the Commission's jurisdiction.

The Hollymount and Eden M&R Stations would require new electrical utility service by the Delaware Electric Cooperative and Delmarva Power or Choptank Electric Cooperative, Inc. respectively. Delaware Electric Cooperative would construct the 100-foot-long electric transmission line for the Hollymount M&R Station within the Project right-of-way and may be subject to local permits. Delmarva Power or Choptank Electric Cooperative, Inc., would construct approximately 200 feet of electric transmission into the Eden M&R Station within existing road right-of-way. The Eden M&R Station electric transmission line would be under the jurisdiction of the Public Service Commission for the State of Delaware. There is no additional right-of-way expected for either electric line installation.

Typical communication lines for the M&R stations may include a combination of standard cable, microwave radio, or satellite link for Supervisory Control and Data Acquisition communications. A determination of the required communication facilities has not been made at this time. If cable is selected, the cable would likely be mounted on the poles used by the power line to the M&R stations and would not require any additional right-of-way. Based on the information provided, no federal permits are anticipated to be required for the power line facilities. Impacts are described further in section B.10.

9.0 PERMITS AND CONSULTATIONS

Table B-1 in appendix B provides a list of known federal, state, and local permits for the Project, as well as any responses that have been received to date. Eastern Shore would be responsible for obtaining all permits and approvals required for the Project, regardless of their listing in table B-1.

B. ENVIRONMENTAL ANALYSIS

We received one comment from an abutting landowner, expressing concerns regarding the potential environmental impacts on each resource. The following sections discuss the Project's potential direct and indirect impacts on environmental resources. When considering the environmental consequences of the Project, the duration and significance of any potential impacts are described below according to the following four levels: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction, with the resources returning to pre-construction conditions almost immediately. Short-term impacts could continue for up to three years following construction. Long-term impacts would require more than three years to recover, but eventually would recover to pre-construction conditions. Permanent impacts could occur because of activities that modify resources to the extent that they may not return to pre-construction conditions during the life of the Project, such as with the construction of an aboveground facility. An impact would be considered significant if it would result in a substantial adverse change in the physical environment.

1.0 GEOLOGY

1.1. PHYSIOGRAPHIC SETTING AND GEOLOGIC CONDITIONS

The Project is in the Atlantic Coastal Plain physiographic province (U.S. Geological Survey [USGS, 2009]). The Atlantic Coastal Plain physiographic province is underlain by a wedge of unconsolidated sediments including gravel, sand, silt, and clay, which overlaps the crystalline bedrock of the eastern Piedmont physiographic province. The topography of the Project area is relatively flat with elevations ranging from approximately 2 to 158 feet above mean sea level.

1.2. MINERAL RESOURCES

Based on an assessment of mineral resources within 0.25 mile of the Project workspaces using aerial photographs, USGS topographic maps, U.S. Energy Information Administration information (2018a, 2018b), USGS Mineral Resources Data System information (2011), Maryland Department of the Environment (MDE) (2018a) information, and Delaware Geological Survey (DGS) (2004) mapping, no existing or abandoned oil and gas wells or active or inactive mining operations were identified, with the exception of one active, non-coal surface mine (sand and gravel) approximately 700 feet from the Somerset Extension at MP 5.15. State Route 13 Salisbury Bypass physically separates this surface mine from the Project workspace. Therefore, we conclude that impacts on fuel and non-fuel mineral resources would not occur during Project construction and operation.

1.3. GEOLOGIC HAZARDS

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. Such hazards typically are seismic-related, including earthquakes, surface faulting, and soil liquefaction; landslides, flooding, and karst terrain; or ground subsidence hazards. These hazards, as well as the feasibility of utilizing HDD based on hydrogeologic conditions present in the Project area and the potential for an inadvertent return of drilling fluid to the ground surface (IR) during HDD activities, are discussed below.

The shaking during an earthquake can be expressed in terms of the acceleration as a percent of gravity (g), and seismic risk can be quantified by the motions experienced at the ground surface or by structures during a given earthquake expressed in terms of g. USGS National Seismic Hazard Probability Mapping shows that for the Project area, within a 50-year period, there is a 2 percent probability of an earthquake with an effective peak ground acceleration (PGA) of 4 to 8 percent g; and a 10 percent probability of an earthquake with an effective PGA of 1 to 3 percent g being exceeded (USGS, 2014a). For reference, PGA of 10 percent g (0.1g) is generally considered the minimum threshold for damage to older structures or structures not constructed to resist earthquakes.

Further, modern pipeline systems have not sustained damage during seismic events except due to permanent ground deformation, or traveling ground-wave propagation greater than or equal to a Modified Mercalli Intensity of VIII (similar to a Richter scale magnitude around 6.8 to 7.0) (O'Rourke and Palmer 1996, USGS 2018a). According to the USGS Quaternary Fault and Fold Database, no Quaternary-age faults would be crossed by the Project (USGS, 2018b). As such, the risk of a significant earthquake in the Project area damaging Project facilities is low and the risk of seismic ground faulting to occur is also low. Similarly, because the Project area has a low potential for strong prolonged ground shaking associated with seismic events, the potential for soil liquefaction is negligible.

USGS landslide incidence and susceptibility mapping indicates that the Project facilities would be in areas of low landslide incidence (USGS, 2014b). Project area topography is generally flat or gently sloping; however, where the alignment crosses streams with relatively steep banks, the potential for slope or trench failure increases. Eastern Shore would implement safety precautions (including dewatering and shoring, wherever deemed necessary), to stabilize the sides of trench excavations during construction. Further, blasting, which can trigger landslides, is not anticipated to be required due to the nature of the soils in the Project area and because depth to bedrock within the Project area is expected to be several hundred feet. If an area of shallow bedrock is encountered during construction, Eastern Shore would adhere to FERC Plan and Procedures and all applicable laws and regulations. As such, the potential for slope

instability to significantly impact the Project during construction or operation is negligible.

Ground subsidence, involving the localized or regional lowering of the ground surface, may be caused by karst formation due to limestone or gypsum bedrock dissolution; sediment compaction due to groundwater pumping and/or oil and gas extraction; and underground mining. Oil and gas extraction and subsurface mines do not occur in the proposed Project area and given the nature of Project activities (involving the installation of subsurface pipeline and small aboveground facilities), regional ground subsidence from the over-pumping of groundwater would be a negligible hazard. In the proposed Project area, no karst terrain is present and the lithology that could lead to bedrock dissolution and karst development do not generally occur. Therefore, we conclude that ground subsidence within the Project area is unlikely to occur.

Eastern Shore would use the HDD construction method to construct approximately 6.6 miles of its Project, consisting of 36 separate crossings of wetlands, waterbodies, roads, and areas where workspace size constraints would not be conducive to open cut construction. During HDD operations, drilling fluid, comprised primarily of bentonite and water, is pumped under pressure through the inside of the drill pipe and returns to the drill entry point along annular space between the outside of the drill pipe and the drilled hole. Because the drilling fluid is pressurized, it can be lost, resulting in an IR if the drill path encounters porous material and/or fractures or fissures in the bedrock. Chances for an IR are greatest near the drill entry and exit points where the drill path has the least amount of ground cover. It is also possible for HDD operations to fail, primarily due to encountering unexpected geologic conditions, such as coarse materials, or if the pipe were to become lodged in the hole during pullback operations.

To date, Eastern Shore has not completed site-specific geotechnical investigations for any of the proposed HDDs. Based on publically available information, including geologic and soils mapping, Project areas are expected to overlie geologic formations comprised primarily of fine- to coarse-grained sand interbedded with silts, clays, and minor gravel (DGS, 2011a; DGS, 2011b; DGS, 2007; Maryland Geological Survey, 1984; National Resources Conservation Service [NRCS], 2018). Clays, silts, and sands are generally well suited to HDD installations; bedrock is not anticipated to be encountered at any HDD crossing. Furthermore, proposed installation lengths between 225 and 1,950 feet are well below the maximum industry standard installation lengths of approximately 8,000 feet, achievable for a 8- to 10-inch-diameter pipe, and 7,000 feet for a 16-inch-diameter pipe. Based on the information available, Eastern Shore's geotechnical contractor concluded that the proposed HDD crossings would be technically feasible.

For all HDD installations on the Woodside Loop, and for HDD installations which cross wetlands or waterbodies on the East Sussex Extension and the Somerset Extension, Eastern Shore has committed to completing site-specific geotechnical investigations, hydrofracture analyses, and providing site-specific plans and profiles to FERC staff for review and approval prior to, or at the time Eastern Shore submits, the Implementation Plan.

While use of the HDD method would significantly minimize potential impacts on the proposed crossings of waterbodies and wetlands, HDDs could result in an unanticipated release of drilling fluids into a waterbody or wetland during drilling. Eastern Shore has indicated that for the drills proposed to cross wetlands or waterbodies, the vertical separation between the surface feature and the depth of the alignment would be greater than 15 feet but that minimum installation depths would be determined during detailed design of the crossings after site-specific geotechnical information has been obtained. Eastern Shore has also stated that due to the shallow depth (typically between four and ten feet) of HDD/bore hybrid installation that would be performed in upland areas, there is an increased risk associated with IRs.

To minimize the potential impacts of an IR, Eastern Shore would use only non-petrochemical-based, non-hazardous additives that comply with permit requirements and environmental regulations. Eastern Shore has committed to providing a list of drilling fluid additives other than bentonite and water to FERC for approval prior to use. Eastern Shore's HDD Inadvertent Return and Contingency Plan would apply to all HDD operations. Eastern Shore would ensure that all HDD activities are monitored and that drilling procedures are adjusted, as necessary, to avoid or minimize potential IRs. If an IR should occur, Eastern Shore would contain the release to the extent practicable and remediated. We have reviewed Eastern Shore's HDD Inadvertent Return and Contingency Plan and find it acceptable. Based on the above analysis, we conclude that HDDs are a feasible installation method for the proposed pipelines, and that potential impacts from IRs would not be significant.

Based on the construction methods and mitigation measures, we conclude that the impact from geologic hazards on the Project facilities during construction and/or operation would be minimal and the Project would not have significant impacts on geologic resources.

2.0 SOILS

Soil characteristics in the Project area were assessed using the NRCS Soil Survey geographic database (NRCS, 2018). Soils were grouped and evaluated according to the characteristics that could affect construction or increase the potential for soil impacts during construction. These characteristics include prime farmland; compaction prone,

hydric, and highly erodible soils; and the presence of stones and shallow bedrock (see table 6). Additional soil-related issues considered in the analysis include revegetation potential and soil contamination.

Table 6
Project Soil Characteristics and Limitations (Construction Impacts)[1]

Facility/County	Total Acres	Prime Farmland[3]	Hydric Soils	Compaction Prone[4]	Highly Erodible		Revegetation Concerns[7]
					Water[5]	Wind[6]	
Woodside Loop							
Kent County	56.9	50.8	47.2	--	0.0	0.7	0.8
East Sussex Extension							
Sussex County	84.6	83.8	83.0	--	0.6	84.6	--
Somerset Extension							
Wicomico County	61.7	60.4	44.2	8.6	--	47.3	--
Somerset County	8.0	8.0	8.0	7.3	--	--	--
Millsboro Pressure Control Station Extension							
Sussex County	6.4	--	--	--	0.1	6.3	--
TOTALS [2]	**217.5**	**203.0**	**182.4**	**15.9**	**0.7**	**138.9**	**0.8**

[1] The area affected includes the permanent pipeline right-of-way, temporary pipeline right-of-way, aboveground facilities, and ATWS.
[2] The totals shown in this table may not equal the sum of addends due to rounding.
[3] As designated by the NRCS. Includes prime farmland, unique farmland, and farmland of statewide or local importance.
[4] Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.
[5] Land in capability subclasses 4E through 8E and soils with an average slope greater than or equal to 9 percent.
[6] Soils with a wind erodibility group classification of 1 or 2.
[7] Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, and soils with an average slope greater than or equal to 9 percent.

Note: No Project area soils are stony/rocky or have a shallow depth to bedrock (bedrock within 60 inches of the ground surface).

Typical soil impacts that may occur during construction include mixing of topsoil and subsoil layers, compaction, rutting, erosion, and alteration of drainage characteristics. Construction activities such as clearing, grading, trench excavation, backfilling, heavy equipment traffic, and restoration along the construction right-of-way have the potential to adversely affect natural soil characteristics such as water infiltration, storage and routing, and soil nutrient levels, thus reducing soil productivity. Clearing removes protective vegetative cover and exposes soils to the effects of wind and water which potentially increases the potential for soil erosion and the transport of sediment to sensitive resource areas.

Prime Farmland

The U.S. Department of Agriculture defines prime farmland as land that has the best combination of physical and chemical characteristics for growing food, feed, forage, fiber, and oilseed crops. Unique farmland is land that is used for production of specific high-value food and fiber crops. In addition, soils may be considered of statewide or local importance if those soils are capable of producing a high yield of crops when managed according to accepted farming methods.

Approximately 203 acres of soils mapped as prime farmland or farmland of statewide importance would be disturbed by construction of the Project. However, only 0.6 acre would be permanently disturbed for aboveground facilities proposed for the Project. Construction in agricultural areas and pasture areas would temporarily disrupt ongoing agricultural activities.

Potential impacts on agricultural soils would be minimized and mitigated in accordance with the FERC Plan. These include measures to conserve and segregate the upper 12 inches of topsoil, alleviate soil compaction, protect and maintain existing drainage tile and irrigation systems, prevent the introduction of weeds, and retain existing soil productivity. Implementation of proper topsoil segregation, soil decompaction, drainage, and weed controls would help ensure post-construction revegetation success and productivity, thereby minimizing the potential for long-term impacts on agricultural lands. Eastern Shore proposes to use a 6-inch layer of weed-free straw as a barrier between subsoil and topsoil to prevent mixing. While this performance measure adheres to the FERC Plan, the addition of straw to agricultural areas could impact agricultural productivity. Therefore, **we recommend that:**

- **Prior to construction, Eastern Shore should file with the Secretary of the Commission (Secretary) its commitment to obtain landowner approval for the proposed use of straw to segregate topsoil in cultivated cropland.**

Permanent impacts would be limited to prime farmland soils within the footprints of new aboveground facilities and permanent access roads, which collectively total approximately 0.6 acre. The total area of prime farmland and farmland of statewide importance in Wicomico, Sussex, and Somerset Counties is approximately 794,250 acres (NRCS, 2018). Therefore, and with our recommendation, we conclude that impacts on prime farmland from construction and operation of the Project would not be significant.

Soil Erosion and Revegetation Potential

Soil erosion is the wearing away of physical soil properties by wind and water, and could result in a loss of soil structure, organic matter, and nutrients, all of which, when present, contribute to healthy plant growth and ecosystem stability. Clearing, grading, and equipment movement can accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands.

To minimize or avoid potential impacts due to soil erosion, Eastern Shore would implement erosion controls in accordance with the FERC Plan. Temporary erosion controls, including sediment filter devices and silt fences, would be installed immediately following land disturbing activities. Eastern Shore would seed and mulch bare soils and/or stockpiles exposed during cut and fill operations to avoid erosion. Additionally, hay/straw bales or other methods of inlet sediment protection would be used to protect catch basins, culverts, and storm drain inlets. Eastern Shore would inspect these erosion controls on a regular basis and after each rainfall event of 0.5 inch or greater to ensure proper function. Eastern Shore would additionally utilize dust-control measures, including routine wetting of the construction workspace as necessary.

Following construction, the right-of-way would be re-seeded and/or mulched according to permit requirements and landowner agreements. Eastern Shore would maintain temporary erosion control devices until the Project areas are successfully revegetated or stabilized with gravel surfacing.

Eastern Shore plans to begin Project construction in September 2019, with the duration of construction extending 12 months. Construction activities during the winter may require additional procedures to address snow handling; access road construction and maintenance; and freeze/thaw soil conditions. Therefore, **we recommend that:**

- **Prior to construction, Eastern Shore should file a Winter Construction Plan with the Secretary, for review and written approval by the Director of the Office of Energy Projects (OEP). The plan should address all items included in section III.I of the FERC Plan.**

Soil Rutting and Compaction

Eastern Shore would mitigate for soil compaction and rutting by segregating topsoil in agricultural and residential areas, ripping and breaking up the soil once construction is complete, if necessary, and following other measures outlined in FERC's Plan such as restricting construction in wet weather to avoid excessive rutting. If post-construction monitoring and inspection determines additional measures are warranted, Eastern Shore would employ mechanical methods to break up the subsoil to restore

affected areas to pre-construction conditions. Care would be taken to not mix topsoil and subsoil during decompaction.

Inadvertent Spills or Discovery of Contaminants

Eastern Shore conducted regulatory database searches in January 2019 to identify sites with existing or potential soil or groundwater contamination within 0.25 mile of Project work areas that could be impacted by the Project or that could impact Project construction. Numerous soils and groundwater regulatory sites were identified within 0.25 mile of Project areas, as detailed within section B.3.1.

In the event that contaminated soils or other environmental media are identified during construction, Eastern Shore would implement measures contained in its UDCMP. Specifically, Eastern Shore would cease activities and restrict access in that area, initiate measures to characterize and handle contamination, and complete required agency notifications.

During construction, contamination from accidental spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely impact soils. To minimize impacts, Eastern Shore would implement measures contained in its SPCC Plan which specifies prevention measures, containment actions, and cleanup procedures in the event of inadvertent spills during Project construction. We have reviewed this plan and find it to be acceptable. Based on these measures, and our recommendation, we conclude that the Project's impacts on soils would not be significant.

3.0 WATER RESOURCES AND WETLANDS

3.1. GROUNDWATER RESOURCES

Aquifers in the Project area are part of the Northern Atlantic Coastal Plain aquifer system. The Northern Atlantic Coastal Plain aquifer system consists primarily of semi-consolidated sand aquifers separated by clay confining units.

The Surficial aquifer is the uppermost aquifer in the Northern Atlantic Coastal Plain aquifer system. This aquifer is close to the surface and averages less than 50 feet in thickness. Due to its exposure at the surface, this aquifer is particularly susceptible to contamination.

The Chesapeake aquifer is below the Surficial aquifer and likely underlays the majority of the Project area. Where the Surficial and Chesapeake aquifers are in direct contact, they form a composite aquifer that contains water under unconfined conditions.

The Chesapeake aquifer's thickness exceeds 600 feet near the coast (Trapp and Horn, 1997).

According to the Delaware Department of Natural Resources and Environmental Control (DNREC), approximately 80 percent of freshwater used in Delaware comes from surface water sources and the remaining 20 percent is obtained from groundwater sources. In Delaware and Maryland, major uses of groundwater include irrigation systems and public supply systems (Dieter et al., 2018). Delaware and Maryland's groundwater quality is generally high, though local contamination exists in some areas.

Sole Source Aquifers and Wellhead Protection Areas

The U.S. Environmental Protection Agency (EPA) oversees the Sole Source Aquifer Protection Program to protect high production aquifers that supply 50 percent or more of the region's water supply and for which there are no reasonably available alternative drinking water sources should the aquifer become contaminated. The Project area does not overlie any EPA designated sole-source aquifer(s) (EPA, 2018). In addition, no Wellhead Protection Areas were identified within the Project area (State of Delaware, 2019; MDE, 2018b).

Public and Private Water Supply Wells

A review of the Delaware Environmental Navigator (DNREC, 2017) and reports of well searches performed by Environmental Data Resources, Inc. identified 50 private, community, irrigation, livestock, and municipal/public wells within 150 feet of the proposed construction area, including the construction right-of-way, access roads, contractor yards/staging areas, and sites for new aboveground facilities. Specifically, 5 public (observation) and private (irrigation and drinking) water wells were identified within 150 feet of the Woodside Loop workspaces; 16 private (observation, drinking, and irrigation) water wells were identified within 150 feet of the East Sussex Loop workspaces; 26 public (testing and drinking) and private (drinking, monitoring, and irrigation) water wells were identified within 150 feet of the Somerset Extension workspaces; and 3 private (drinking and monitoring) water wells were identified within 150 feet of the Millsboro Pressure Control Station Extension workspace. Of these wells, five were identified within the construction workspaces, and ten were identified outside of the construction workspace but 50 feet or less feet from Project areas.

With landowner approval, Eastern Shore has committed to perform pre- and post-construction well yield and water quality testing for residences with potable water wells within 150 feet of the construction work areas. These tests would include pump inspection, flow rate measurement, and chemical testing to federal and state standards. If it is determined that a well is impacted from the construction of the proposed facilities,

Eastern Shore would coordinate the level of repair and ensure a temporary source of water is provided until the damaged well is restored to its original capacity/quality.

Wells within 150 feet of the construction area would be staked and flagged for visibility. For wells that may be inside or adjacent to a work area, Eastern Shore would narrow the right-of-way/work area, where possible, to avoid the well; or, for wells within the workspace itself, Eastern Shore would surround each well site with a safety fence and use appropriate best management practices regarding protection of the well. If damage to a potable water well appears to be unavoidable, Eastern Shore would relocate the construction right-of-way to avoid the well. With implementation of these measures, we conclude that impacts on water wells would be avoided to the extent practicable and would not be significant.

Groundwater Contamination

Eastern Shore conducted regulatory database searches in January 2019 to identify sites with existing or potential soil or groundwater contamination within 0.25 mile of Project work areas that could be impacted by the Project or that could impact Project construction. Numerous regulatory sites were identified within 0.25 mile of Project areas; however, except as detailed below, none of these sites are expected to present a concern for planned construction activities based on their distance from the Project area, media impacted (i.e., soil only or no associated contamination), regulatory status (i.e., closed with no identified engineering or institutional controls), and/or topographical position from the Project area (i.e., down-gradient or cross-gradient). Based on its regulatory database review, Eastern Shore categorized sites as "low," "medium," or "high" risk based on the potential for Project activities to encounter existing contamination originating from these sites. Sites that were identified as having medium to high risk are detailed in table 7, below.

Table 7
Contamination Sites Impacting Project Construction

Site Name and Address	Description	MP	Approximate Distance from Work Area	Risk
Woodside Loop				
Pennsy Supply, Inc. 140 Southern Boulevard Wyoming, DE 19934	Active RCRA Small Quantity Generator of Lead Waste. Former storage bins and stockpiles in area of proposed pipeline.	0.2 – 0.5	Within Construction Work Area	Medium
Millsboro Pressure Control Station Upgrade				
Millsboro BP – Store #2461 28194 East DuPont Boulevard Millsboro, DE 19966	State and federal agency records report multiple AST, UST, and LUST cases; soil and groundwater contamination ranging from below action levels to levels of concern; on-going inspections reported on-site. Likely groundwater flow direction is towards the Construction Work Area.	0.25	Within 500 feet	Medium
Sommerset Extension				
John Sobers Property 402 E Church Street Salisbury, MD	One "open" petroleum release incident from an aboveground residential heating oil tank.	0.20	Within 500 feet	Medium
Chesapeake Utilities 520 Commerce Street Fruitland, MD	Maryland land reuse program site; records do not specify the nature of contamination or case status. Associated with a LUST incident for motor/lube oil identified during tank closure and closed in 2001.	0.25	Within Construction Work Area	Medium
Peninsula Regional Medical Center 100 E. Carroll Street Salisbury, MD	Registered hazardous waste generator and processing facility with numerous reported violations. Several petroleum release incidents (all closed). Registered with engineering controls in place (poured concrete wall).	0.60	Within 500 feet	Medium
Pacific Pride 436 Eastern Shore Dr Salisbury, MD	Several closed petroleum release incidents and one "open" incident for motor/lube oil tank test failure.	0.70	Within 500 feet	Medium
Satimano Inc. 1053 S Salisbury Blvd Salisbury, MD	Several closed petroleum release incidents and one "open" incident for an "unknown source/surface spill".	1.56	Within 500 feet	Medium
Dresser Industries 124 W College Ave Fruitland, MD	RCRA CORRACTS site, closed in September 2004 based on verification that migration of contaminated groundwater was under control. No Further Remedial Action status for state hazardous waste site listing. Several LUST incidents resulting in soil and groundwater contamination (all closed). Engineering controls in place (poured concrete wall)	1.60	Within Construction Work Area	High
Chevron Chem Co. 125 Bateman Street Fruitland, MD	0.53 acre state voluntary cleanup program and land restoration program site. Soil contamination with pesticides is recorded. Regulatory cases closed in 2003 with institutional controls in place (land use restrictions).	1.80	Within Construction Work Area	Medium
Global Beverages, Inc. 1324 S Salisbury Blvd Salisbury, MD	Several closed petroleum release incidents and one "open" incident for motor/lube oil tank test failure.	2.15	Within 500 feet	Medium

RCRA = Resource Conservation and Recovery Act; RCRA CORRACTS = waste handler with corrective action activity; AST = aboveground storage tank; UST = underground storage tank; LUST = leaking underground storage tank

Eastern Shore would provide an Environmental Scientist to screen excavated material during construction in areas with "medium" or "high" risk. If impacted material is identified during Eastern Shore's construction efforts, the material would be handled according to Eastern Shore's UDCMP or by an applicable site-specific material management plan as mandated by state and/or federal regulatory agencies. This would include coordination with regulatory agencies, impact migration prevention measures, and mitigation oversight, as required.

Woodside Loop

Three sites with "closed" petroleum product release listings (leaking aboveground storage tank [LAST] or leaking underground storage tank [LUST]) were identified within the construction workspace, and an additional "closed" LUST site was identified within 500 feet of the Project workspace. Based on the "closed" status of these facilities, Eastern Shore determined these sites to be "low" risk. We agree.

One additional site, Pennsy Supply, Inc. (a registered small quantity generator of hazardous waste), was categorized by Eastern Shore as a "medium" risk site based on a review of available historic aerial photographs, which depict material storage areas and apparent soil stockpiles associated with Pennsy Supply, Inc. in the area of the proposed pipeline. Accordingly, Eastern Shore would notify DNREC in advance of construction activities and conduct environmental screening during subsurface construction activities in the area of the Pennsy Supply Inc. site based on the procedures in Eastern Shore's UDCMP.

East Sussex Extension

No regulatory sites were identified within the construction workspace. Three "closed" LUST sites were identified within 500 feet of Project workspaces; however, based on the "closed" status of these facilities, Eastern Shore determined these sites to be "low" risk. We agree.

Millsboro Pressure Control Station Upgrade

No regulatory sites were identified within the construction workspace. One site (Millsboro BP –Store #2461) was listed in regulatory databases within 500 feet of the Project workspace. Multiple LUST cases (both active and closed) are associated with the site. The Millsboro BP site is topographically up-gradient from the proposed construction area and was assigned a "medium" risk level by Eastern Shore. Accordingly, Eastern Shore would notify DNREC in advance of construction activities and conduct environmental screening during subsurface construction activities in the area of the Millsboro BP based on the procedures in Eastern Shore's UDCMP.

Somerset Extension

Eastern Shore identified 49 regulatory sites within the study corridor, including three state regulated cleanup sites (e.g. state hazardous waste sites and voluntary cleanup program sites), 31 LUST sites, and 2 dry cleaner sites. Within 0.25 mile of the study corridor, 5 additional state regulated sites, 89 LUST sites, and 4 dry cleaner sites were identified.

Based on the review of available regulatory databases, eight of these sites were categorized as medium or high risk, as detailed in table 7. Accordingly, Eastern Shore would notify MDE in advance of construction activities and conduct environmental screening during subsurface construction activities in the area of these sites based on the procedures in Eastern Shore's UDCMP.

However, given the high density of historic release incidents in the proposed work area and the general commercial/industrial nature in the Somerset Extension vicinity, it is likely that unknown contamination is present within the Project workspace and vicinity for this segment. Given this, Eastern Shore's intent to use trenchless crossing methods (HDD or bore) to construct 2.8 miles (41 percent) of the Somerset Extension, and because Eastern Shore has not completed site-specific investigations for proposed trenchless crossings or provided design profiles for these crossings, **we recommend that:**

- **<u>Prior to construction of the Somerset Extension</u>, Eastern Shore should file with the Secretary, for review and written approval by the Director of the OEP, the measures it would use to protect subsurface resources from the spread of existing contamination during trenchless construction.**

<u>Groundwater Impacts and Mitigation</u>

Surface drainage and groundwater recharge patterns can be temporarily altered by clearing, grading, trenching, and soil stockpiling activities, potentially causing minor fluctuations in groundwater levels and/or increased turbidity, particularly in shallow surficial aquifers. We expect the resulting changes in water levels and/or turbidity in these aquifers to be localized and temporary because water levels quickly re-establish equilibrium and turbidity levels rapidly subside.

An accidental spill of fuel or hazardous material during refueling or maintenance of construction equipment could affect groundwater if not cleaned up appropriately. Soils impacted from spills could continue to leach contaminants to groundwater long after the spill has occurred. To minimize the risk of potential fuel or hazardous material

spills, Eastern Shore would implement measures within its SPCC Plan. Furthermore, Eastern Shore would prohibit refueling and storage of hazardous substances within 200 feet of private wells and 400 feet of municipal wells.

Upon completion of construction, Eastern Shore would restore the ground surface to original contours, to the extent practicable, and would revegetate disturbed areas, excluding areas within permanent aboveground facility fence lines and access roads, with the goal of restoring pre-construction overland flow and recharge patterns. We conclude no significant or long-term impacts from construction of the facilities would occur on groundwater resources with implementation of Eastern Shore's proposed mitigation measures, the FERC Plan and Procedures, and our recommendation above. The addition of impervious surfaces at aboveground facilities may affect overland flow patterns and subsurface hydrology. However, these effects would be highly localized and minor.

3.2. SURFACE WATER RESOURCES

Surface waterbodies that would be crossed by the Project were identified by field surveys conducted between July 2016 and June 2018. The Project would require 12 waterbody crossings, which include 8 crossings of intermediate waterbodies (greater than 10 feet, but less than 100 feet wide at the water's edge) and 4 crossings of minor waterbodies (less than or equal to 10 feet wide at the water's edge). No waterbodies would be directly impacted by aboveground facility construction. Table C-3 in appendix C lists the waterbodies Eastern Shore would cross, including county, approximate MP, waterbody name, flow regime, crossing length, and proposed crossing method.

No National Wild and Scenic Rivers have been identified within the Project's USGS hydrologic unit code (HUC) 8 sub-basin (USGS 2017; MDNR 2018). No Maryland or Delaware state protected waterbodies have been identified within the Project USGS HUC 8 sub-basin.

Flood Plains

Review of Federal Emergency Management Agency (FEMA) flood maps indicates pipeline construction would cross multiple 100-year floodplains as identified in table 8. The remaining Project facilities including proposed aboveground facilities are not proposed in flood hazard areas.

Table 8 FEMA 100-year Floodplains Crossed by the Project							
County, State	**MP Begin**	**MP End**	**Construction Area (acres)**	**Operation Area (acres)**	**Waterbody Name**	**Flood Zone**	**Construction Method**
Woodside Loop							
Kent, Delaware	1.87	2.09	1.4	1.4	Red House Branch	Zone AE	Conventional HDD (1.87-2.06)/Conventional open trench (2.06-2.09)
Kent, Delaware	2.39	2.63	1.6	1.4	Tidbury Creek	Zone AE	Conventional open trench (2.39-2.48, 2.56-2.63)/Conventional HDD (2.48-2.56)
Kent, Delaware	2.72	2.77	0.3	0.0	Tidbury Creek	Zone AE	Conventional open trench
Sussex Extension							
Sussex, Delaware	0.00	0.04 [2]	0.3	0.1	Peterkins Branch	Zone AE	Bore (0.00-0.02)/Conventional open trench (0.02-0.04)
Sussex, Delaware	0.02	0.19 [2]	1.0	0.0	Peterkins Branch	Zone AE	Conventional open trench (0.02-0.09, 0.09-0.19)/Bore (0.09-0.09)
Sussex, Delaware	0.29	0.37	0.5	0.0	Peterkins Branch	Zone AE	Bore (0.29-0.34)/Open Trench (0.34-0.37)
Sussex, Delaware	2.31	2.37	0.6	0.0	Sockorockets Ditch	Zone AE	Conventional HDD (2.31-2.37)
Somerset Extension							
Wicomico, Maryland	0.14	0.16	<0.1	<0.1	South Prong Wicomico River	Zone AE	Conventional HDD
Wicomico, Maryland	2.51	2.56	0.2	0.0	Tonytank Pond	Zone AE	Conventional HDD
Millsboro Pressure Control Station Extension							
--	--	--	--	--	--	--	--
Total Project			**5.8**	**2.8**			

[1] Totals are subject to rounding error.
[2] Overlap in mileposts is due to a road crossing which results in a floodplain being on both sides of the pipeline.
[3] Zone A are areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no base flood elevations or flood depths are shown on the mapping. Zone AE are areas that have a 1 percent probability of flooding every year, and where predicted flood water elevations above-mean sea level have been established. Zone AE floodway are areas that have a 1 percent probability of flooding every year, and where predicted flood water elevations above-mean sea level have been established and are within the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Eastern Shore proposes to cross 100-year floodplains via the HDD, bore, and open trench methods. The construction methods proposed for the pipeline crossings would not result in any permanent fill within floodplains or alterations to flood capacity as temporary construction impacts would be restored to pre-construction contours. Eastern Shore would consult with the United States Army Corps of Engineers (USACE) for the

portions of the proposed pipeline and associated construction rights-of-way, access roads, and ATWS within the FEMA 100-year floodplains.

Because none of the work proposed by Eastern Shore would impact the flood displacement, the extent of the 100-year floodplain, and the fact that Eastern Shore would construct the pipelines in compliance with applicable floodplain and building regulations, we conclude that impacts would not be significant and would be minimized to the extent practicable.

Impaired Waterbody Crossings

Eastern Shore searched the EPA database of impaired waters to identify waterbodies with contaminated sediments that do not meet water quality standards (EPA 2018). All waterbodies that would be crossed by the Woodside Loop, East Sussex Extension, and Somerset Extension are listed as Section 303(d) impaired waterbodies (EPA 2018, DNREC 2012). The Millsboro Extension would not cross any waterbodies. These waterbodies are listed as impaired due to excessive nutrients, low levels of dissolved oxygen, bacteria, biology degradation, and copper pollution. Nonpoint and point sources are listed as contributing to these impairments. Impacts on these waterbodies are discussed further under surface waterbodies impacts and mitigation measures.

Sensitive Waterbody Crossings

The South Prong Wicomico River that would be crossed by the Somerset Extension via HDD, is listed as a Tier II waterbody, which represents high quality waters. Table C-3 in appendix C identifies all waterbodies that would be crossed by the Project, including information relevant to sensitive surface water resources. Impacts on these waterbodies are discussed further below.

Surface Waterbodies Impacts and Mitigation Measures

Eastern Shore proposes to avoid impacts on all waterbodies by using trenchless construction techniques (see section A.7.2). HDD and guided bore crossing methods would generally avoid and significantly minimize the potential for surface water impacts resulting from erosion, sedimentation, and/or excess turbidity by avoiding ground surface disturbance in and immediately adjacent to the waterbody. The execution of these trenchless methods requires the circulation of drilling fluid, and the potential exists for an IR if the drill path encounters fractures or fissures that offer a pathway to the ground surface or the waterbody being crossed. Drilling fluid released into a waterbody can result in temporary sedimentation of stream bottom habitats, increased turbidity levels, and cover stream bottom habitats and benthic organisms. Eastern Shore would minimize the potential for accidental releases of drilling fluid and potential impacts on waterbodies

by following its HDD Inadvertent Return and Contingency Plan. This plan includes procedures for monitoring, detecting, isolating, stopping, and clean-up of IRs, as well as making necessary agency notifications. We have reviewed this plan and find that impacts on waterbodies due to an IR would be minimized to the extent practicable.

A release of fuel or hazardous material into a waterbody can impact water quality. Eastern Shore has developed an SPCC Plan to prevent, contain, and clean-up spills and address necessary precautions during material storage. As part of the SPCC Plan, fuel storage and refueling of equipment would not be allowed within 100 feet of waterbody boundaries, unless otherwise reviewed and approved by the EI. All equipment would be checked for leaks by a company inspector prior to beginning work in waterbodies. Eastern Shore would minimize impacts on waterbodies through the implementation of the FERC Procedures. Based on these measures, we find the potential for a release of fuel or hazardous material into a waterbody would be minimized to the extent practicable.

Although not anticipated, trenchless crossing methods may fail at the time of construction. As stated in section A.7.2 above, Eastern Shore would be required to file a variance request in the case that an alternative crossing method would be needed at any of the sites proposed for HDD.

Removal of streambank vegetation during construction can temporarily expose streambanks to erosion, cause sedimentation, increase turbidity, reduce riparian habitat, and result in increased water temperatures if there is a loss of significant shade vegetation. Some limited clearing of vegetation (hand cutting) may be required for placement of guidance cables for the HDD.

The temporary and permanent erosion and sediment control measures would be installed as specified in the FERC's Procedures. Following construction, Eastern Shore would restore temporary workspaces to pre-construction contours, stabilize the areas with erosion control blankets, and would revegetate the area with the appropriate seed mix.

Based on Eastern Shore's proposed crossing methods and implementation of its HDD Inadvertent Return and Contingency Plan, SPCC Plan, and the FERC Procedures, we conclude that impacts on surface water resources would be minor and negligible. In addition, Eastern Shore would construct its facilities in accordance with the regulations and requirements of applicable permits such as USACE authorizations under Section 404 of the Clean Water Act and NPDES stormwater discharge permit.

Hydrostatic Testing

In accordance with DOT regulations, Eastern Shore would perform hydrostatic testing of the each pipeline segment and the new above- and below-ground facility piping

prior to placing the Project facilities into service. Hydrostatic testing is a method by which water is introduced to segments of pipe and then pressurized to verify the integrity of the pipeline. A total of 239,375 gallons of water is anticipated to be used for hydrostatic testing of the Woodside Loop, 103,963 gallons of water for the Sussex Extension, 137,221 gallons of water for the Somerset Extension, and 7,747 gallons of water would be used for the pipeline extension into the Millsboro Pressure Control Station (totaling 488,306 gallons of hydrostatic test water). Hydrostatic test water would be sourced from municipal sources; however, should surface water sources be used, Eastern Shore would follow appropriate state permits. No chemicals would be added to the hydrostatic test water.

Following hydrostatic testing, test water would first pass through an energy-dissipation device as necessary, before being discharged into a well vegetated, upland area in accordance with the FERC's Procedures.

Water also may be withdrawn for the control and mitigation of fugitive dust from the Project. Eastern Shore estimates up to about 280,000 gallons of water may be used over the course of construction for the Woodside Loop; 320,000 gallons of water for the East Sussex Extension; 60,000 gallons of water for the Millsboro Extension; and 320,000 gallons of water for the Somerset Extension (totaling 980,000 gallons of dust suppression water). Water for hydrostatic testing and fugitive dust control would be sourced from local municipal sources such as the City of Dover (Woodside Loop); Town of Georgetown (East Sussex Extension); Town of Millsboro (Millsboro Extension); and City of Salisbury (Somerset Extension).

Based on Eastern Shore's implementation of the FERC's Procedures, we conclude that hydrostatic test water and fugitive dust control impacts on surface water resources would be minor and temporary.

3.3. WETLAND RESOURCES

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation adapted for life in saturated soil conditions. Wetlands can be a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality.

Eastern Shore conducted field surveys to delineate wetlands in the Project footprint in July 2016, August 2017, and June 2018. Eastern Shore identified eight wetlands within the construction corridor. Delineations were performed in accordance with the 1987 Wetland Delineation Manual and the USACE Regional Supplement to the Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0

(Environmental Laboratory 2010). Construction of the Project would impact 1.1 acre of palustrine forested (PFO) and 0.3 acre of palustrine emergent (PEM) wetlands. Table 9 provides a list of wetlands within the Project area.

Table 9 Wetlands within the Project Area							
Wetland Designation[1]	**MP Begin**	**MP End**	**Wetland Type Classification[2]**	**Crossing Method**	**Crossing Length (ft)[3]**	**Wetlands within Construction Area (acres)[4]**	**Wetlands within Operation Area (acres)**
Woodside Loop							
1	1.94	2.03	PFO	HDD	439	0.4	0.4
2	2.5	2.54	PFO	HDD	161	0.2	0.2
Total PFO[5]						**0.6**	**0.6**
Total PEM						**--**	**--**
East Sussex Extension							
1	2.35	2.35	PFO	HDD	14	0.1	--
4[6]	3.17	3.17	PEM	N/A[7]	--	<0.1	--
Total PFO						**0.1**	**--**
Total PEM						**<0.1**	**--**
Somerset Extension Pipeline							
1	3.89	3.93	PFO	N/A[7]	--	0.4	--
1	3.89	3.93	PEM	HDD	213	0.2	--
4	6.82	6.82	PEM	N/A[7]	--	<0.1	--
5	6.82	6.82	PEM	N/A[7]	--	<0.1	--
Total PFO						**0.4**	**--**
Total PEM						**0.3**	**--**
Millsboro Pressure Control Station Extension							
Total PFO						**--**	**--**
Total PEM						**--**	**--**
Total Wetlands						**1.4**	**0.6**

[1] Field designations represent unique identifiers assigned to each wetland during field surveys.
[2] Wetland classifications are based on the USFWS Cowardin classification system whereby: P = Palustrine, EM = Emergent, FO = Forested
[3] Wetland crossing length was calculated using actual linear footage crossed by the pipeline centerline. Crossing lengths of zero indicate that the pipeline centerline does not cross this wetland.
[4] Land within the Construction Workspace includes disturbance to the ATWS, TWS, and the PE, existing and new. Wetlands listed as crossed by HDD construction method would not be impacted by construction or maintained during operation.
[5] Operational impacts represent acreage within the new permanent easement; however, these wetlands would not be impacted by construction or maintained during operation as they were avoided by HDD construction methods.
[6] Wetland not crossed but within, or partially within, a parcel where Eastern Shore was denied access. Measurements calculated based on aerial photographs and NWI mapping.
[7] The East Sussex Wetland 4 and Somerset Extension Wetlands 1, 4, and 5, are not crossed by the Project; however, they are partially within construction workspaces for the proposed pipelines.
[8] Totals subject to rounding error.

Wetland Impacts and Mitigation Measures

We received one comment from an abutting land owner regarding concerns on wetland impacts. While there is a total of 1.4 acres of PFO and PEM wetlands within the construction area, Eastern Shore would avoid disturbance to 0.9 acre of these wetlands by HDD and construction activities would only temporarily impact 0.5 acre of these wetlands. Approximately, 0.6 acre of wetlands would be within the new permanent easement; however, Eastern Shore would limit impact on these wetlands during operational vegetation maintenance of its rights-of-way. East Shore's proposed HDD method would require it to conduct minor brush/tree clearing, less than 3 feet wide between the drill entry and exit site, using hand tools only, to facilitate the use of the HDD tracking system. Thus, no permanent impacts on wetlands are anticipated.

Construction could result in temporary impacts on wetlands from the loss of herbaceous and scrub/shrub vegetation, potentially altering wildlife habitat; increased sedimentation and turbidity; and hydrologic profile changes. Additionally, compaction of wetland soils and rutting within wetlands caused by equipment operation can affect wetland hydrology and revegetation, and would be minimized by limiting equipment operation in wetlands and installing temporary equipment mats, as necessary. The use of timber mats or other temporary surface material to provide a stable work area within wetlands could reduce compaction of wetland soils. Construction activities could also impact water quality within the affected wetlands as a result of inadvertent spills of fuel or chemicals.

Eastern Shore proposes to clear 0.12 acre of forested wetlands (Woodside Loop Wetlands 1 and 2) and annually maintain in an emergent state a 10-foot-wide corridor between the trenchless crossing entry and exit site along the centerline. Eastern Shore states the purpose for this clearing would be to allow for routine pipeline patrolling, cathodic protection inspections such as close interval surveys and direct current voltage gradient surveys, pipeline integrity assessments, leakage surveys, and to provide access in the event of abnormal or emergency operating conditions. However, we conclude that these post-construction surveys could be conducted without clearing of forested wetlands along the alignment, as stipulated in the FERC Procedures. Therefore, to avoid unnecessary impacts and to limit disturbance to the minimum area needed to construct the trenchless crossings, **we recommend that:**

- **<u>Prior to construction of the Woodside Loop</u>, Eastern Shore should file with the Secretary, for review and written approval by the Director of OEP, revised site-specific HDD construction and maintenance plans associated with Wetlands 1 and 2 that:**
  - **a. limits vegetation clearing to only using hand tools to facilitate the use of the HDD tracking system between the HDD entry and exit sites during construction; and**
  - **b. ensures that Eastern Shore will not conduct any routine vegetation maintenance along these HDD segments during operation.**

Wetland crossings completed using the HDD method would avoid and minimize the potential for wetland impacts resulting from erosion, sedimentation, or excess turbidity by avoiding ground surface disturbance in and immediately adjacent to the wetlands. Because our recommendation above would prohibit Eastern Shore from maintaining vegetation between the HDD entry and exit sites, we conclude that no conversion or permanent impacts on PFO wetlands that would be crossed by the HDD method are anticipated.

As described above, the potential for accidental releases of drilling mud exists, and potential impacts on wetlands could occur, but would be minimized by implementation of Eastern Shore's HDD Inadvertent Return and Contingency Plan, which includes procedures for monitoring, detection, isolating, stopping, and clean-up of inadvertent releases, as well as making necessary agency notifications.

In addition, Eastern Shore's SPCC Plan provides restrictions and mitigation measures to limit potential impacts associated with the release of fuels, lubricants, or other potentially toxic materials used during routine construction. Eastern Shore would prohibit refueling and storage of hazardous materials within 100 feet of wetlands during construction, unless otherwise reviewed and approved by the EI. Based on these measures, we find the potential for a release of fuel or hazardous material into a wetland would be minimized to the extent practicable.

To minimize the potential for sedimentation of wetlands from Project construction activities, Eastern Shore would install erosion and sediment control measures prior to or immediately following initial ground disturbance along wetland boundaries and would maintain them in working condition until the adjacent upland areas are successfully revegetated as specified in the FERC's Procedures. Additionally, Eastern Shore would follow the Project ESC Plan and the remaining measures within the FERC's Procedures to avoid or minimize impacts on wetlands.

PEM wetlands, which are dominated by low-growing sedges, rushes, and other herbaceous vegetation, would revert to pre-existing conditions within one to two growing seasons following construction, resulting in no permanent impacts on these wetland types. PFO wetlands, include areas dominated by woody vegetation greater than 20 feet tall with average trunk diameters at breast height greater than three inches. Impacts on PFO wetlands, which are limited to the Somerset Extension, would be considered a temporary long-term impact as it would take more than 20 years for forested vegetation to return to pre-construction conditions. PFO wetlands would be allowed to re-vegetate across construction workspaces and no permanent impacts on these wetland types are anticipated. In accordance with the FERC's Procedures, wetlands would be monitored annually until revegetation is successful. Based on Eastern Shore's proposed mitigation measures, we conclude that impacts on wetlands would not be significant.

Eastern Shore is seeking authorization pursuant to section 404 of the Clean Water Act from the USACE for surface water and wetlands temporarily affected by the Project. In addition to consulting with MDE and DNREC for authorizations under section 401 of the Clean Water Act. Eastern Shore would adhere to conditions of these authorizations, which would include any mitigation measures (including compensatory mitigation) necessary for impacts on wetlands.

The USFWS indicated that it is concerned with additional wetland protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Chesapeake Bay's remaining wetlands, and the long term goal of increasing the quality and quantity of the Chesapeake Bay's wetland resource base. The USFWS recommended avoiding wetland impacts. With our recommendation, no permanent impacts on wetlands would occur. Eastern Shore has avoided wetland impacts to the extent practicable, and Eastern Shore is conducting consultation with the USACE regarding wetland impacts and has submitted its 404 application.

4.0 FISHERIES, VEGETATION, AND WILDLIFE

4.1. FISHERIES

As previously discussed in section B.3.2, a total of 12 waterbody crossings are proposed. Of these 12 waterbodies, 11 are perennial freshwater and are classified as warmwater fisheries. Species such as sunfish, bullhead catfish, channel catfish, chain pickerel, white perch, smallmouth bass, yellow perch, American eel, bluegill, white crappie, and largemouth bass are likely to be found within the 11 waterbodies (DNREC 2018, MDNR 2018, USGS 2018c). None of the waterbodies that would be crossed in either Delaware or Maryland contain federally listed threatened, endangered, or special concern fisheries or designated critical habitat; and no essential fish habitat occurs within

or near the Project area. No special status fish species were identified as being present within any of these waterbodies.

No cold water fish or ERES fisheries would be crossed by the Woodside Loop, although one ERES waterbody, Derby Pond, is about 1 mile from the Project area (DNREC 2018). In a letter dated August 31, 2016, the DNREC's Division of Fish and Wildlife expressed concerns to Eastern Shore during its preliminary Project correspondence regarding flow into Derby Pond. Eastern Shore proposes to cross two tributaries (Red House Branch and Tidbury Creek) using HDD construction methods and would not directly impact the flow of Derby Pond (see table C-3 in appendix C). On September 14, 2016, DNREC requested it be added to Eastern Shore's contact information on the HDD Inadvertent Return and Contingency Plan and replied that it had no further concerns with the Project. Eastern Shore provided the requested plan.

The Rehoboth Bay sub-basin near the Sussex Extension is designated as an ERES; however, construction of the Project would not impact this basin. No cold water fisheries or ERES fisheries would be crossed by the Sussex Extension or the Millsboro Pressure Control Station Upgrade (DNREC 2018). One Tier II waterbody, the South Prong of the Wicomico River, would be crossed by the Somerset Extension Project area (MDE 2018).

Eastern Shore would implement the HDD and guided bore methods for installing the pipelines across all potentially aquatic life-supporting waterbodies, thereby avoiding direct impacts on the waterbodies and associated fisheries and other aquatic resources other than minimal impacts due to placement of travel lanes and equipment bridges. Eastern Shore proposes to use municipal sources for HDD hydrostatic test construction; however, if surface waters were used, alteration or removal of instream and stream bank cover, stream bank erosion, introduction of water pollutants, water depletions, and entrainment of small fishes during water withdrawals resulting from Project activities could increase stress, injury, and mortality of stream biota, including fisheries. Additionally, potential impacts on stream habitats and aquatic life include off-site migration of sediment into a waterbody during precipitation events, increased turbidity, removal of riparian vegetation, and fugitive dust migration resulting from right-of-way construction activities. The resulting turbidity would affect water quality and impede fish movement, potentially increasing the rates of stress, injury, and/or mortality of individual fish. However, Eastern Shore would follow the FERC's Plan and Procedures to control erosion and sedimentation to minimize impacts on waterbodies. Although there are no direct impacts on surface waters proposed for the Project, there is the potential for an IR from HDD construction methods, as discussed in sections 3.2 and 3.3.

Given Eastern Shore's construction measures to avoid direct impacts on surface waterbodies by utilizing trenchless techniques and its implementation of its SPCC, HDD

Inadvertent Return and Contingency Plan, and FERC's Plan and Procedures, we conclude that impacts on fisheries would be negligible.

4.2. VEGETATION

The proposed Project crosses a variety of habitat vegetation types commonly found in Maryland and Delaware. Approximately 90 percent of the Project would be co-located with existing road, railroad, and pipeline rights-of-way.

In addition to utility and road rights-of-way, pipeline construction would affect mostly agricultural (pasture and cultivated cropland), upland forest, and herbaceous vegetation. No sensitive and/or unique vegetative habitat types are within the Project area. Construction of the Project would impact 85.7 acres of existing utility and road rights-of-way, 83.3 agricultural land, 12.7 acres of herbaceous vegetation, 9.3 acres of forested and woodland, and 0.5 acres of wetlands. Project operational rights-of-way would consist of about 18.7 acres of agricultural pasture, 4.0 acres of existing utility and road rights-of-way, 1.2 acres forested and woodland, and 0.5 acre herbaceous vegetation cover. However, only 0.2 acres of agricultural pasture would be permanently converted for a proposed aboveground facility. Section B.5.0 and table C-5 in appendix C lists the amount of each cover type that would be impacted by construction and operation of the Project in greater detail.

The primary impact of the Project on vegetation would be the cutting, clearing, and/or removal of existing vegetation within the construction work area. Forest/woodland impact areas within construction workspace or ATWS along the pipeline route would be seeded and allowed to revegetate. During operation of the Project, about 1.2 acres of forest/woodland area would be maintained in an herbaceous state within Eastern Shore's permanent right-of-way. Secondary effects associated with disturbances to vegetation could include the increased potential for soil erosion and increased potential for the introduction and establishment of invasive weedy species. Potential increases in fugitive dust, visual resource impacts, and potential wildlife and agricultural productivity impacts are discussed in the appropriate resource sections below.

Eastern Shore would prevent and control infestations of noxious weeds and exotic plant species. Where practical, soil would be stockpiled adjacent to the area from which it was stripped to prevent the spread of plant material. Contractor vehicles and construction equipment would be cleaned prior to entering construction areas, and equipment cleaning stations would be available to prevent the spreading of plants from infested areas. After construction, Eastern Shore would monitor the non-cultivated portions of the Project area for noxious weeds and would use spraying or mechanical

removal, as appropriate and as allowed or directed by the landowner, to control noxious weeds.

Given the limited permanent impacts associated with aboveground facilities and limited long-term impact from removal of forested vegetation, along with implementation of restoration methods outlined in the FERC Plan and Procedures and Eastern Shore's ESC Plan, we conclude that the Project would not have significant impacts on vegetation.

4.3. WILDLIFE

Wildlife commonly found in the Project area include white-tailed deer, raccoon, striped skunk, eastern cottontail rabbit, eastern gray squirrel, common garter snake, wild turkey, mourning dove, northern cardinal, wood thrush, and Carolina wren.

Potential impacts on wildlife include habitat removal, construction-related ground disturbance, and noise. Some individuals could be inadvertently injured or killed by construction equipment. However, more mobile species such as birds and larger mammals would likely relocate to other nearby suitable habitat and avoid the Project area once construction activities commence. Noise levels along the proposed pipelines would return to pre-construction levels immediately following completion of construction activities. Noise associated with new aboveground facilities would be permanent; however, the aboveground facilities associated with the Project would be within or adjacent to existing industrial facilities. Therefore, noise associated with construction and operation of the Project is not anticipated to significantly impact wildlife in the Project area.

The disturbance of local habitat is not expected to have population-level effects on wildlife because the amount of habitat crossed represents only a small portion of the habitat available to wildlife throughout the Project area, and much of the disturbed habitat would return to pre-construction conditions following construction. Long-term impacts from habitat alteration would be further minimized by the amount of colocation proposed by Eastern Shore and the implementation of the Plan and Procedures, which would ensure revegetation of all areas temporarily disturbed by construction. Individual wildlife species are expected to habituate to facility operations and reoccupy adjacent habitats following completion of construction activities.

Given the abundance of similar habitat adjacent to the Project area, Eastern Shore's proposed colocation for the majority of the route (thereby minimizing long-term habitat impacts) and Eastern Shore's commitment to revegetate all areas temporarily disturbed by construction, we conclude that the Project would not have a significant impact on wildlife or wildlife habitat in the Project area.

Migratory Birds

Migratory birds are species that nest in the U.S. and Canada during the summer and then migrate to and from the 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 ([MBTA] – 16 U.S. Code [U.S.C] 703-711), and Bald and Golden Eagles are additionally protected under the Bald and Golden Eagle Protection Act ([BGEPA] – 16 U.S Code 668-668d). The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Executive Order (EO) 13186 was enacted in 2001 to, among other things, ensure that environmental analyses of federal actions evaluate the impacts of actions on migratory birds. EO 13186 directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and avoid, minimize, or mitigate adverse impacts on migratory birds through enhanced collaboration with the USFWS, and emphasizes species of concern, priority habitats, and key risk factors, with particular focus given to population-level impacts.

On March 30, 2011, the USFWS and FERC entered into a Memorandum of Understanding between the Commission and the USFWS regarding implementation of EO 13186, that focuses on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This memorandum does not waive legal requirements under the MBTA, BGEPA, the ESA, or any other statutes, and does not authorize the take of migratory birds.

A variety of migratory bird species, including songbirds, raptors, and waterfowl utilize habitat in the Project area. The USFWS-established Birds of Conservation Concern (BCC) lists migratory nongame birds that, without additional conservation actions, were likely to become candidates for listing under the ESA (USFWS 2008). The Project is within the New England/Mid-Atlantic Coast Bird Conservation Region (U.S. North American Bird Conservation Initiative 2018). Table C-4 in appendix C, lists 44 bird species identified by the USFWS as Birds of Conservation Concern within this Bird Conservation Region (USFWS 2008). Consultation with the USFWS indicates that there are no federally-listed threatened or endangered migratory birds along the Project corridors and no species-specific conservation measures have been recommended.

Some indirect impacts caused by construction activity and noise could occur during the construction period. Some individuals may leave the Project area as construction activities commence and relocate to available habitat nearby. The general nesting season for migratory birds is April 15-August 1. Eastern Shore has committed to conduct tree clearing activities outside the primary migratory bird nesting season, minimizing impacts on migratory birds nesting and breeding season. Timber would be chipped to prevent nesting in downed vegetation. If nesting birds are identified by

personnel within the right-of-way, Eastern Shore would consult with the USFWS to identify appropriate mitigation measures. Permanent herbaceous vegetation removal (about 0.5 acre at above-ground facilities) and forested vegetation (about 1.2 acres) would decrease the amount of available cover, nesting, and foraging habitat in the Project area; however, this impact would not be significant. During operation, Eastern Shore would conduct vegetative maintenance outside of the migratory bird nesting season. No major alterations to migratory bird use and occurrence patterns, or to ecosystems or biodiversity, would occur from Project activities.

Eastern Shore conducted surveys July 2016, August 2017, and June 2018 and did not identify any eagles or nests in the Project area. In the event that the construction schedule is delayed or if nesting bald eagles are observed in the Project area, Eastern Shore has committed to implement the measures outlined in the USFWS' *National Bald Eagle Management Guidelines* (2007).

Given the majority of the Project workspaces would be within existing road, railroad, and utility rights-of-way, there is ample adjacent habitats suitable for any birds that may be disturbed, that clearing would be conducted outside of the migratory bird nesting season, and that no eagles or nests were observed in the Project area, we conclude that the Project would not significantly impact migratory birds or eagles.

4.4. SPECIAL STATUS SPECIES

Special status species are those species for which state or federal agencies provide an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the ESA, species considered as candidates for such listing by the USFWS, and those species that are state-listed as threatened, endangered, or state species of special concern.

Federally Listed Species

In accordance with Section 7 of the ESA, the FERC, in coordination with the USFWS, must ensure that any federal action authorized, funded, or carried out by the agency does not jeopardize the continued existence of a federally listed threatened or endangered species or result in an adverse modification of designated critical habitat of a federally listed species. As our non-federal representative, Eastern Shore initiated consultation with the USFWS to identify federally listed threatened and endangered species that may occur in the Project area.

According to the USFWS', Information for Planning and Consultation (IPaC) search conducted between April 6, 2016 and December 2, 2018[8], nine federally listed endangered species (northern long-eared bat, piping plover, red knot, bog turtle, northern beach tiger beetle, seabeach amaranth, sensitive joint-vetch, small whorled pogonia, and swamp pink) potentially occur in the Project area. The USFWS also indicated the eastern black rail, currently proposed for federal listing with a final decision expected February/March 2019; the saltmarsh sparrow considered for listing with a final decision expected late 2019; and critical habitat for the red knot which the USFWS proposes to designate in the future may also be in the Project area. Based on a January 31, 2019, habitat suitability analysis, except for the swamp pink, no suitable habitat for these federally listed and candidate species exist within the Project area.

Suitable habitat for the swamp pink, which is a threatened plant, was found within the East Sussex and Millsboro Pressure Control Station Upgrade Project area. The swamp pink inhabits a variety of PFO wetlands including swamp forested wetlands bordering meandering streams, headwater wetlands, and spring seepage areas. It requires an area that is perennially saturated, but not inundated by floodwater. The local water table should remain at or near the surface, fluctuating only slightly during spring and summer months (USFWS 2018b). Swamp pink could occur in the limited areas delineated as PFO wetlands crossed by the Project. Eastern Shore proposes to cross wetlands or streams by trenchless methods, thereby avoiding direct impacts on swamp pink. There is potential for an IR of drilling fluid to reach a wetland inhabited by swamp pink; however, Eastern Shore's implementation of its HDD Inadvertent Return and Contingency Plan would minimize any potential impacts on this species.

Given that there is no suitable habitat for the remaining eight federally listed and two candidate species identified within the Project area, we conclude that there would be *no effect* on these federally listed species or critical habitat. On April 6, 2016 and June 7, 2018 respectively, the USFWS certified that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the Project area.

Given that the Project would have minimal impacts on PFO and PEM wetlands as discussed in section 3.3, Eastern Shore's use of trenchless technology to avoid most direct impacts, and use of its HDD Inadvertent Return and Contingency Plan should an IR occur, we conclude that the Sussex Extension and Millsboro Pressure Controller Station upgrade of the Project is *not likely to adversely affect* the swamp pink. On

[8] Available on eLibrary under accession no. 20181128-5147. To access the public record for this proceeding, go to FERC's Internet website (http://www.ferc.gov), click on "Documents & Filings" and select the "eLibrary" feature. Click on "Advanced Search" from the eLibrary menu and enter the accession number for the document of interest.

September 7, 2017, the USFWS concurred that the Project may affect but is *not likely to adversely affect* the swamp pink; therefore, no further section 7 consultation with the USFWS is required.

State-Listed Species

Eastern Shore consulted with the MDNR on June 29, 2018, and the DNREC Division of Fish and Wildlife on August 31, 2016 and September 22, 2017, for state records for listed plant or animal species. The MDNR and DNREC indicated that no record of state rare plants, animals, or natural communities are within the Project area. On January 30, 2019 and February 18, 2019, respectively, Eastern Shore consulted with the state MDNR and DNREC regarding an additional staging area for the Somerset Extension and an additional 1.5 mile of natural gas pipeline proposed for the Woodside Loop. The MDNR and DNREC stated that comments from the previous response are still applicable, and are reflected in the updated letter. Thus, the Project is not anticipated to impact state-listed species.

5.0 LAND USE, RECREATION, AND VISUAL RESOURCES

The Project would affect 217.5 acres during construction, and Eastern Shore would permanently maintain 28.4 acres for the pipeline and aboveground facilities. Land use types in the Project area consist of agricultural, forest/woodland, industrial/commercial, open land, residential land, road/utility right-of-way, PEM wetland, and PFO wetlands. Land use impacts are quantified in table C-5 in appendix C.

Roads and Utility Rights-of-Way

About 85.7 acres of the Project would be co-located parallel to or within existing transportation and/or utility corridor rights-of-way, of which 4 acres would be permanently impacted by operation for new pipeline rights-of way.

Roads may be gravel or paved surfaces with maintained rights-of-way typically consisting of native grasses. Utility rights-of-way include the maintained easements for existing overhead electric lines and existing natural gas pipelines. The utility rights-of-way consist of mowed and maintained herbaceous vegetation along with areas of impervious or semi-impervious surfaces. Table C-6 in appendix C depicts the roads and utility rights-of-way to be used for the Project.

Road and Railroad Crossings

Road crossings would be completed using open-cut or trenchless techniques (either boring or HDD), depending upon site-specific conditions. Table C-7 in appendix C provides a list of roadways that Eastern Shore would cross and its proposed crossing

technique. High traffic volume paved public roads would be bored to avoid further impacts during construction. Some low volume roads would be crossed using the open-cut construction method, and would require temporary road closures and detours. Construction disturbance at each open-cut road crossing would typically be completed in 24 hours. Eastern Shore would coordinate with state and local Department of Transportation to establish detours to reduce impacts on local traffic. Where the Project would cross roads that provide access to private residences, and no alternative entrances exist, Eastern Shore would implement measures to maintain passage for landowners (such as steel plates over open trenches). Eastern Shore would attempt to avoid peak traffic time periods for construction activities that would temporarily close roads.

Eastern Shore would cross Norfolk Southern Corporation's railroad via a trenchless method at three locations (MP 0.59 and 4.85 on the Woodside Loop and MP 0.25 on the Somerset Extension). No other railroads would be crossed. Eastern Shore would obtain applicable permits from state and local authorities for work planned within road and railroad rights-of-way.

Agricultural Land

The Project would impact about 83.3 acres of agricultural land during construction, of which 18 acres would be within the maintained rights-of-way for operation. Agricultural land consists of pasture areas used for grazing livestock, producing hay or alfalfa, and cultivated areas that are under active row crop production such as corn, soybean, or sunflower.

Following construction, agricultural land use would be permitted within the permanent right-of-way in accordance with applicable easement agreements. Landowners would be compensated by Eastern Shore for crop losses and other damages caused by construction activities. With the exception of the 0.6 acre required for new aboveground facilities, agricultural lands would be reverted to prior uses.

We received one landowner comment regarding stormwater runoff impacts on agricultural land. Eastern Shore would use silt fencing, straw bales, and other suitable erosion and sediment control devices in accordance with its ESC Plan and FERC's Plan to minimize soil erosion and sedimentation in stormwater runoff from the disturbed areas. Following construction, Eastern Shore would restore the drain tiles, top- and subsoil, and contours and install temporary and permanent erosion control measures. Actively cultivated agricultural land would not be seeded unless requested by the landowner. These measures would minimize the likelihood of stormwater runoff from the disturbed areas impacting the surrounding agricultural areas.

Because Eastern Shore would restore the construction workspaces in accordance with the FERC's Plan and landowner agreements, we conclude that impacts on agricultural land use would mostly be temporary and not significant.

Upland Forest

The Project area is within the northern extent of the Outer Coastal Plain Mixed Forest Province which includes a mosaic of deciduous and coniferous forests in upland habitats. About 9.3 acres of upland forest would be impacted by construction, and 1.2 acres would be impacted from operation.

To minimize impacts on upland forest, Eastern Shore has co-located the pipeline facilities with existing rights-of-way and previously disturbed land to the greatest extent practicable. Land within the permanent right-of-way would be permanently converted from upland forest to maintained herbaceous right-of-way; however, trees would be allowed to regenerate outside of the permanent right-of-way. Forest areas would be reseeded in accordance with the FERC's Plan, NRCS, and other agency recommendations or requirements associated with applicable permits, and landowner agreements.

Based on the co-location of the pipelines with existing Eastern Shore utility rights-of-way and previously disturbed land, and Eastern Shore's proposed restoration measures, we conclude that impacts on forested land would be long-term, not significant, and adequately minimized.

Industrial/Commercial Land

Industrial land uses include facility sites, industrial parcels, borrow pits, and utility sites including existing rights-of-way. Commercial lands include areas that are either sparsely vegetated or lack vegetation due to the presence of impervious or non-natural surfaces such as buildings, pavement, gravel pads, excavated material, or bare, compacted lands. Approximately 16.1 acres temporarily affected by the Project is classified as industrial/commercial land, and 2.6 acres would be required for Project operation. Following construction, these areas would be restored and vegetation would quickly return to its pre-construction condition. Therefore, we conclude that most impacts on industrial/commercial land use would be temporary and not significant.

Open Land

The Project would disturb about 12.7 acres of open land during construction. Approximately 0.2 acre of open land would be converted to industrial land for aboveground facilities, and 0.3 acre would be converted to maintained pipeline right-of-way. Open land includes grasslands without apparent grazing, cultivation, or haying operations. The use of open land would be temporarily impacted during grading,

trenching, backfilling, and restoration. Eastern Shore would restore open lands in accordance with its ESC Plan, the FERC's Plan, and landowner agreements, which would minimize impacts on open land crossed by the Project.

Therefore, we conclude that the Project's impacts on open land would be short-term and not significant.

Residential Land

Residential land is developed land that includes both single and multiple family homes. The residential lands generally consist of mowed lawns and landscaped areas along with impervious to semi-impervious surfaces. The Project would disturb approximately 8.6 acres of residential lands during construction and require 1.2 acres for operation. There are 65 residential structures within 50 feet of the construction workspace, including 21 residences within 25 feet of the construction workspace. There are a total of three residences within 10 feet of the construction workspace: two on the East Sussex Extension, and one on the Somerset Extension. Table C-8 in appendix C lists residences and structures within 50 feet of the Project.

Temporary construction impacts on residential areas may include inconveniences caused by increased construction-related traffic on local roads; noise and dust generated by construction equipment; the presence of onsite construction personnel; trenching through roads or driveways; disturbance of lawns and removal of trees, landscaped shrubs, or other vegetation screening between residences and adjacent rights-of-way; and removal of encroaching aboveground structures, such as sheds, from within the existing right-of-way. These impacts would be greatest where construction equipment is operating near homes but would diminish quickly once construction activities move away.

Eastern Shore would coordinate with residents prior to any work and would notify homeowners and business owners within three business days of the start of construction by certified letter. Construction activities would be limited to daylight hours with the exception of pipe pull-back for HDD operations and hydrostatic testing. Roads proposed to be crossed by the bore or HDD method would be conducted during the daytime hours as well. Section B.8 provides further details on noise impacts due to construction activities.

Eastern Shore would ensure that emergency vehicles and typical local traffic would not be hindered or otherwise impacted by construction activities. If Project activities in residential areas disrupt ingress and egress to the affected areas, Eastern Shore would offer to temporarily relocate the landowner to a motel and provide a meal allowance or provide alternative access to their property. Eastern Shore would also attempt to leave mature trees and landscaping intact within the construction work areas

unless the trees and landscaping interfere with installation techniques or present unsafe working or operational conditions.

Eastern Shore would use specialized methods, such as stovepipe and/or drag section construction, to minimize the impacts and duration of construction in residential areas. Further, Eastern Shore would not excavate the pipeline trench until the pipeline is ready for installation in an area near a residence.

Eastern Shore would minimize the duration of an open trench to the contractor's working hours within 100 feet on either side of a nearby residence or commercial property, or as otherwise negotiated with the landowner, to minimize the hazard of open trenches when construction activities are not in progress. Eastern Shore would use temporary fencing for a distance of 100 feet on either side of residences to secure work areas, and steel plates would be used to cover any open trenches near residences if trenches are to be left open overnight. Additionally, Eastern Shore would implement measures to mitigate fugitive dust associated with construction activities near residences or businesses.

Eastern Shore has developed site-specific residential construction drawings and a Residential Construction Plan that would be implemented to minimize impacts on residences within 50 feet of the construction right-of-way. Eastern Shore's residential construction plans are included in appendix D. We encourage affected landowners to review the residential plan for their property and file with the Secretary any comments or concerns during the EA comment period.

The proposed pipeline routes are constrained between road rights-of-way, railroad rights-of way, and residences due to existing developments and adjacent active parallel pipelines. Therefore, in certain areas of the Project, residences within 10 feet of the construction work areas may be temporarily impacted by construction of the pipeline routes. Because of the increased potential for construction activities to disrupt residences within 10 feet of construction activities, and to ensure that a property owner has adequate input to a construction activity occurring so close to their residence, **we recommend that**:

- **Prior to construction, Eastern Shore should file with the Secretary evidence of landowner concurrence with the site-specific residential construction plan for any residence within 10 feet of the proposed construction workspaces.**

Following completion of major construction, Eastern Shore would restore all affected residential properties (including lawns and landscaping that do not conflict with Eastern Shore's operation policies) in accordance with its ESC Plan, the FERC's Plan,

and any agreements between Eastern Shore and the landowner. After cleanup, an Eastern Shore representative would contact landowners to ensure that conditions of all landowner agreements have been met. 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.

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.

Public or Conservation Land

The Project would not impact any Native American reservations, national trails, old growth forest, flood control land, designated Native American religious sites, national wild and scenic rivers, state scenic rivers, local or culturally significant areas, designated scenic roads, flood control levees, or flood storage areas. The Project would also not impact any federal land management areas.

The East Sussex Extension begins on the eastern edge of the county-owned Delaware Coastal Airport. However, there would be no direct impacts on the airport, or airport operations. Eastern Shore would implement mitigation measures in the FERC's Plan and Procedures and other federal, state, or local agency requirements. Eastern Shore's consultation with Sussex County regarding construction on the Delaware Coastal Airport property is ongoing.

Construction of the Somerset Extension would affect 0.03 acre of a public sanitary sewer pump station in Wicomico County, Maryland. During construction, Eastern Shore would stake out and install high visibility safety fence within the proposed workspace area to provide a minimum 10-foot clearance from the pump station. Based on Eastern Shore's mitigation measures, we conclude impacts on the sanitary facilities would be minimal and temporary.

Coastal Zone Management Areas

Construction and operation of the Woodside Loop, East Sussex Extension, and the Millsboro upgrades are subject to Delaware's Coastal Zone Consistency Review. Additionally, Project activities for the Somerset Extension are subject to the MDE Consistency Review. Eastern Shore has initiated consultation with the DNREC and the MDE for compliance with the Coastal Zone Management Act. FERC must confirm Eastern Shore's receipt of these determinations prior to authorizing construction. Because these determinations have not yet been received, **we recommend that:**

- **Eastern Shore should <u>not begin construction</u> of the respective Project facilities <u>until</u> it files with the Secretary a copy of the determination of consistency with the Coastal Zone Management Plan issued by DNREC and MDE.**

<u>Landfill and Hazardous Waste Sites</u>

A review of the EPA's Superfund Enterprise Management System (SEMS) determined that there are no sites listed within 10 miles of the Project (EPA, 2017). Land Recycling Cleanup Locations contain sites listed under the federal SEMS and these sites are previously contaminated commercial and industrial sites that are cleaned up and reused by the community. No Land Recycling Cleanup Locations are within 0.5 mile of the Project area.

<u>Visual Resources</u>

We received one comment from an abutting landowner, expressing concerns regarding aesthetic impacts. The majority of visual and aesthetic impacts associated with the Project would be limited to the period of active construction within an area, in which the landscape would be characterized by areas of construction equipment, cleared or flattened vegetation, trench and foundation excavation, grading, and spoil storage. These construction-related visual and aesthetic impacts would decrease with distance from areas of active construction.

The Woodside Loop would involve construction primarily along Eastern Shore's existing pipeline right-of-way. For the majority of the route, the loop would not increase the width of the permanent right-of-way within the existing corridor. Eastern Shore would restore these lands as required by its ESC Plan and the FERC's Plan.

The visual impact of new rights-of-way along the proposed pipeline extensions would decrease over time as vegetation becomes reestablished. Long-term and permanent visual changes would involve cleared pipeline rights-of-way in wooded areas, the installation of pipeline markers, and the permanent aboveground facilities. The Eden M&R and Millsboro Pressure Control Stations are in predominantly developed areas and are visually consistent with their existing surroundings. The Hollymount M&R Station would be highly visible to the existing residences (particularly the residence directly across Hollymount road) as the station is proposed in a predominately open and agricultural field and Eastern Shore has not proposed a visual screening plan to minimize viewshed impacts on nearby residences. Therefore, **we recommend that:**

- **Prior to construction, Eastern Shore should file with the Secretary, for review and written approval by the Director of the OEP, a visual screening plan for the Hollymount M&R Station that includes vegetative screening of the proposed M&R Station site.**

With Eastern Shore's proposed project siting and our recommendation, we conclude visual impacts from construction would be mostly temporary, and permanent impacts would not be significant.

6.0 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires the FERC to take into account the effect of its undertakings on properties listed, or eligible for listing, on the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation an opportunity to comment. Eastern Shore, as a non-federal party, is assisting the FERC in meeting our obligations under Section 106 and its implementing regulations at 36 CFR 800.

Woodside Loop

Eastern Shore conducted a cultural resources survey in the area of potential effect for the Woodside Loop, and provided a *Phase I Cultural Resource Survey* report to the FERC and the Delaware State Historic Preservation Office (SHPO). The survey included both archaeological and architectural resources. For archaeological resources, a 150- to 600-foot-wide corridor was surveyed for the loop, as well as staging areas and access roads, and covered 172.4 acres. The survey included visual inspection and excavation of 1,600 subsurface shovel test pits and six test units. For architectural resources, the study area included the Project area and a 300-foot buffer, as well as areas within the viewshed of the Project. As a result of the survey, five archaeological sites and nine artifact loci, which did not qualify as sites, were identified. The sites included an early 20th century refuse scatter (7K-E-105); an 18th-19th century domestic scatter (7K-C-467); artifacts associated with a former support building for the Delaware and Pennsylvania Railroad (7K-E-211); a late 19th-early 20th century domestic scatter (7K-E-212); and a small 20th century artifact scatter (7K-E-213). Sites 7K-E-105, 7K-E-211, 7K-E-212, and 7K-E-213, and the artifact loci, were recommended as not eligible for the NRHP. Site 7K-C-467 was recommended as potentially eligible for the NRHP. Eastern Shore indicated it would avoid this site. In a letter dated July 6, 2018, the Delaware SHPO agreed with the report's recommendations and indicated the Project would have no adverse effect on historic properties. We agree with the SHPO. The SHPO also requested an avoidance plan for site 7K-C-467. Eastern Shore has not yet provided an avoidance plan (see

recommendation below). Approximately 3.2 acres remain to be surveyed due to denied access.

The architectural survey resulted in the identification of 25 previously recorded architectural resources and 34 newly recorded architectural resources in the study area. These included 1 group of outbuildings; 32 dwellings; 13 dwelling complexes; 4 agricultural complexes; 2 schools; 1 orchard/agricultural buildings; 1 store/dwelling; 1 commercial building; 1 religious building (Cor Jesu Marie Foundation); 1 proposed historic district (Woodside African American Community); 1 warehouse; and 1 railroad. In its July 6, 2018 letter, the SHPO indicated that the subterranean nature of the Project would not diminish the setting or impact the structures, and no further evaluation was recommended. We agree with the SHPO.

East Sussex Extension

Eastern Shore conducted a cultural resources survey in the area of potential effect for the East Sussex Extension, and provided a *Phase I Cultural Resource Survey* report to the FERC and the Delaware SHPO. The survey included both archaeological and architectural resources. For archaeological resources, a 75-foot-wide corridor was surveyed on either side of the existing road which the pipeline would parallel/follow, as well as staging areas, and covered 139.6 acres. The survey included visual inspection and excavation of 1,143 subsurface shovel test pits. For architectural resources, the study area included the Project area and a 300-foot buffer, as well as areas within the viewshed of the Project. As a result of this survey, no archaeological sites were identified. In a letter dated November 21, 2017, the SHPO agreed that no archaeological sites were observed. We agree also. Approximately 100.8 acres remain to be surveyed due to denied access.

The architectural survey resulted in the identification of 29 previously recorded architectural resources and 35 newly recorded architectural resources in the study area. These included 18 dwellings; 26 dwelling complexes; 10 agricultural complexes; 1 farm; 1 store complex; 1 store/dwelling; 1 bridge; 1 school/church; 1 cemetery; 2 church/cemeteries (Indian Mission Church and Cemetery, and St. John's United Methodist Church and Cemetery); 1 airport; and 1 auto shop. In its November 21, 2017 letter, the SHPO indicated that none of the resources would be adversely affected and none required evaluation. We agree with the SHPO. The SHPO also indicated that the Indian Mission Church and Cemetery and the St. John's United Methodist Church and Cemetery were both listed on the NRHP, and recommended keeping all construction activities off these properties. Eastern Shore indicated it would avoid these properties. The one cemetery would also be avoided.

Subsequently, Eastern Shore provided an addendum survey report for some previously denied access parcels. Approximately 67.3 acres were archaeologically surveyed, augmented by 958 shovel test pits. The previous architectural survey included the viewshed of these parcels, so no additional architectural survey was undertaken. As a result of the survey, one archaeological site (7S-F-168, a mid-19th-early 20th century domestic site) was identified and recommended as potentially eligible for the NRHP. In a letter dated January 31, 2018, the SHPO concurred and indicated the site should be evaluated. Eastern Shore indicated it would avoid the site. Approximately 37.6 acres still remain to be surveyed due to continued denied access.

Millsboro Pressure Control Station Upgrade

Eastern Shore completed a cultural resources survey in the area of potential effect for the Millsboro Pressure Control Station Upgrade, and provided a *Phase I Cultural Resource Survey* report to the FERC and the Delaware SHPO. The survey included both archaeological and architectural resources, and covered 5.5 acres for the pipeline and a staging area. The survey included visual inspection and excavation of 98 subsurface shovel test pits. For architectural resources, the study area included the Project area and a 300-foot buffer, as well as areas within the viewshed of the Project. As a result of the survey, no archaeological resources were identified. In a letter dated July 9, 2018, the SHPO indicated that there were no historic properties present to be affected by the Project. We agree with the SHPO.

The architectural survey resulted in the identification of three previously recorded architectural resources and six newly recorded architectural resources in the study area. Two of the previously recorded resources were recorded in 2017 and were not resurveyed as part of the current Project. The remaining seven resources included four dwellings; two commercial buildings; and one liquor store. In its July 9, 2018 letter, the SHPO indicated that none of the resources were eligible for the NRHP, and that there were no historic properties present to be affected by the Project. We agree with the SHPO.

Somerset Extension

Eastern Shore completed an archaeological survey in the area of potential effect for the Somerset Extension, and provided a *Phase I Archaeological Survey* report to the FERC and the Maryland SHPO. A 65- to 250-foot-wide corridor was surveyed for the extension, as well as staging areas, and covered 127.4 acres. The survey included visual inspection and excavation of 342 subsurface shovel test pits. On January 8, 2019, the SHPO indicated an architectural survey was not required. As a result of the survey, five archaeological sites were identified. These included 4 scatters of 20th-century refuse (18WC203, 18WC204, 18SO375, and 18SO376) and the remnants of a 20th-century outbuilding (18WC202). All were recommended as not eligible for the NRHP. On

January 22, 2019, the Maryland SHPO indicated the Project would have no adverse effect on historic properties. We agree with the SHPO.

Native American Consultation

Eastern Shore contacted the Absentee-Shawnee Tribe of Oklahoma, Delaware Nation, Delaware Tribe of Indians, Eastern Shawnee Tribe of Oklahoma, Lenape Tribe of Delaware, Nanticoke Indian Tribe, Nanticoke Lenni-Lenape Indian Nation, and Shawnee Tribe regarding the Project. The Delaware Nation responded and requested to be a consulting party and to be contacted in the event of any discoveries during construction. The Unanticipated Discoveries Plan (see below) provides for notification of the tribe in the event of a discovery. Eastern Shore also provided the Delaware Nation with the survey reports. No other responses have been received. We sent our NOI to those tribes above that are federally-listed. No responses to our NOI have been received.

Other Parties Contacted

Eastern Shore contacted the Archaeological Society of Maryland, Delaware Historical Society, Maryland Historical Society, Preservation Delaware, Inc., Somerset County Historical Society, and Wicomico County Historical Society regarding the Project. No responses have been received to date.

Unanticipated Discoveries Plan

Eastern Shore provided a plan to address the unanticipated discovery of cultural resources and human remains during construction. We reviewed the plan and found it acceptable.

Compliance with the NHPA

Compliance with Section 106 of the NHPA has not been completed for the Project. To ensure that the FERC's responsibilities under the NHPA and its implementing regulations are met we recommend that:

- **Eastern Shore should not begin construction of facilities and/or use of staging, storage, or temporary work areas and new or to-be-improved access roads until:**

  a. Eastern Shore files with the Secretary:

  i. **the avoidance plan for site 7K-C-467, requested by the Delaware SHPO, and any resulting SHPO comments on the plan;**
  ii. **remaining cultural resources survey report(s)/addendum(s) for the Woodside Loop and East Sussex Extension, and the Delaware SHPO's comments on the report(s)/addendum(s); and**
  iii. **site evaluation report(s) and avoidance/treatment plan(s), as required, and the Delaware SHPO's comments on any plans.**

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

  c. the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Eastern Shore in writing that treatment plans/mitigation measures (including archaeological data recovery) 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: "CUI//PRIV - DO NOT RELEASE."

7.0 AIR QUALITY

Air quality in the Project area would be affected by construction and operation of the Project. Although minor air emissions would be generated by Project operation, the

majority of air emissions associated with the Project would result from construction activities. The term air quality refers to relative concentrations of pollutants in the ambient air. The subsections below summarize the federal and state air quality regulations that are applicable to the Project. This section also characterizes the existing air quality and describes potential impacts the Project may have on air quality regionally and locally.

7.1. EXISTING ENVIRONMENT

The Project area is within Kent and Sussex Counties, Delaware, and Somerset and Wicomico Counties, Maryland. The climate in the Project area is generally characterized as a climatological transition zone, with characteristics of the humid subtropical zone to the south and the humid continental zone to the north. The region has a continental climate with cold winter temperatures, hot summers, and ample precipitation throughout the year, with average winter temperatures that range from the mid-30s to mid-40s degrees Fahrenheit (°F), and average summer temperatures that range from the low 70s to the upper 80s. Average precipitation is 43 inches per year, with well-distributed rainfall throughout the year (National Climatic Data Center, 2015).

Ambient air quality is protected by the Clean Air Act (CAA) of 1970, as amended in 1977 and 1990. The EPA oversees the implementation of the CAA and establishes National Ambient Air Quality Standards (NAAQS) to protect human health and welfare.[9] NAAQS have been developed for seven "criteria air pollutants," including nitrogen dioxide, carbon monoxide (CO), ozone, sulfur dioxide (SO_2), particulate matter less than or equal to 2.5 microns in aerodynamic diameter ($PM_{2.5}$), particulate matter less than or equal to 10 microns in aerodynamic diameter (PM_{10}), and lead, and include levels for short-term (acute) and long-term (chronic) exposures. The NAAQS include two standards, primary and secondary. Primary standards establish limits that are considered to be protective of human health and welfare, including sensitive populations, such as children, the elderly, and asthmatics. Secondary standards set limits to protect public welfare, including protection against reduced visibility and damage to crops, vegetation, animals, and buildings (EPA, 2018a). Although ozone is a criteria air pollutant, it is not emitted into the atmosphere directly from an emissions source; rather, it develops as a result of a chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Therefore, NO_x and VOCs are referred to as ozone precursors and are regulated to control the potential for ozone formation. Additional pollutants, such hazardous air pollutants (HAP), are emitted during fossil fuel combustion.

The EPA, and state and local agencies, have established a network of ambient air quality monitoring stations to measure concentrations of criteria pollutants across the

[9] The current NAAQS are listed on EPA's website at https://www.epa.gov/criteria-air-pollutants/naaqs-table.

U.S. The data are then averaged over a specific time period and used by regulatory agencies to determine compliance with the NAAQS and to determine if an area is in attainment (criteria pollutant concentrations are below the NAAQS), nonattainment (criteria pollutant concentrations exceed the NAAQS), or maintenance (area was formerly nonattainment and is currently in attainment).

Air quality control regions (AQCR) are areas established by the EPA and local agencies for air quality planning purposes, in which State Implementation Plans describe how the NAAQS would be achieved and maintained. The AQCRs are intra- and interstate regions (such as large metropolitan areas) where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. The Project is within the Southern Delaware Intrastate AQCR (Kent and Sussex Counties, Delaware) and the Eastern Shore Intrastate AQCR (Wicomico and Somerset Counties, Maryland). Sussex County is designated as marginal nonattainment for the 2008 ozone standard, but was designated maintenance for the 2015 ozone standard. All other counties in the Project area were designated as attainment or unclassifiable for the remaining criteria pollutants.

Greenhouse gases (GHG) occur in the atmosphere both naturally and as a result of human activities, such as the burning of fossil fuels. Carbon dioxide is the primary GHG emitted during fossil-fuel combustion, while smaller amounts of methane and nitrous oxide are GHGs that are also emitted. GHGs are non-toxic and non-hazardous at normal ambient concentrations, and there are no applicable ambient standards or emission limits for GHGs under the CAA. Increased atmospheric concentration of GHGs are the primary contributor to climate change. The primary GHGs that would be emitted by the Project are carbon dioxide (CO_2), methane, and nitrous oxide. During construction and operation of the Project, these GHGs would be emitted from the majority of construction and operational equipment, as well as from fugitive methane leaks from the pipeline and aboveground facilities.

Emissions of GHGs are typically quantified and regulated in units of carbon dioxide equivalents (CO_2e). The CO_2e takes into account the global warming potential (GWP) of each GHG. The GWP is the measure of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. The GWP allows comparison of global warming impacts between different gases; the higher the GWP, the more that gas contributes to climate change in comparison to CO_2. Thus, CO_2 has a GWP of 1, methane has a GWP of 25, and nitrous oxide has a GWP of 298. [10]

[10] These GWPs are based on a 100-year time period. We have selected their use over other published GWPs for other timeframes because these are the GWPs the EPA has established for reporting of GHG emissions and air permitting requirements. This allows for a consistent comparison with these regulatory requirements.

7.2. REGULATORY REQUIREMENTS

The provisions of the CAA that may be applicable to the Project are discussed below. The estimated potential operational emissions for the Project are discussed in section 7.5.

General Conformity

The lead federal agency must conduct a conformity analysis if a federal action would result in the generation of emissions that would exceed the conformity threshold levels of the pollutant(s) for which a county is designated nonattainment or maintenance. Although the Project is in an Ozone Transport Region, estimated emissions for the Project are not subject to review under the general conformity thresholds because the Project is in an area classified as attainment/unclassifiable for all criteria pollutants based on the most recent standards.

7.3. STATE AIR QUALITY REGULATIONS

This section discusses the potentially applicable state air regulations for the Project. In addition to federal standards, the DNREC and MDE establish additional standards as outlined below.

Control of Particulate Emissions and Fugitive Dust

Particulate emissions and fugitive dust are regulated by 7 DE Administrative Code (AC), section 1106.3 in Delaware, while similar requirements are codified under the Code of Maryland Regulations 26.11.06.03(D) in Maryland. These requirements generally mandate the use of watering or other dust control methods during grading, land clearing, excavation, and use of non-paved roads. Eastern Shore would be required to comply with these requirements during construction of the Project. Additional information on dust control is provided below.

Control of Engine Idling

Engine idling is regulated under 7 DE AC, section 1145 in Delaware, which restricts idling to no more than 3 minutes for on-road heavy duty motor vehicles. In Maryland, idling of motor vehicles is prohibited for more than 5 consecutive minutes when not in motion, and is mandated under Transportation Article section 22-402. Eastern Shore would be required to comply with these standards.

Control of Odor and Nuisances

Odors and nuisances are regulated by 7 DE AC, section 1119, which prohibits the emission of an odorous air contaminant that results in air pollution. In Maryland, COMAR 26.11.06.09 mandates that sites may not allow any gases, vapors, or odors to be discharged beyond the property line such that it creates a nuisance or incidence of air pollution. Eastern Shore would be required to comply with these standards.

7.4. CONSTRUCTION EMISSIONS IMPACTS AND MITIGATION

Project construction would result in temporary, localized emissions that would last the duration of construction activities (i.e., about 12 months). Heavy equipment, trucks, delivery vehicles, and construction workers commuting to and from work areas would generate exhaust emissions through the use of diesel or gasoline engines.

Construction activities, such as land clearing and grading, ground excavation and soil disturbance, and driving on unpaved roads would also result in the temporary generation of fugitive dust. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic and types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity.

Eastern Shore estimated construction emissions based on the fuel type and anticipated frequency, duration, capacity, and levels of use of various types of construction equipment. Construction emissions were estimated using EPA's MOVES model and NONROAD model, the 2017 Climate Registry Default Emission Factors, and AP-42: Compilation of Air Emission Factors (EPA, 2018b). Fugitive dust emissions were calculated based on the 2006 WRAP Fugitive Dust Handbook. Table 10 below provides the total Project construction emissions by county, including exhaust emissions and fugitive dust from on-road and off-road construction equipment and vehicles, exhaust emissions from construction worker vehicles for commuting, and vehicles used to deliver equipment/materials to the site.

Table 10
Construction Emissions for the Project (tons per construction duration)

County	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAPS	CO_{2e}
Kent County, Delaware	7.3	3.4	24.3	2.8	0.1	0.5	0.04	1,162
Sussex County, Delaware	6.4	3.1	68	7.1	0.01	0.5	0.03	1,023
Wicomico and Somerset, Maryland	6	3.2	3	0.5	0.01	0.4	0.03	973
Total Project Emissions	**19.7**	**9.7**	**95.3**	**10.4**	**0.12**	**1.4**	**0.1**	**3,158**

Construction emissions shown in table 10 are not expected to result in a degradation of ambient air quality standards or an exceedance of the NAAQS. Eastern

Shore would minimize construction exhaust emissions by operating equipment on an as-needed basis, using ultra-low sulphur diesel in construction equipment, and limiting idling to less than 5 minutes in Maryland and less than 3 minutes in Delaware. In order to mitigate and minimize fugitive dust, Eastern Shore has committed to implementing the following measures:

- applying dust suppressants when needed;
- reducing vehicle speeds on unpaved roads;
- covering all haul trucks or maintaining at least six inches of freeboard space;
- rinsing construction vehicles prior to site egress to remove soil;
- maintaining existing ground coverings until disturbance is required;
- building and maintaining construction entrances to minimize transport of soil/mud to paved roads; and
- revegetating disturbed areas promptly.

Construction emissions would occur over the duration of construction activity and would be emitted at different times throughout the Project area. Construction emissions would be relatively minor and would result in short-term, localized impacts in the immediate vicinity of construction work areas. With the mitigation measures proposed by Eastern Shore, we conclude air quality impacts from construction would be temporary and would not result in significant impact on local or regional air quality.

7.5. OPERATIONAL EMISSIONS IMPACTS AND MITIGATION

Operation of the Project would not result in any stationary source emissions. However, the Project would result in minor operational emissions due to venting and fugitive natural gas emissions along the proposed pipelines and at the proposed new M&R stations and the modified pressure control station. Fugitive emissions are minor leaks that would occur at various piping components, valves, fittings, and aboveground equipment. Eastern Shore estimated that operation of the Project would result in 0.01 ton per year (tpy) of VOCs, 1,598 tpy of CO_2e, and 0.5 tpy of total HAPs. Because there are no stationary source emissions proposed for the Project, and based on the limited quantity of vented and fugitive emissions during Project operation, the Project would not cause or significantly contribute to a degradation of ambient air quality or result in an exceedance of the NAAQS.

8.0 NOISE

Noise is generally defined as sound with intensity greater than the ambient or background sound pressure level. Construction and operation of the Project would affect overall noise levels in the Project area. The magnitude and frequency of environmental

noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetative cover. Two measures that relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (L_{eq}) and day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Specifically, the L_{dn} is the L_{eq} plus a 10 decibel on the A-weighted scale (dBA) penalty added to account for people's greater sensitivity to nighttime sound levels (typically considered between the hours of 10:00 p.m. and 7:00 a.m.). The A-weighted scale is used to assess noise impacts because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dBA, 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise (Bies and Hansen, 1988).

8.1. FEDERAL NOISE REGULATIONS

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA 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 impacts from the Project at noise sensitive areas (NSAs). NSAs are defined as homes, schools, churches, or any location where people reside or gather. FERC requires that the noise attributable to any new compressor engine or modifications during full load operation not exceed an L_{dn} of 55 dBA at any NSAs. Due to the 10 dBA nighttime penalty added prior to the logarithmic calculation of the L_{dn}, for a facility to meet the 55 dBA L_{dn} limit, it must be designed such that actual constant noise levels on a 24-hour basis do not exceed 48.6 dBA L_{eq} at any NSA. This noise requirement is also applied to temporary nighttime construction noise, unless ambient noise levels are greater than 55 dBA L_{dn}, in which case nighttime construction noise must be less than 10 dBA over ambient noise levels.

8.2. AMBIENT NOISE CONDITIONS

Delaware and Maryland both have applicable noise standards that apply to construction and operation of the Project, contained within 7 DE AC, section 1149 and section 26.02.03.02, respectively. Additionally, Kent County, Delaware, contains noise requirements that are equal to or less restrictive than FERC's standards; therefore, Eastern Shore would meet these state and local noise requirements through compliance with FERC's standards.

8.3. CONSTRUCTION NOISE IMPACTS AND MITIGATION

Noise would be generated during construction of the Project. Construction activities in any one area could last from several days to several weeks on an intermittent basis. While individuals in the immediate vicinity of the construction activities would experience an increase in noise, this effect would be temporary and local. Eastern Shore proposes to construct the majority of the pipeline route through the HDD method to drill and install the pipeline at 36 locations (see figure 1 in appendix A). There are numerous residences within 0.5 mile of all of the proposed HDD sites. Residents at these NSAs would be impacted by drilling noise. The sound level at any specific NSA would be a function of the NSA's distance from the HDD site and any intervening topography. Project construction, including HDD construction (both conventional HDD and small diameter HDD) would occur during daytime hours, but may extend into nighttime hours if necessary during pipeline pullback. With the exception of pipeline pullback, Eastern Shore would limit construction and drilling activities to between the hours of 7:00 am to 7:00 pm in order to minimize disruption on nearby residents. If construction or drilling activities (excluding pipeline pullback) occur outside of Eastern Shore's proposed hours of operation, Eastern Shore would need to propose a variance request. Additionally, Eastern Shore has committed to offering temporary housing accommodations to residents within 300 feet of HDD activities. Lastly, Eastern Shore would install work site barriers for noise mitigation of HDD sites along the Woodside Loop. However, Eastern Shore has not provide site-specific drawings specifying the proposed height, specifications, or location of the work site barriers.

In order to evaluate the potential noise level impacts on nearby NSAs, Eastern Shore measured the existing ambient noise levels and estimated the predicted noise levels at the nearest NSAs for each of the drill entry/exit points during the daytime hours only. Eastern Shore did not estimate the noise levels during any required nighttime pullback operations. The results of the HDD noise impact analysis are provided in table 11.

Table 11 Predicted Noise Impacts During Drilling Operations						
HDD No. [1, 2]	**Entry or Exit**	**Distance and Direction of Closest NSA**	**Measured Ambient L_{dn} dBA**	**Predicted Contribution due to HDD L_{dn} dBA[3]**	**Total Predicted Noise Levels (HDD + Ambient) L_{dn} dBA**	**Increase Above Ambient (dBA)**
WS-0.1	Entry	100 feet northwest	49.4	**74.2**	60.4	11
	Exit	400 feet west	49.4	43.3	50.3	0.9
WS-1.7	Entry	300 feet east	51.6	**64.1**	53.9	2.3
	Exit	150 feet southeast	49.4	**58.6**	50.7	1.3
WS-2.5	Entry	700 feet south	47.5	**55.8**	49.6	2.1
	Exit	500 feet northeast	47.4	44.6	49.2	1.8
WS-3.1	Entry	100 feet west	47.5	**74.2**	60.3	12.8
	Exit	150 feet northwest	47.5	**58.6**	49.5	2
SE-0.0	Entry	400 feet northwest	70	53	70	0
SE-0.3	Entry	200 feet northwest	67	**59**	68	1
SE-0.9	Entry	800 feet east	67	46	67	0
SE-1.3	Entry	750 feet west	67	53	67	0
SE-1.7	Entry	600 feet west	67	49	67	0
SE-1.9	Entry	650 feet south	63	**57**	64	1
SE-2.2	Entry	350 feet northeast	63	54	63	0
SE-2.4	Entry	300 feet southeast	63	**55**	63	0
SE-2.7	Entry	700 feet northwest	63	48	63	0
SE-3.1	Entry	350 feet northeast	61	54	62	1
SE-3.4	Entry	400 feet northeast	61	53	61	0
SE3.7	Entry	450 feet northwest	60	51	61	1
SE-4.6	Entry	300 feet southeast	60	**55**	62	2
SE-5.0	Entry	550 feet northwest	70	50	70	0
SE-5.8	Entry	250 feet southeast	70	**57**	70	0
SE-6.1	Entry	750 feet southwest	70	47	70	0
SE-6.7	Entry	300 feet west	62	**55**	63	1
ES-0.1	Entry	50 feet northwest	57	**71**	71	14
ES-0.7	Entry	400 feet southwest	57	53	59	2
ES-1.4	Entry	225 feet northwest	57	**57**	60	3
ES-1.9	Entry	150 feet northeast	57	**61**	63	6
ES-2.3	Entry	100 feet northeast	57	**65**	65	8
ES-2.5	Entry	150 feet south	57	**61**	63	6
ES-2.8	Entry	150 feet south	52	**61**	62	10
ES-3.0	Entry	75 feet south	52	**67**	67	15
ES-3.3	Entry	375 feet northeast	53	53	56	3
ES-3.7	Entry	600 feet east	53	49	54	1
ES-3.8	Entry	500 feet east	51	51	54	3
ES-4.3	Entry	350 feet southwest	51	54	55	4
ES-4.6	Entry	750 feet east	49	47	51	2
ES-4.8	Entry	650 feet east	49	48	52	3
ES-5.0	Entry	150 feet east	49	**61**	61	12

[1] For the Somerset and East Sussex Extensions that would utilize small-diameter HDD equipment, the only equipment at the exit site would be the intermittent removal of drilling fluid; therefore, the noise levels were not estimated.
[2] For the Somerset and East Sussex Extensions, the noise levels represent the impacts of daytime only construction.
[3] Bold = predicted contribution of HDD noise exceeds FERC's noise operational requirement, which we use to assess noise impact of any night-time construction activities.

Although construction activities would result in temporary impacts on nearby residents, based on the mitigation measures proposed by Eastern Shore and their commitment to limit construction and drilling activities to between the hours of 7:00 am to 7:00 pm (with the exception of pipeline pullback), the limited duration of construction/drilling activities, in addition to Eastern Shore's offer for temporary relocation for nearby landowners, we conclude that construction of the Project would not result in significant noise impacts on residents or the surrounding communities.

8.4. OPERATION NOISE IMPACTS AND MITIGATION

The new M&R stations would generate noise on a semi-continuous basis when in operation. Noise impacts associated with the operation of M&R stations would be limited to the vicinity of the facilities. Eastern Shore estimated the noise impacts at nearby NSAs associated with operation of the M&R stations, the results of which are outlined in table 12 below. The Millsboro Pressure Control Station would not result in any noise impacts as a result of Project modifications; therefore, noise from the existing station would remain the same following the completion of the Project.

Table 12
Noise Analysis for the New Hollymount and Eden M&R Stations

NSA	Type	Distance and Direction from Facility	Existing Ambient Sound Levels (dBA L_{dn})	Predicted Sound Level Contribution from M&R Station (dBA L_{dn})	Total Sound Level after Project Completion(dBA L_{dn})	Predicted Change in L_{dn} (dBA)
New Hollymount M&R Station						
NSA 1	residence	150 feet north	54.9	50.9	56.4	1.5
NSA 2	residence	750 feet west	53.1	35.8	53.2	0.1
NSA 3	residence	1,300 feet south	49.1	30.2	49.2	0.1
New Eden M&R Station						
NSA 1	residence	100 feet west south-west	65.2	51.6	65.3	0.1
NSA 2	residence	500 feet southeast	65.4	36.8	65.4	0.0
NSA 3	residence	525 feet southwest	67.2	36.3	67.2	0.0

The results of the noise analysis above indicates that although total sounds levels would be above 55 dBA L_{dn} at four NSAs following Project completion, the noise attributable to operation of the M&R stations would be below our requirement of 55 dBA L_{dn}. Additionally, because the increase in noise levels near the M&R stations are anticipated to range from 0 to 1.5 dBA, which are less than 3 dBA, operation of the M&R stations is not anticipated to result in perceptible increases in noise. However, both M&R stations are in very close proximity to a residence and it is our experience that meter stations can vary widely in terms of actual sound level impacts after being placed in service relative to the predicted impacts from these stations. To verify the accuracy of Eastern Shore's noise analyses and ensure sound levels do not exceed our criterion, **we recommend that**:

- **Eastern Shore should file with the Secretary noise surveys for the Hollymount and Eden M&R Stations no later than 60 days after placing the stations into service. If full flow/load condition noise surveys are not possible, Eastern Shore should file an interim survey at the maximum possible power load within 60 days of placing the stations into service and file the full flow/load survey within 6 months. If the noise attributable to operation of all equipment at each station under interim or full power load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Eastern Shore should:**

  a. file a report with the Secretary, for review and written approval by the Director of OEP, on what changes are needed;

  b. install additional noise controls to meet that level within 1 year of the in-service date; and

  c. confirm compliance with this requirement by filing a second full flow/load noise survey with the Secretary for review and written approval by the Director of OEP no later than 60 days after it installs the additional noise controls.

Based on Eastern Shore's noise analysis and our recommendation above, we conclude that operation of the Project would not result in significant noise impacts on residents or the surrounding communities.

9.0 RELIABILITY AND SAFETY

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural 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. Methane has an auto-ignition temperature of 1,000 ºF and is flammable at concentrations between 5.0 and 15.0 percent in air. An unconfined mixture of methane and air is not explosive; however, it may ignite and burn if there is an ignition source. A flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

9.1. SAFETY STANDARDS

We received one comment from an abutting landowner, expressing concerns regarding safety. The DOT is mandated to prescribe minimum safety standards to protect against risks posed by pipeline facilities under Title 49 of the U.S.C., Chapter 601. The DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA's safety mission is to ensure that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local level.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The DOT specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion.

The DOT 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, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; maximum allowable operating pressure; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The Project would be designed to meet the requirements of Class 4 locations.

9.2. EMERGENCIES

The DOT Pipeline Safety Regulations require operators to develop and follow a written integrity management program that contains all the elements described in 49 CFR 192.911 and addresses the risks on each transmission pipeline segment. The rule establishes an integrity management program which applies to all high consequence areas. The DOT has published rules that define high consequence areas where a gas pipeline accident could do considerable harm to people and their property in a high-density population area and requires an integrity management program to minimize the potential for an accident.

The DOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Each pipeline operator is required to establish an emergency plan that includes procedures to minimize the hazards of a natural gas pipeline emergency. Key elements of the plan include procedures for:

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;

- emergency system shutdown and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

The DOT requires that each operator establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. 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. Eastern Shore would provide the appropriate training to local emergency service personnel before the pipeline is placed in service.

9.3. PIPELINE ACCIDENT DATA

The DOT requires all operators of natural gas transmission pipelines to notify the DOT of any significant incident and to submit a report within 30 days. Significant incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization; or
- involve property damage of more than $50,000 (1984 dollars).[11]

During the 20-year period from 1999 through 2018, a total of 1,373 significant incidents were reported on more than 300,000 total miles of natural gas transmission pipelines nationwide (U.S. DOT-PHMSA 2018b,c). Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 13 provides a distribution of the causal factors as well as the number of each incident by cause.

[11] $50,000 in 1984 dollars is approximately $123,509.32 as of February 2019 (CPI, Bureau of Labor Statistics, 2019)

Table 13 Natural Gas Transmission Pipeline Significant Incidents by Cause 1998-2017		
Cause	**Number of Incidents[a]**	**Percentage**
Pipeline material, weld, or equipment failure	413	30.1
Corrosion	317	23.1
Excavation	195	14.2
Natural force damage [c]	156	11.4
All other causes [b]	142	10.3
Outside force [d]	95	6.9
Incorrect operation	55	4.0
Total	1,373	100

a All data gathered from PHMSA's Oracle BI Interactive Dashboard website for Significant Transmission Pipeline Incidents, https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Portalpages. Accessed 2/21/19.

b All other causes include miscellaneous, unspecified, or unknown causes.

c Natural force damage includes earth movement, heavy rains/floods, high winds, lightning, temperature, unspecified natural force damage, and other natural force damage.

d Outside force damage includes electrical arcing, fire/explosions, fishing or maritime activities, intentional damage, maritime equipment, previous mechanical damage, unspecified or other outside force damage, and vehicle damage (not associated with excavation).

The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents and material failure, because corrosion and pipeline stress/strain is a time-dependent process. The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

The dominant causes of pipeline incidents are corrosion and pipeline material, weld or equipment failure constituting 53.2 percent of all significant incidents. The pipelines included in the data set in table 13 vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

Outside forces, excavation, and natural forces are the cause of 32.5 percent of significant pipeline incidents. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Older pipelines have a higher frequency of outside forces incidents, in part because their location may be less well known and less well marked as compared to newer pipelines. In addition, older pipelines comprise a disproportionate

number of smaller-diameter pipelines, which have a greater rate of outside force incidents. Smaller pipelines are more easily crushed or broken by mechanical equipment or earth movement.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities in the vicinity of pipelines. The ”One Call“ program is a service used by public utilities and some private sector companies (e.g., oil pipelines and cable television) to provide pre-construction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts. Eastern Shore would be required to comply with the requirements of the “One Call” program.

The Project’s construction and operation would represent a minimum increase in risk to the public; however, we are confident that with Eastern Shore’s continued compliance with DOT safety standards, operation, and maintenance requirements, the Project would be constructed and operated safely.

10.0 CUMULATIVE IMPACTS

In accordance with NEPA and with FERC policy, we evaluated the potential for cumulative effects of the Project. 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 time.

This cumulative effects analysis generally follows a method set forth in relevant Council of Environmental Quality and EPA guidance and focuses on potential impacts from the Project on resource areas or issues where the incremental contribution would be potentially significant when added to the potential 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 (i.e. geographic scope); and
- cause this impact within all, or part of, the time span for the potential impact from the Project.

10.1. PROJECTS IDENTIFIED WITHIN THE GEOGRAPHIC SCOPE

The geographic scope used to assess cumulative impacts for each resource are discussed below in table 14.

Table 14
Geographic Scope of Potential Impact of the Project

Resource	Geographic Scope
Geological Resources and Soils	Limits of Project disturbance
Water Resources	Watershed boundary (HUC-12)
Vegetation, Wildlife, and Special Status Species	HUC-12
Land Use, Recreation, and Visual Resources	1 mile
Cultural Resources	Area of potential effect
Air Quality	Construction: 0.25 mile Operation: 50 kilometer
Noise	Construction: 0.25 mile for general construction activities, 0.5 mile for drilling activities Operation: 1 mile

The EA analyzed the Project's impacts on geology and soils; water resources; vegetation and wildlife; cultural resources; land use and visual resources; and air quality and noise. As described in section B of this EA, pipeline construction activities associated with the Project would have a negligible impact on geology, water resources, vegetation and wildlife, threatened and endangered species, cultural resources, and operational impacts on air quality and noise. Therefore, these resources will not be discussed further in this section. The following describes the geographic scope and rationale for our cumulative impact analysis:

- Project construction and restoration measures, including erosion control devices, are designed to confine impacts on soil resources to the Project workspaces. Therefore, we evaluated potential cumulative impacts on soils resources within the same construction footprint as the proposed Project.
- Impacts on land use (including traffic), recreational, and visual resources would occur as a result of temporary vegetation clearing, ground disturbance, and increases in noise and dust during construction activities. The geographic scope of cumulative impacts analysis for land use, recreational, visual resources is focused on those projects that occur within 1 mile of the Project.
- Temporary impacts on air quality, including fugitive dust, would be largely limited to areas within 0.25 mile of active construction. We evaluated current and proposed sources that overlap in time and location with construction activities within the geographic scope.

- Impacts from construction noise could potentially contribute to cumulative impacts on NSAs within 0.25 mile for general construction activities and 0.5 mile for drilling activities.

In this analysis, we consider the impacts of past projects as part of the affected environment (environmental baseline) which was described and evaluated in the preceding analysis. However, present effects of past actions that are relevant and useful are also considered. Eastern Shore obtained information about present and future planned developments by consulting federal, state, and local agency and municipality websites, reports, and direct communications; permit applications with various agencies; and online database searches. The projects identified as occurring within the resource-specific geographic scopes are identified below based on resource type.

As described in section A.8, the Hollymount and Eden M&R Stations would require new non-jurisdictional electric powerlines. The Hollymount electric powerline would be co-located within the Project right-of-way. The Eden electric powerline would be co-located within existing road right-of-way. The powerlines would be permitted through the local authority and no additional impacts on resources are expected than those presented in this EA. Additionally, Eastern Shore would acquire any necessary federal, state, or local permits, as applicable, for non-jurisdictional facilities. Therefore, these projects are not included in the cumulative impact discussion below.

10.2. POTENTIAL CUMULATIVE IMPACTS OF THE PROPOSED ACTION

Based on our review, resources with potential to contribute to overall cumulative impacts at some level are soils, land use, and construction impacts on air quality and noise, as discussed below. Table 15 lists the past, present, and reasonably foreseeable projects identified within the geographic scope and within the same timeline as the Project for each resource and considered for cumulative impact analysis.

Table 15 Cumulative Actions Occurring in Proximity to the Project					
Project Type/Name	**Development Description**	**Status (Date)**	**Approximate Distance from Proposed Project (miles)**	**Watershed (HUC 12)**	**Resources Potentially Cumulatively Affected**
Woodside Loop					
Residential / Savannah mixed-use development	Mixed-use residential subdivision	In Design (no construction schedule identified)	<0.5 (near MP 0.65 to MP 1.12)	Tidbury Creek (HUC 020402070303)	Soils, land use, and noise due to drilling during construction (if construction were to overlap).
Somerset Extension					
Transportation / U.S. 13 Salisbury Boulevard	Maryland DOT road drainage improvements	Under Construction	<0.1 (MP 0.1 to MP 1.05) (Overlap near MP 0.3)	South Prong Wicomico River and Tonytank Creek (HUC 021303010561 and 021303010558)	If construction schedules overlap, combination of construction air and noise, land use, and local traffic impacts.
Millsboro Pressure Control Station Extension					
Utility / Eastern Shore – 2017 Expansion Seaford-Millsboro Connector CP17-28-000	Natural gas pipeline installation	Approved NTP Issued *Nov. 15, 2017* Under Construction (Partially In-service)	<0.1 (Overlaps near MP 0.0)	Long Drain Ditch – Betts Pond 020403030202	Soils, land use and local traffic, and construction air and noise impacts.
Residential \ Plantation Lakes mixed-use development	Mixed-use residential subdivision	In Design (no construction schedule identified)	<0.1 (Overlaps near MP 0.0)	Long Drain Ditch – Betts Pond 020403030202	If construction schedule overlaps there is potential for soils, land use, and construction noise and air impacts.

As indicated in table 15, there are four projects within the same geographic scope and timeline as the Project for all relevant resources. Cumulative impacts for these projects and the proposed Project are considered below by resource.

Soils

Concurrent or consecutive construction schedules could prolong the duration that soils are disturbed and thus susceptible to erosion and invasive species establishment. Eastern Shore anticipates beginning Project construction by September 2019 and placing the facilities into service by September 2020. Based on this anticipated schedule and the status of other projects in the geographic scope for cumulative impacts on soils resources, Project construction could geographically and temporally overlap the U.S. Salisbury Boulevard drainage improvements project and the Eastern Shore – 2017 Expansion Seaford-Millsboro Connector Project. However, due to the limited extent of

overlapping footprints as well as soil conservation and restoration measures that would be implemented by all projects to prevent erosion and stabilize disturbed areas, cumulative impacts on soils are anticipated to be minor.

Land Use

Construction and operation of the Project and other reasonably foreseeable future projects would require the temporary and permanent use of land, which would result in temporary and permanent impact/conversion of land use. The majority of the Project impacts on general land uses would be temporary, and related to construction workspaces. As the predominant land use in the area is agricultural land, the conversion of agricultural lands to commercial/industrial, residential, or other non-agricultural uses would have the greatest potential for cumulative impact with the 2017 Eastern Shore Project (CP17-28-000). The Project would be converting 0.3 acres of agricultural land, and the 2017 Eastern Shore Project would convert about 0.4 acres of agricultural land. While the majority of the Project impacts would be temporary, construction of the Project would result in some permanent land use impacts, including the conversion of 1.2 acre of forest and 0.2 acre of open land to maintained right-of-way for aboveground facilities operation.

Cumulative impacts on land use could occur due to the projects listed in table 15. The Project would be co-located with existing rights-of-way for over 90 percent of the route, which would minimize visual impacts. Minor amounts of forest conversion would occur where the construction work area requires clearing of trees outside the existing cleared rights-of-way. The Project would generally allow most areas to revert to pre-construction conditions. The projects located at the Somerset and Millsboro Pressure Control Station Extension in table 15 may impact both industrial and residential land use types. However, due to the limited project impacts on industrial and residential land within the Project area, we conclude that cumulative impacts on land use would not be significant.

Visual Resources

Cumulative impacts on visual resources could occur due to the projects listed in table 15 and industrial/residential developments within the same viewshed of the proposed two M&R Stations, two mainline valve assemblies, and the pressure control station modification. All are located in areas that are actively cultivated with road, residential, and other human developments commonly visible, such that their cumulative impacts are not expected to be noticeable with the exception of the Plantation Lakes mixed use development, and the two proposed M&R stations at the Project's East Sussex and Somerset Extension, which would create new visible features to the existing landscape. Most of the areas that would be affected by construction occur on actively cultivated and previously disturbed lands, and these lands would revert to their previous

uses and contours following construction thereby limiting permanent visual impacts. Therefore, we find that the Project when considered cumulatively with past, present, and reasonably foreseeable projects, would not contribute to significant cumulative visual impacts.

Traffic

If the proposed Del-Mar Pathway Energy Project and the projects listed in table 15 are constructed at the same time, there could be minor cumulative impacts from increased traffic in the general area (e.g., town or concentrated residential area) of the combined project activities. If new residential mixed-use subdivisions (Savannah and Plantation) Lakes), the Eastern Shore 2017 Expansion Project, and/or the U.S. 13 Salisbury Boulevard project are constructed at the same time as construction of the proposed Project, we anticipate that deliveries of building materials, and use of local roads (e.g., right-of-way access; pipe deliveries; personnel commutes), could result in cumulative impacts on local traffic.

These impacts would be expected to be localized, minor, and short-term, and as for the proposed Project, the other projects listed in table 15 would also provide detours and/or maintain local access. Based on this information, we do not anticipate that the Project, when considered with the other projects in the area, would result in any significant cumulative impact on traffic.

Air Quality

Construction of the Project would result in short-term impacts on air quality in the vicinity of the Project, as discussed in section B.7.

Construction of the natural gas infrastructure, residential developments, and DOT-related construction projects listed in table 15 are within the geographic scope of construction and have the potential to occur at the same time as the proposed Project; therefore, these projects, combined with the proposed Project, may result in cumulative impacts on air quality during construction. Construction of these projects would involve the use of heavy equipment that would generate emissions of air pollutants and fugitive dust. Construction equipment emissions would result in short-term emissions that would be highly localized, temporary, and intermittent. In order to mitigate fugitive dust emissions, Eastern Shore would implement dust control measures such as watering access roads and construction areas. Because watering access roads and construction areas is a common construction best management practices, the other projects listed in table 15 may also implement similar dust control measures to minimize fugitive dust generation. Additionally, these projects would also likely be subject to the idling restrictions required by Delaware and Maryland that are applicable to the Project. Based on the mitigation measures proposed by Eastern Shore, and the temporary and localized impacts of

construction, the Project would not result in significant cumulative impacts on air quality during construction.

The Project would result in direct and downstream GHG emissions and would contribute to global increases in GHG levels. GHG emissions from construction and operation were included in table 10 and discussed in section 7.5, respectively as CO_2e. The Project would transport a total of 14.3 million cubic feet per day of firm transportation capacity. As discussed in section A.2 of this EA, Eastern Shore would deliver the majority of this volume to local distribution companies to serve residential end-user growth and to meet demand in Delaware. A total of 2.5 million cubic feet per day of natural gas would be delivered to Valley Proteins, Inc. (Valley Proteins), a rendering company, for off-peak use to support new energy efficient natural gas boilers at its plant. Although the specific Valley Proteins plant was not identified in Eastern Shore's application, and therefore the permitted air emissions from the plant is not searchable, the downstream burn for the volume of gas transported to Valley Proteins was calculated by FERC staff, and would result in annual emissions of 50,000 metric tons of CO_2 per year. This calculation represents the upper bound of emissions because it assumes the gas would be burned 24 hours a day, every day of the year. This figure represents a 0.38 percent and a 0.09 percent increase in CO_2 emissions from fossil fuel combustion in Delaware and Maryland, respectively, and a 0.0009 percent increase at the national level (EIA, 2018; EPA, 2018d). Currently, there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Project's incremental contribution to GHGs. Similarly, it is not currently possible to determine localized or regional impacts from GHG emissions from the Project or from end-use combustion of the natural gas transported by the Project. Absent such a method for relating GHG emissions to specific resource impacts, we are not able to assess potential GHG-related impacts attributable to this Project. Additionally, there is no widely accepted standard, per international, federal, or state policy, to determine the significance of the Project's GHG emissions. Therefore, without the ability to determine discrete resource impacts, we are unable to determine the significance of the Project's contribution to climate change.

Noise

Construction of the Project would result in short-term and temporary impacts on existing noise levels in the Project area. Construction of the Project may occur concurrently with construction of the natural gas infrastructure, residential development, and DOT-related construction projects listed in table 15 and may contribute cumulatively to impacts on noise levels. However, based on the short-term and temporary nature of construction-related activities impacts from the Project are not expected to significantly contribute to cumulative impacts on noise levels during construction.

C. ALTERNATIVES

In accordance with NEPA and Commission 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, and site alternatives. The evaluation criteria used for developing and reviewing alternatives were:

- ability to meet the Project's stated objective;
- technical and economic feasibility and practicality; and
- significant environmental advantage over the proposed action.

Through environmental comparison and application of our professional judgment, each alternative is considered to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery) and assume the same general workspace requirements.

1.0 NO-ACTION ALTERNATIVE

Under the no-action alternative, the proposed facilities would not be constructed, and the environmental impacts associated with the Project would not occur. However, the Project's objectives would not be met. The no-action alternative would not provide for growing market demands of the Delmarva Peninsula region. Eastern Shore would not be able to meet the Project's three local distribution companies (LDC) and one industrial shipper's stated need to transport 11.8 million cubic feet per day of natural gas and 2.5 million cubic feet of off-peak transportation service.

Although a Commission decision to deny the proposed action would avoid the environmental impacts addressed in this EA, other natural gas projects could be constructed to supply the LDCs and industrial shipper and provide a substitute for the natural gas supplies offered by Eastern Shore. Such alternative projects to supply the LDCs and industrial shipper could require the construction of additional and/or new pipeline facilities in the same or other locations as the Project, which would result in their own set of environmental impacts that could be similar to, or greater than, those associated with the current proposal. Therefore, we have dismissed this alternative as a reasonable alternative to meet the Project objectives.

2.0 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of existing, modified, or proposed project(s) systems to meet the stated objective of the proposed Project. System alternatives involve the transportation of the equivalent amount of natural gas by the modification or expansion of existing pipeline systems or by other new pipeline systems.

Eastern Shore currently operates the only interstate natural gas transmission pipeline system on the Delmarva Peninsula in reasonable geographic proximity of its existing customers. We are not aware of any competing pipeline company, system, or project that could reasonably be expected to serve as an environmentally preferable alternative to the Project.

We have not identified any other system alternative that would have a significant environmental advantage over the Project and achieve Eastern Shore's stated Project objective; therefore, we eliminated system alternatives from further consideration.

3.0 SITE ALTERNATIVES

As discussed in section B above, the majority of the Project facilities would be constructed or installed adjacent to existing rights-of-way where environmental impacts would be minimized. Where practicable, locating new facilities in existing rights-of-way avoids the creation of new rights-of-way, minimizes impacts on new landowners, avoids or minimizes the need for new permanent rights-of-way, and reduces temporary impacts.

In response to our NOI, we received comments from an affected landowner, Mr. Eckrich, expressing concerns of the proposed East Sussex Extension mainline valve (MP 4.2) and staging area proposed on his property. Eastern Shore is in the process of negotiating easement agreements on all aboveground facilities. The proposed site is immediately adjacent to a county road and would encumber 0.2 acre of prime farmland. Based on the amount of prime farmland in the county the permanent loss of 0.2 acre of agricultural land would not be significant.[12] Based on the landowner's comment, Eastern Shore has identified a potential alternative site for the East Sussex Extension mainline valve and staging area. This new location would be within the existing study area at MP 3.28. This site is in similar active agricultural land and would have similar impacts on land as the proposed aboveground facility on Mr. Eckrich's property. No additional resources would be impacted by moving the proposed mainline valve to this new location. However, Eastern Shore has not secured the rights to this alternative location to date.

[12] Acreage of prime farmland within Sussex County is approximately 491,350 acres (NRCS, 2018).

As indicated in section B.9.1, the pipeline and aboveground facilities associated with the Project must be designed in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192, which are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. Eastern Shore's Project is designed to meet the highest safety pipeline class location requirements for populated areas, and its proposed and alternative East Sussex Extension mainline valve location is designed to meet DOT's mainline valve siting regulation requirements.

Based on our analysis in section B of this EA, Eastern Shore has minimized impacts on agricultural lands and prime farmland to the greatest extent possible. Therefore, we conclude neither the proposed site, nor the alternative would have significant impacts. Because there is a possibility that Eastern Shore may relocate the proposed East Sussex Extension mainline valve to the alternative site, **we recommend that:**

- **Prior to construction, Eastern Shore should file with the Secretary an update on its easement negotiations for the East Sussex Extension mainline valve and staging area at the proposed site near MP 4.2 and the alternative site near MP 3.8, and confirm the facility location in any revised alignment sheets required by recommended environmental condition 4 in section D of this EA.**

4.0. ROUTE ALTERNATIVES

Route alternatives are routes that deviate from the proposed route for a substantial distance (for example, several miles) to either avoid major features (for example, communities) or minimize environmental impacts (for example, by increasing co-location with other, existing infrastructure). Route variations are relatively short deviations from the proposed route that remain in close proximity to the proposed route, but avoid or further reduce impacts on specific localized resources.

Based on the limited environmental impact associated with this Project, we did not identify any unresolved resource conflicts which would present a need to examine route alternatives. The proposed route would meet the Project objectives while minimizing impacts on resources to the extent practicable. Because the impacts associated with the Project are not significant, we did not evaluate additional alternatives. In addition, we did not receive any comments or concerns from stakeholders regarding route alternatives.

5.0. CONCLUSION

We reviewed alternatives to Eastern Shore's proposal based on our independent analysis. Although several of the site location alternatives appear to be technically feasible, no system, or aboveground facility alternatives provide a significant

environmental advantage over the Project design. No comments were received regarding system or aboveground facilities (other than Mr. Eckrich's comment noted above). Therefore, we conclude that the Project is the preferred alternative to meet the Project objectives.

D. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis in this EA, we have determined that if Eastern Shore constructs and operates the proposed facilities in accordance with its application and supplements, and the staff's recommended mitigation measures below, approval of the Project would not constitute a major action significantly affecting the quality of the human environment. We recommend that the Commission Order contain a finding of no significant impact and include the measures listed below as conditions in any authorization the Commission may issue to Eastern Shore.

1. Eastern Shore 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. Eastern Shore 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 OEP **before using that modification.**

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order;
    b. stop-work authority; and
    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction**, Eastern Shore 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 Project alignment sheets. **As soon as they are available, and before the start of construction**, Eastern Shore 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.

   Eastern Shore'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. Eastern Shore's right of eminent domain granted under NGA section 7(h) does not authorize it to increase the size of its natural gas facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Eastern Shore 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 OEP **before construction in or near that area**.

   This requirement does not apply to extra workspaces allowed by the Commission's 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 resource mitigation measures;
   b. implementation of endangered, threatened, or special concern species mitigation measures;
   c. recommendations by state regulatory authorities; and

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

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

   a. how Eastern Shore would 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 Eastern Shore would 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 would ensure that sufficient personnel are available to implement the environmental mitigation;
   d. company personnel, including EIs and contractors, who would receive copies of the appropriate material;
   e. the location and dates of the environmental compliance training and instructions Eastern Shore would 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 Eastern Shore's organization having responsibility for compliance;
   g. the procedures (including use of contract penalties) Eastern Shore would follow if noncompliance occurs; and
   h. for each discrete facility, a Gantt or PERT chart (or similar Project scheduling diagram), and dates for:
      i. the completion of all required surveys and reports;
      ii. the environmental compliance training of onsite personnel;
      iii. the start of construction; and
      iv. the start and completion of restoration.

7. Eastern Shore shall employ at least one EI per construction spread. The EI(s) shall be:

   a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;
c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;
d. a full-time position, separate from all other activity inspectors;
e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and
f. responsible for maintaining status reports.

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

a. an update on Eastern Shore's 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 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;
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 Eastern Shore from other federal, state, or local permitting agencies concerning instances of noncompliance, and Eastern Shore's response.

9. Eastern Shore must receive written authorization from the Director of OEP **before commencing construction of any Project facilities**. To obtain such authorization, Eastern Shore must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

10. Eastern Shore must receive written authorization from the Director of OEP **before placing the Project into service.** Such authorization would 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.

11. **Within 30 days of placing the authorized facilities in service**, Eastern Shore 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 Eastern Shore 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.

12. **Prior to construction,** Eastern Shore shall file with the Secretary its commitment to obtain landowner approval for the proposed use of straw to segregate topsoil in cultivated cropland.

13. **Prior to construction,** Eastern Shore shall file a Winter Construction Plan with the Secretary, for review and written approval by the Director of the OEP. The plan shall address all items included in section III.I of the FERC Plan.

14. **Prior to construction of the Somerset Extension**, Eastern Shore shall file with the Secretary, for review and written approval by the Director of the OEP, the measures it will use to protect subsurface resources from the spread of existing contamination during trenchless construction.

15. **Prior to construction of the Woodside Loop,** Eastern Shore shall file with the Secretary, for review and written approval by the Director of OEP, revised site-specific HDD construction and maintenance plans associated with Wetlands 1 and 2 that:

    a. limits vegetation clearing to only using hand tools to facilitate the use of the HDD tracking system between the HDD entry and exit sites during construction; and
    b. ensures that Eastern Shore will not conduct any routine vegetation maintenance along these HDD segments during operation.

16. **Prior to construction,** Eastern Shore shall file with the Secretary evidence of landowner concurrence with the site-specific residential construction plan for any residence within 10 feet of the proposed construction workspaces.

17. Eastern Shore **shall not begin construction** of the respective Project facilities **until** it files with the Secretary a copy of the determination of consistency with the Coastal Zone Management Plan issued by DNREC and MDE.

18. **Prior to construction,** Eastern Shore shall file with the Secretary, for review and written approval by the Director of the OEP, a visual screening plan for the Hollymount M&R Station that includes vegetative screening of the proposed M&R Station site.

19. **Eastern Shore shall not begin construction** of facilities and/or use of staging, storage, or temporary work areas and new or to-be-improved access roads **until**:

    a. Eastern Shore files with the Secretary:

        i. the avoidance plan for site 7K-C-467, requested by the Delaware SHPO, and any resulting SHPO comments on the plan;
        ii. remaining cultural resources survey report(s)/addendum(s) for the Woodside Loop and East Sussex Extension, and the Delaware SHPO's comments on the report(s)/addendum(s); and
        iii. site evaluation report(s) and avoidance/treatment plan(s), as required, and the Delaware SHPO's comments on any plans.

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

    c. the FERC staff reviews and the Director of OEP approves the cultural resources reports and plans, and notifies Eastern Shore in writing that treatment plans/mitigation measures (including archaeological data recovery) 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: "**CUI//PRIV - DO NOT RELEASE**."

20. Eastern Shore shall file with the Secretary noise surveys for the Hollymount and Eden M&R Stations **no later than 60 days** after placing the stations into service. If full flow/load condition noise surveys are not possible, Eastern Shore shall file

an interim survey at the maximum possible power load **within 60 days** of placing the stations into service and file the full flow/load survey **within 6 months**. If the noise attributable to operation of all equipment at each station under interim or full power load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Eastern Shore shall:

a. file a report with the Secretary, for review and written approval by the Director of OEP, on what changes are needed;
b. install additional noise controls to meet that level **within 1 year** of the in-service date; and
c. confirm compliance with this requirement by filing a second full power load noise survey with the Secretary for review and written approval by the Director of OEP no later than 60 days after it installs the additional noise controls.

21. **Prior to construction,** Eastern Shore shall file with the Secretary an update on its easement negotiations for the East Sussex Extension mainline valve and staging area at the proposed site near MP 4.2 and the alternative site near MP 3.8, and confirm the facility location in any revised alignment sheets required by environmental condition 4 above.

E. REFERENCES

Bies, D.A., & Hansen, C.H. *Engineering Noise Control, Theory and Practice*. Spoon Press, 1988.

Council of Environmental Quality. 1997. "Environmental Justice Guidance under the National Environmental Policy Act" Executive Office of the President. Washington, D.C. December 10, 1997.

Cowardin Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* U.S. Department of the Interior Fish and Wildlife Service, U.S. Department of the Interior. Washington, D.C. 104 pp.

Delaware Administrative Code (DE AC). 2014. Stream Basins & Designated Uses. http://regulations.delaware.gov/AdminCode/title7/7000/7400/7401.shtml. Accessed January 2019.

DGS. 2004. Sand and Gravel. https://www.dgs.udel.edu/delaware-geology/sand-and-gravel. Accessed January 2019.

DGS. 2007. Geological Map Series No. 16, Geological Map of the Kent County, Delaware. https://www.dgs.udel.edu/sites/default/files/publications/geomap14.jpg. Accessed February 2019.

DGS. 2011a. Geological Map Series No. 16, Geological Map of the Fairmount and Rehoboth Beach Quadrangles, Delaware. https://www.dgs.udel.edu/sites/default/files/publications/GM16_Screenshot.png. Accessed February 2019.

DGS. 2011b. Geologic Map of the Harbeson Quadrangle, Delaware. https://www.dgs.udel.edu/sites/default/files/publications/geomap17.jpg. Accessed February 2019.

DGS. 2017. Coastal Plain Rock Units (Stratigraphic Chart). https://www.dgs.udel.edu/delaware-geology/coastal-plain-rock-units-stratigraphic-chart. Accessed February 2019.

Dieter, C.A., Maupin, M.A., Caldwell, R.R., Harris, M.A., Ivahnenko, T.I., Lovelace, J.K., Barber, N.L., and Linsey, K.S. 2018. Estimated use of water in the United States in 2015: U.S. Geological Survey Circular 1441, 65 p., https://doi.org/10.3133/cir1441. [Supersedes USGS Open-File Report 2017–1131.]

DNREC. 2012. State of Delaware 2012 Combined Watershed Assessment Report.

http://www.dnrec.delaware.gov/swc/wa/Documents/WAS/Final%202012%20Integrated%20305(b)%20Report%20and%20303(d)%20list.pdf. Accessed August 2018.

EIA. 2017. State Carbon Dioxide Emissions Data. Available online at: https://www.eia.gov/environment/emissions/state/. Accessed February 2018.

EIA. 2018. State Carbon Dioxide Emissions Data. https://www.eia.gov/environment/emissions/state/. Accessed March 2019.

Environmental Laboratory. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0.

EO 12898. February 11, 1994. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Federal Register [Volume 59, Number 32]. Accessed January 2019.

EPA. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Office of Noise Abatement and Control. EPA 550/9-74-004. March 1974. Available online at: http://www.nonoise.org/epa/Roll1/roll1doc11.pdf. Accessed February 2019. Accessed January 2019.

EPA. 2006a. AP-42 Compilation of Air Pollutant Emission Factors. Section 3.3 Gasoline and Diesel Industrial Engines. http://www.epa.gov/ttnchie1/ap42/ch03/final/c03s03.pdf. Accessed February 2019.

EPA. 2006b. AP-42 Compilation of Air Pollutant Emission Factors. Section 13.2.2 Unpaved Roads. http://www.epa.gov/ttnchie1/ap42/ch13/final/c13s0202.pdf. Accessed February 2019.

EPA. 2017a. National Ambient Air Quality Standards (NAAQS). Available online at: https://www.epa.gov/criteria-air-pollutants/naaqs-table, Last updated 3/29/2016. Accessed January 2019.

EPA. 2017b. Air Data Monitor Values Report. Available online at: https://www3.epa.gov/airdata/ad_rep_mon.html. Accessed January 2019.

EPA. 2017c. 40 CFR part 98. Global Warming Potentials. https://www.ecfr.gov/cgi-bin/textidx?SID=97624d04f279ac46154ed9f97f2cc0ed&mc=true&node=ap40.23.98_19.1&rgn=div9. Accessed January 2019.

EPA. 2017d. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2015. https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf. Accessed February 2019.

EPA. 2017e. Superfund Enterprise Management Systems (SEMS). https://www.epa.gov/enviro/sems-search. Accessed: February 2019.

EPA. 2018. Sole Source Aquifer Locations. https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b. Accessed February 2019.

EPA. 2018a. NAAQS Table. Available online at: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed June 2018.

EPA. 2018b. Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors, EPA. Available online at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors. Accessed June 2018.

EPA. 2018c. Water Quality Assessment and TMDL Information. https://ofmpub.epa.gov/waters10/attains_index.home. Accessed August 2018.

EPA. 2018d. Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2016. https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf . Accessed March 2019.

Federal Emergency Management Agency. 2011. FEMA Flood Map Service Center. https://msc.fema.gov/portal/search?AddressQuery=laplace%2C%20louisiana#searchresultsanchor. Accessed March 2019.

Frischhertz, Rob. June 21, 2017. Louisiana Department of Natural Resources – Geologist. Personal communication with Colleen Moss (Staff Biologist, Perennial Environmental Services, LLC).

Hawes, Terri. June 14, 2017. City of Westlake, Permit Clerk. Personal communication with Ashley Thompson (Senior Biologist, Perennial Environmental Services, LLC).

HHS. 2017. HHS Poverty Guidelines. https://aspe.hhs.gov/poverty-guidelines. Accessed March 20, 2017.

Maryland Geological Survey. 1984. Geological Map of Somerset County. https://jscholarship.library.jhu.edu/handle/1774.2/34614. Accessed February 2019.

Maryland Department of the Environment (MDE). 2018a. Mining Locations Mapping. https://mde.maryland.gov/programs/land/mining/pages/mapping.aspx. Accessed January 2019.

Maryland Department of the Environment (MDE). 2018b. Maryland Source Water Assessment Reports. https://mde.maryland.gov/programs/Water/water_supply/Source_Water_Assessment_Program/Pages/wi.aspx. Accessed December 2018.

Maryland Department of Natural Resources (MDNR). 2018. Land Acquisition and Planning. http://dnr.maryland.gov/land/Pages/Stewardship/Scenic-and-Wild-Rivers.aspx. Accessed August 2018.

Maryland Geological Survey. 2019. Maryland Geology. http://www.mgs.md.gov/geology/. Accessed February 2019.

National Climatic Data Center. Local Climatological Data Annual Summary.

Natural Resources Conservation Service. 2018. Web Soil Survey Geographic Database. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed February 2019.

NRCS. 2010 Handbooks, Title 430 – Soil Survey, Part 618 – Soil Properties and Qualities. https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=40560.wba. Accessed October 2017.

O'Rourke, T.D. and M. C. Palmer. 1996. Earthquake Performance of Gas Transmission Pipelines. Earthquake Spectra: August 1996, Vol. 12, No. 3, pp. 493-527

State of Delaware. 2019. Delaware Well Head Protection Areas. http://opendata.firstmap.delaware.gov/datasets/4ef7d33f373d46229c6828ca198df5c5_0 . Accessed January 2019.

Tohn, Tammy. June 13, 2017. Calcasieu Parish, Planning and Development. Personal communication with Ashley Thompson (Senior Biologist, Perennial Environmental Services, LLC).

Trapp, H., and Horn, M.A. 1997. Ground Water Atlas of the United States: Delaware, Maryland, New Jersey, North Carolina, Pennsylvania, Virginia, West Virginia. US Geological Survey Report HA730-L.

USACE. 1987. *Corps of Engineers Wetland Delineation Manual.*

U.S. Census Bureau. 2015. U.S. Census Bureau, American Fact Finder. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_5YR_B03002&prodType=table. Accessed April 2017

U.S. Census Bureau. 2016. https://www.census.gov/quickfacts/fact/table/calcasieuparishlouisiana/PST04521. Accessed December 2017.

U.S. Department of Agriculture. 2013. Summary Report: 2010 National Resources Inventory, Natural Resources Conservation Service, Washington, DC, and Center for Survey Statistics and Methodology, Iowa State University, Ames, Iowa.

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1167354.pdf. Accessed November 2017.

U.S. Department of Transportation - Pipeline and Hazardous Materials Safety Administration. 2018a. States Participating in the Federal/State Cooperative Gas and Hazardous Liquid Pipeline Safety Programs. Available at: https://primis.phmsa.dot.gov/comm/Cooplist.htm. Accessed April 27, 2018.

U.S. Department of Transportation - Pipeline and Hazardous Materials Safety Administration. 2018b. Pipeline Incident 20 Year Trends. Available at: https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-incident-20-year-trends. Accessed December 2018.

U.S. Department of Transportation - Pipeline and Hazardous Materials Safety Administration. 2018c. Pipeline Mileage and Facilities. https://www.phmsa.dot.gov/data-and-statistics/pipeline/pipeline-mileage-and-facilities. Accessed December 2018.

U.S. Department of Transportation - Pipeline and Hazardous Materials Safety Administration. 2018d. Significant Pipeline Incidents by Cause. Available at: https://hip.phmsa.dot.gov/analyticsSOAP/saw.dll?Go. Accessed December 2018.

U.S. Energy Information Administration. 2018. Delaware Profile Analysis. https://www.eia.gov/state/analysis.php?sid=DE. Accessed January 2019.

U.S. Energy Information Administration. 2018. Maryland Profile Analysis. https://www.eia.gov/state/analysis.php?sid=MD. Accessed January 2019.

USFWS. 2007. National Bald Eagle Management Guidelines. https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf. Accessed October 2017.

USGS. 2003. Active Mines and Mineral Plants in the United States. Available online at: http://mrdata.usgs.gov/mineplant/. Accessed May 2016.

USFWS. 2008. Birds of Conservation Concern. http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf. Accessed December 2018.

USFWS. 2018a. Northeast Region. Swamp pink overview and distribution. https://www.fws.gov/northeast/njfieldoffice/endangered/swamppink.html#overview. Accessed August 2018

USFWS. 2018b. Information for Planning and Consultation. https://ecos.fws.gov/ipac/ . Accessed January 2019.

USGS. 2011. Mineral Resources Data System. https://mrdata.usgs.gov/general/map-us.html#home. Accessed December 2018.

USGS. 2009. Physiographic Regions of the United States. https://www.nrc.gov/docs/ML0933/ML093340269.pdf. Accessed February 2019.

USGS. 2016. Atlantic Coastal Plain physiographic provinces. https://www.usgs.gov/media/images/atlantic-coastal-plain-physiographic-provinces. Accessed August 2018.

USGS. 2017. National Hydrography Dataset. https://www.nhd.usgs.gov. Accessed August 2018.

USGS. 2018a. Magnitude/Intensity Comparison. https://earthquake.usgs.gov/learn/topics/mag_vs_int.php. Accessed February 2019.

USGS. 2018b. Quaternary fault and fold database for the United States. http//earthquake.usgs.gov/hazards/qfaults/. Accessed January 2019.

USGS. 2014a. Seismic-Hazards Maps for the Conterminous United States. https://pubs.usgs.gov/sim/3325/. Accessed January 2019.

USGS. 2014b. Landslide Hazards Program - Landslide Overview Map of the Conterminous United States. http://landslides.usgs.gov/hazards/nationalmap/. Accessed January 2019.

F. LIST OF PREPARERS

Melendez-Rivera, Kimberly- Project Manager, Surface Water, Wetlands, Fisheries, Vegetation, Wildlife, Special Status Species, Alternatives, Cumulative Impacts

B.S. BioResource Research, 2013, Oregon State University
B.A. International Studies, 2013 Oregon State University

Augustino, Kylee – Air Quality, Noise, Reliability and Safety

M.S., Environmental Engineering, 2016, The Johns Hopkins University
B.A & Sc., Biology and Geography, 2005, McGill University

Bloomfield, Andrea - Land Use, Visual Resources

B.S., Environmental Management, 2018, University of Maryland University College

Boros, Laurie - Cultural Resources

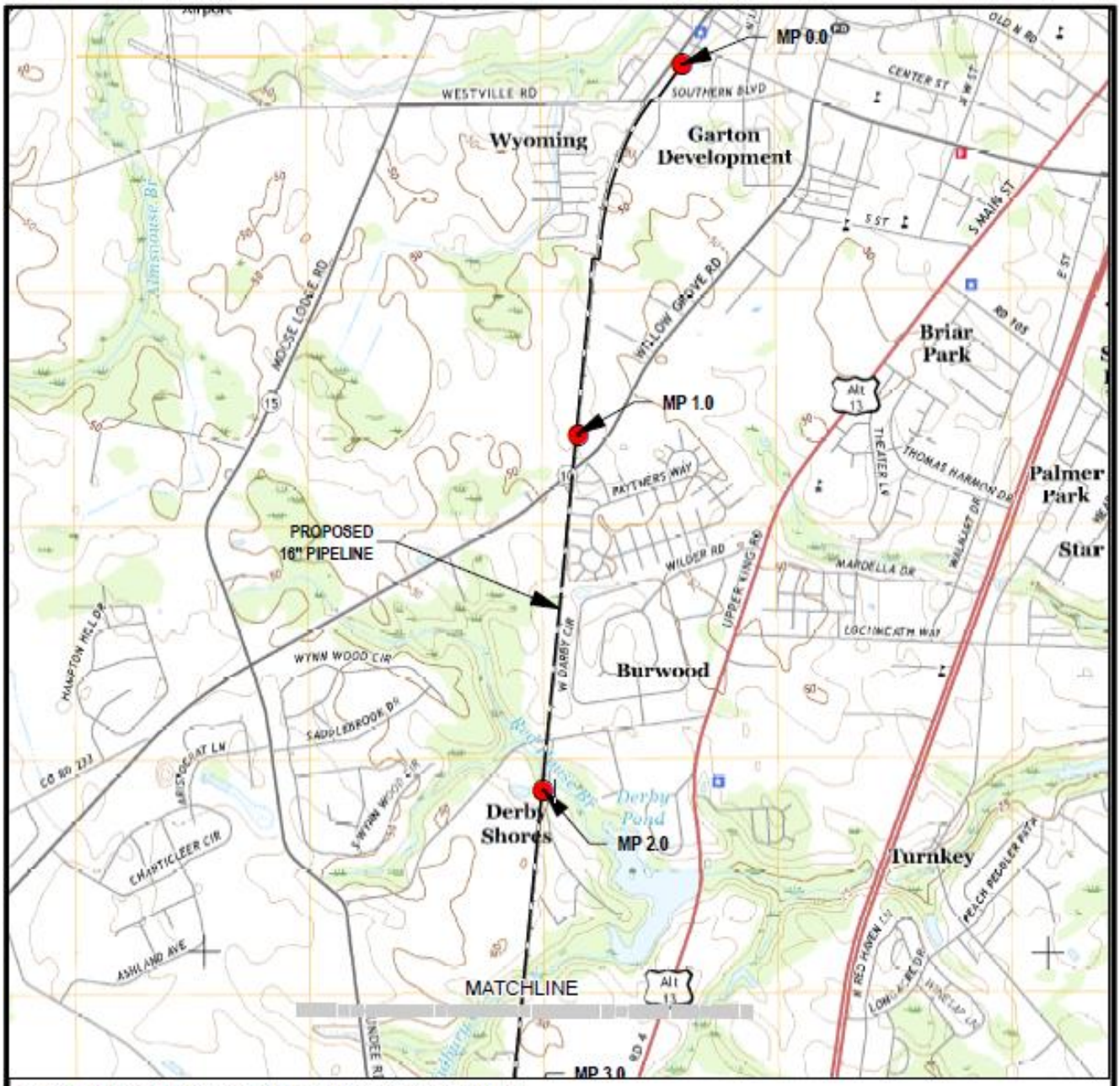
B.A., Anthropology/Archaeology, 1980. Queens College, City University of New York

Jensen, Andrea – Geology, Soils, Groundwater Resources

B.S., Environmental Geology, 2012, College of William and Mary

Appendix A

Pipeline Routes and Site Location Map



SOURCE: UNITED STATES GEOLOGICAL SURVEY, WYOMING, DE QUADRANGLE, 7.5-MINUTE TOPOGRAPHIC MAP SERIES. DATED 2016.

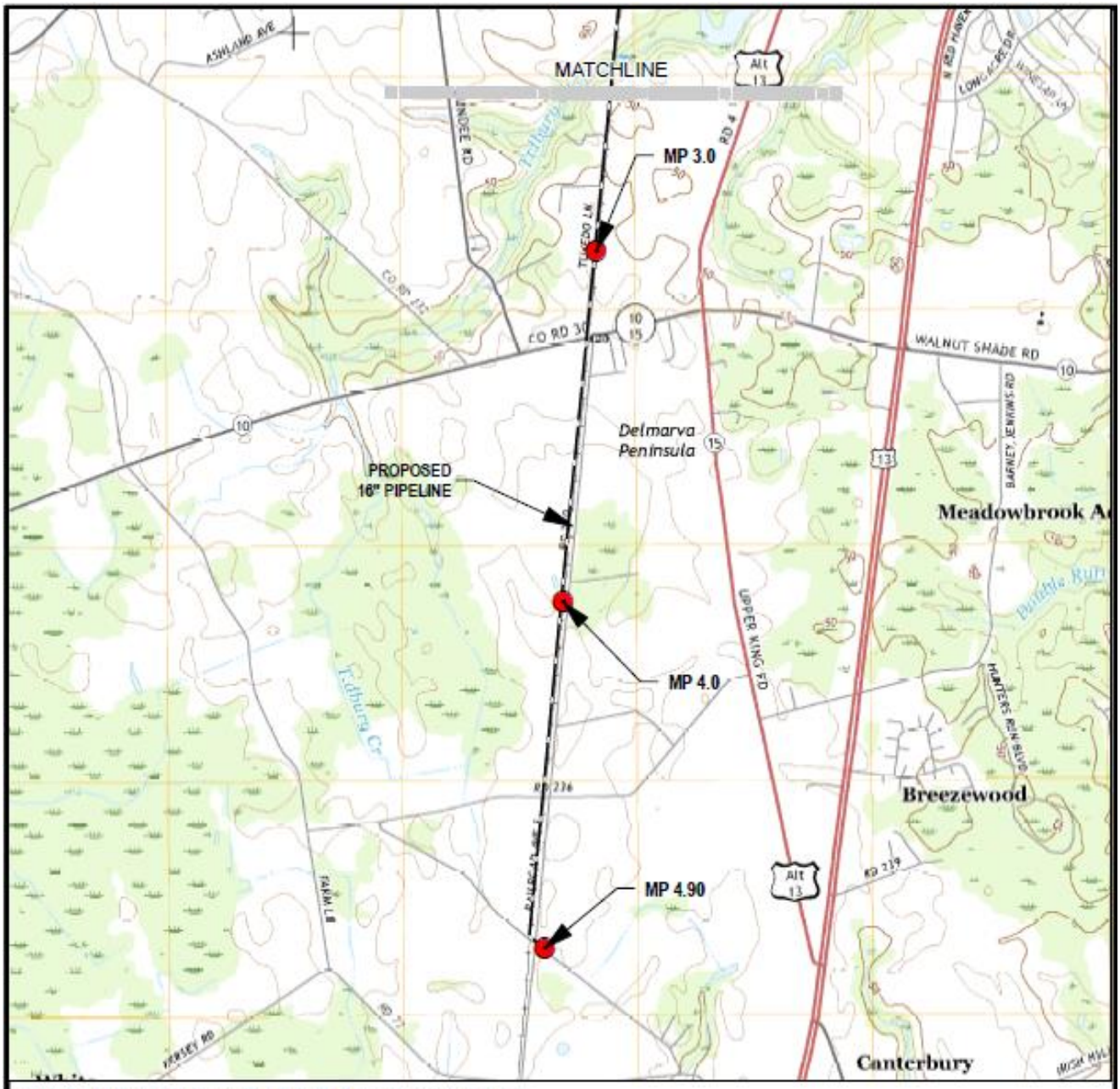
GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT-WOODSIDE LOOP

KENT COUNTY, DELAWARE

JOB NO.	SCALE	DATE	DRAWN BY	REVIEW BY	FIGURE
19227	1" = 2,000'	SEPTEMBER 10, 2018	MAJ	TAS	1.1-2A



SOURCE: UNITED STATES GEOLOGICAL SURVEY, WYOMING, DE QUADRANGLE, 7.5-MINUTE TOPOGRAPHIC MAP SERIES. DATED 2016.

NORTH

0 2,000

Approximate Scale
1 inch = 2,000 feet

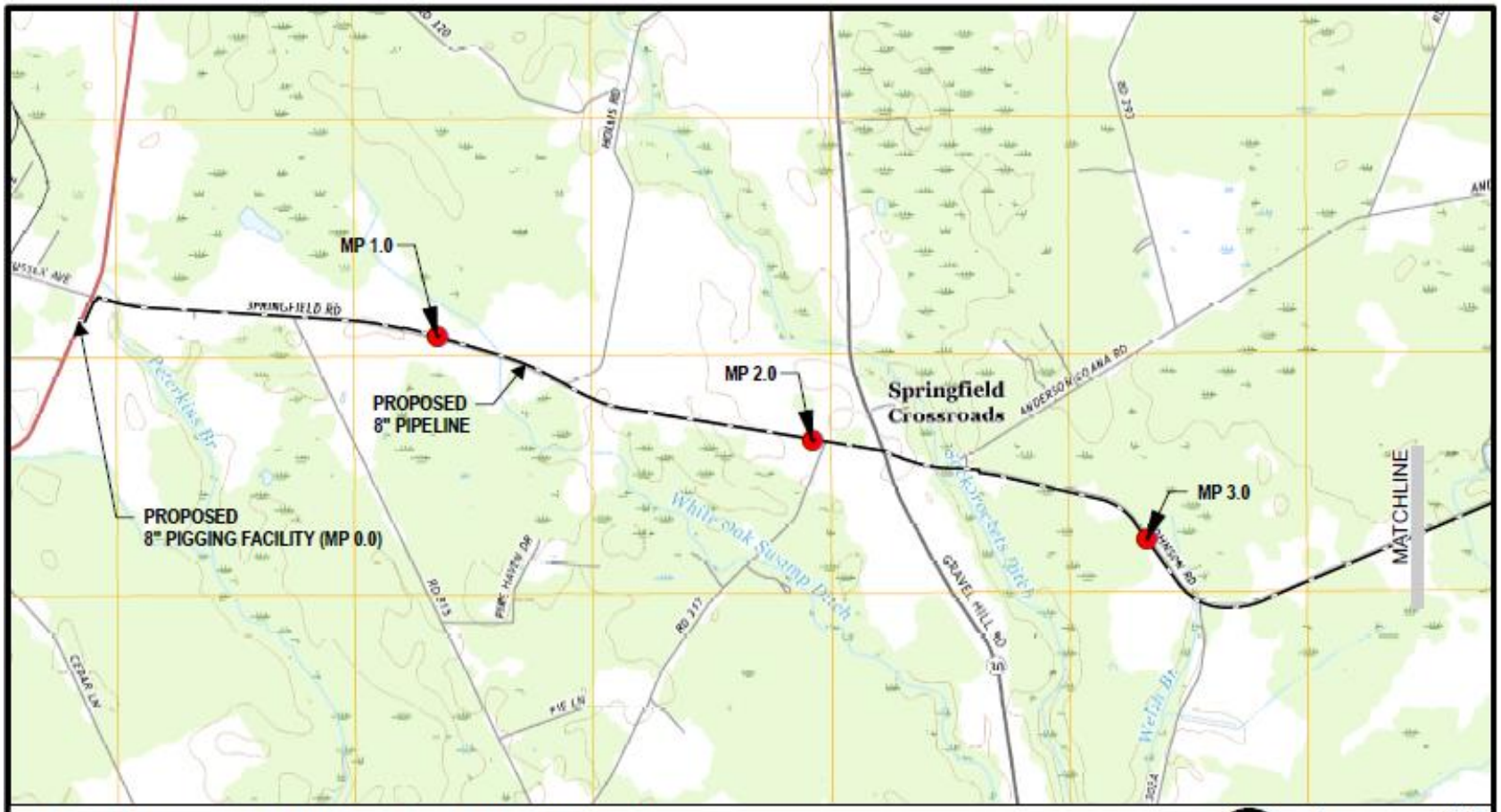
GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT-WOODSIDE LOOP

KENT COUNTY, DELAWARE

JOB NO.	SCALE	DATE	DRAWN BY	REVIEW BY	FIGURE
19227	1" = 2,000'	SEPTEMBER 10, 2018	MAJ	TAS	1.1-2B



SOURCE: UNITED STATES GEOLOGICAL SURVEY, FAIRMOUNT, DE QUADRANGLE AND HARBESON, DE QUADRANGLE, 7.5-MINUTE TOPOGRAPHIC MAP SERIES. BOTH DATED 2016.

NORTH

0 2,000

Approximate Scale
1 inch = 2,000 feet

GTA

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

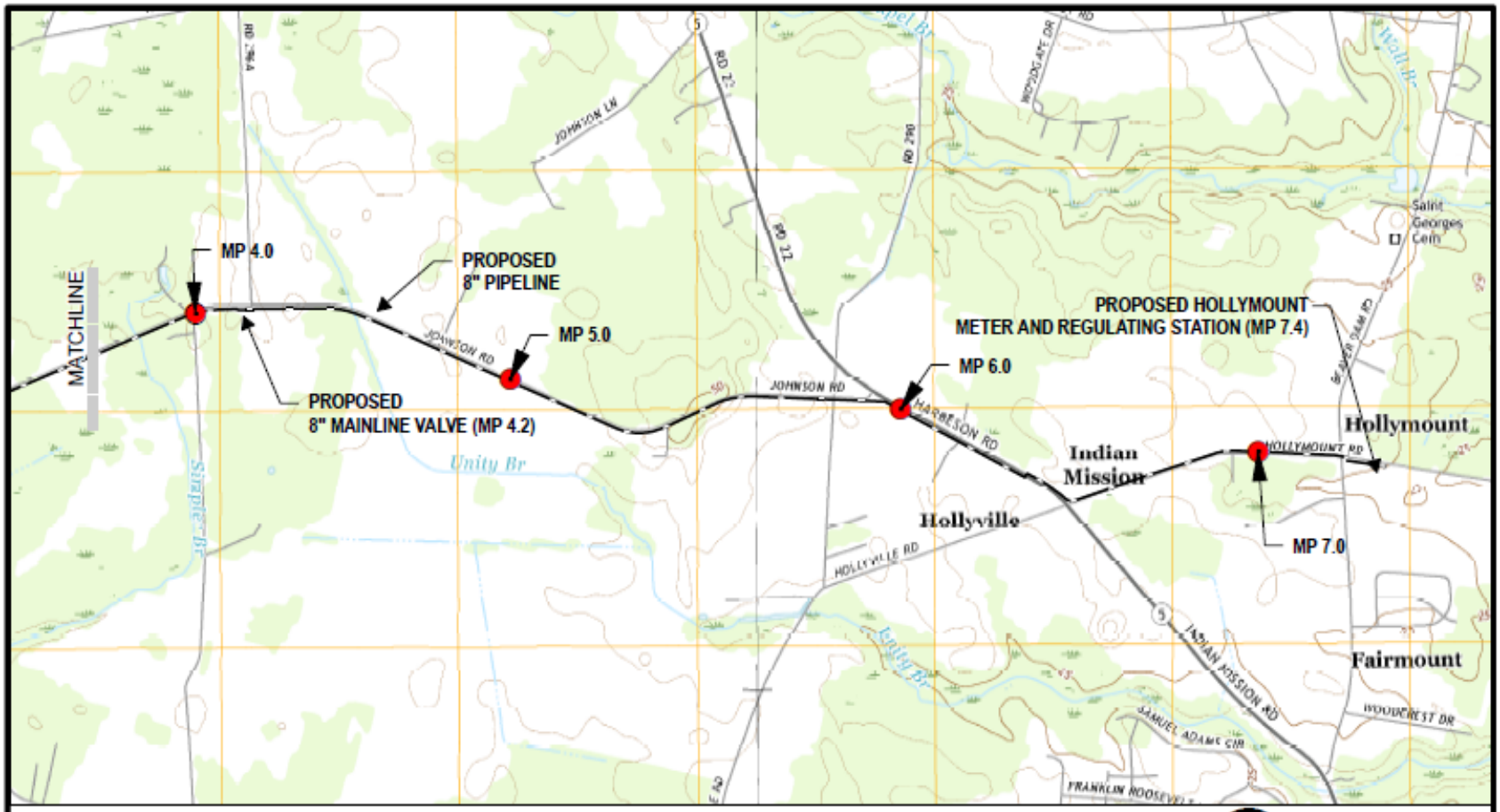
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT- EAST SUSSEX EXTENSION

SUSSEX COUNTY, DELAWARE

JOB NO.	19696	SCALE:	1" = 2,000'	DATE:	SEPTEMBER 10, 2018	DRAWN BY:	MDP	REVIEW BY:	TAS	FIGURE:	1.2-2C



SOURCE: UNITED STATES GEOLOGICAL SURVEY, FAIRMOUNT, DE QUADRANGLE AND HARBESON, DE QUADRANGLE, 7.5-MINUTE TOPOGRAPHIC MAP SERIES. BOTH DATED 2016.

NORTH

0 2,000

Approximate Scale
1 inch = 2,000 feet

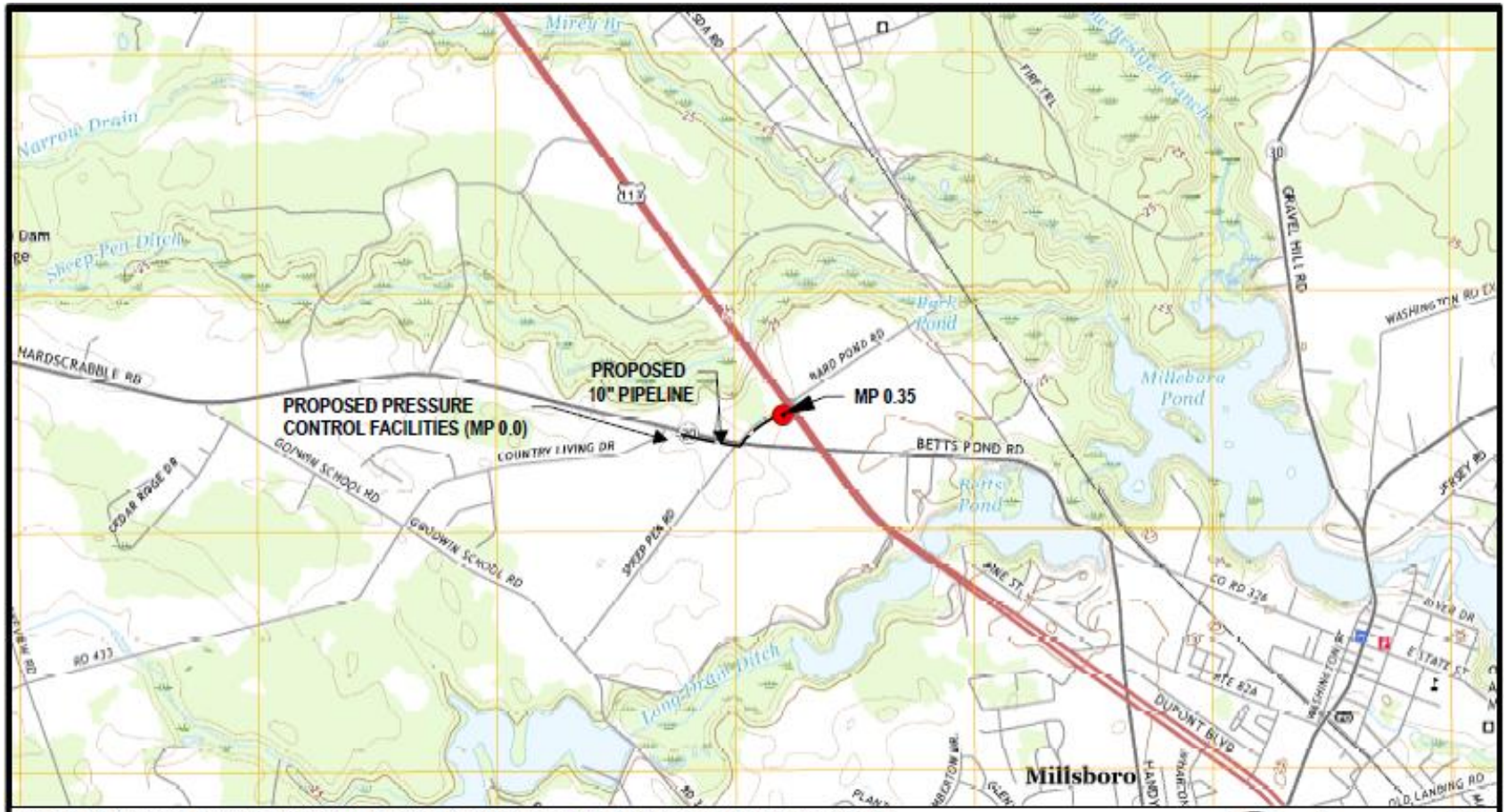
GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT- EAST SUSSEX EXTENSION

SUSSEX COUNTY, DELAWARE

JOB NO.	19696	SCALE:	1" = 2,000'	DATE:	SEPTEMBER 10, 2018	DRAWN BY:	MDP	REVIEW BY:	TAS	FIGURE:	1.2-2D



GTA

GEO-TECHNOLOGY ASSOCIATES, INC.

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

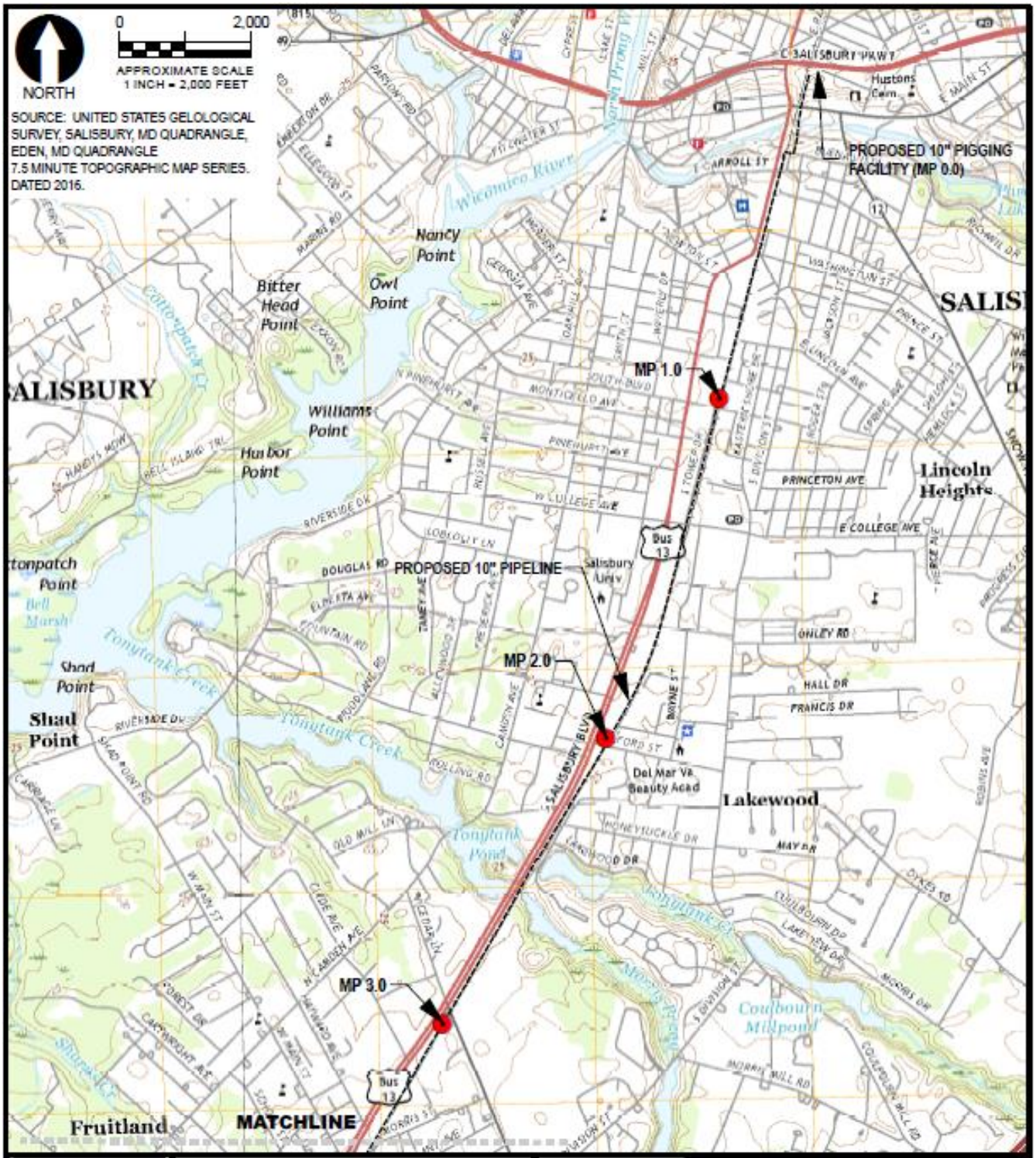
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4695
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT-MILLSBORO CONTROLLER UPGRADE

SUSSEX COUNTY, DELAWARE

JOB NO.	SCALE	DATE	DRAWN BY	REVIEW BY	FIGURE
19697	1" = 2,000'	SEPTEMBER 10, 2018	MDP	TAS	1.2-2E



GTA

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

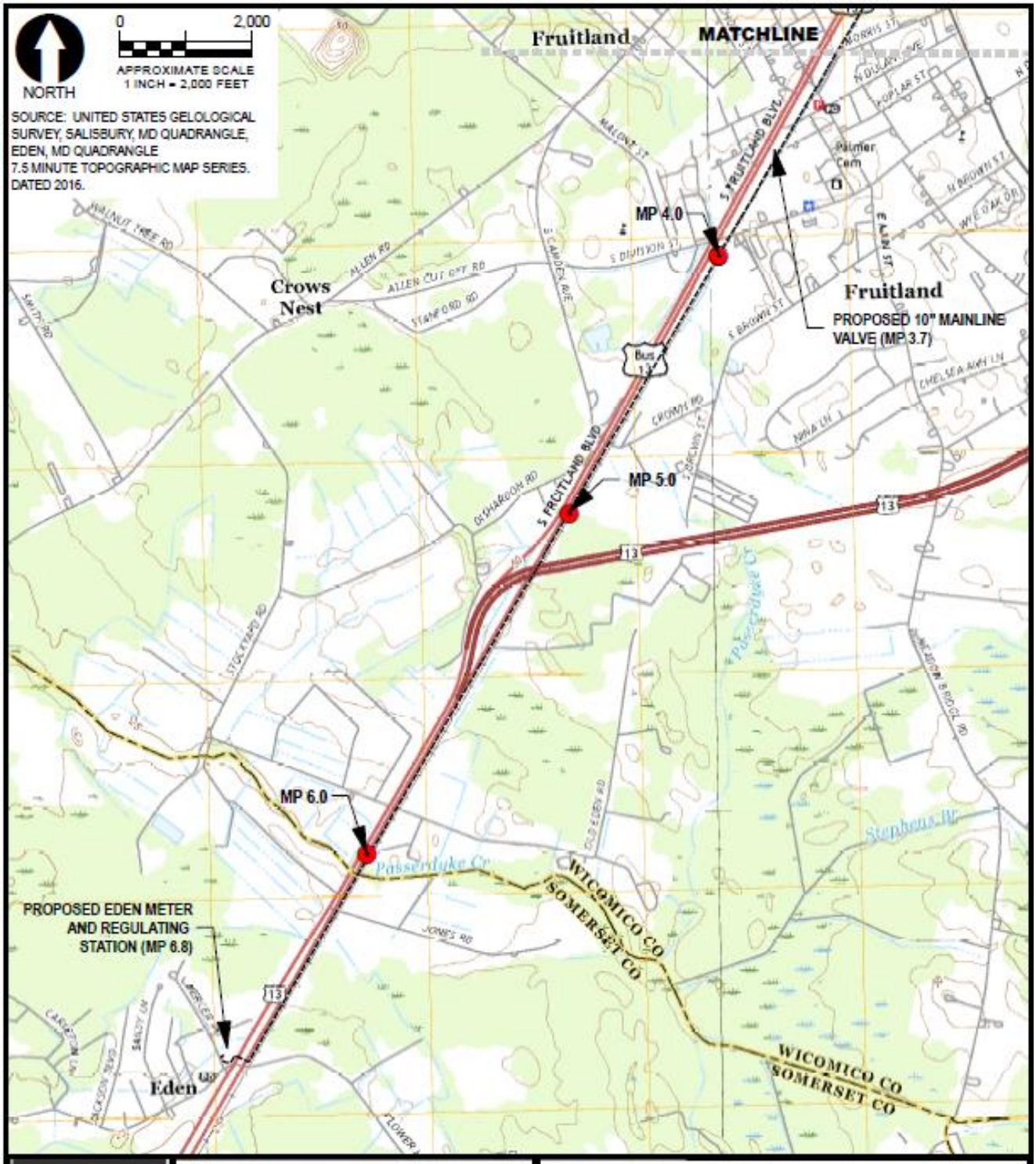
3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT-SOMERSET EXTENSION

WICOMICO AND SOMERSET COUNTIES, MARYLAND

JOB NO.	SCALE:	DATE:	DRAWN BY:	REVIEW BY:	FIGURE:
31180489	1" = 2,000'	SEPTEMBER 10, 2018	RJM	TAS	1.2-2F



GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

3445-A BOX HILL CORPORATE CENTER DRIVE
ABINGDON, MARYLAND 21009
410-515-9446
FAX: 410-515-4895
WWW.GTAENG.COM

TOPOGRAPHIC MAP

DEL-MAR ENERGY PATHWAY PROJECT-SOMERSET EXTENSION

WICOMICO AND SOMERSET COUNTIES, MARYLAND

JOB NO.	SCALE	DATE	DRAWN BY	REVIEW BY	FIGURE
31180489	1" = 2,000'	SEPTEMBER 10, 2018	RJM	TAS	1.2-2G

Appendix B

Project Permits Table

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
Federal			
Federal Energy Regulatory Commission	Section 7 of the Natural Gas Act	Application submitted on September 14, 2018.	Estimated Issue Date- *Pending approval.*
U.S. Army Corps of Engineers (USACE) Philadelphia District	Clean Water Act, 33 U.S.C. 1251 et seq., Section 404	Woodside Loop; East Sussex Extension; Millsboro Control Upgrade – JPP meeting held on October 18, 2019. Application submitted March 2019.	Woodside Loop; East Sussex Extension; Millsboro Control Upgrade - *Anticipate approval in May 2019.*
USACE Baltimore District	Clean Water Act, 33 U.S.C. 1251 et seq., Section 404	Somerset Extension - *Anticipate application submittal in March 2019.*	Somerset Extension - *Anticipate approval in June 2019.*
U.S. Fish & Wildlife Service (USFWS) Endangered Species Unit Chesapeake Bay Field Office	Endangered Species Act of 1973, 16 U.S.C. 1531 et seq., Section 7, Interagency Cooperation	Woodside Loop - Online inquiry and certification letter submitted January 16, 2018 and October 16, 2018. Received online inquiry from USFWS during FERC scoping on December 20, 2018.	Woodside Loop – No effect determination. No further coordination required.
		East Sussex Extension - Online inquiry submitted August 16, 2017. Received online inquiry from USFWS during FERC scoping on December 20, 2018.	East Sussex Extension - Received "not likely to adversely affect" letter on September 7, 2017. No further coordination required.
		Millsboro Control Upgrade - Online inquiry submitted August 16, 2017. Received online inquiry from USFWS during FERC scoping on December 20, 2018.	Millsboro Control Upgrade - Received "not likely to adversely affect" letter on September 7, 2017. No further coordination required.
		Somerset Extension - Online inquiry submitted June 7, 2018. Online inquiry for staging areas submitted on January 29, 2019. Received online inquiry from USFWS during FERC scoping on	Somerset Extension - No further coordination required, including staging areas.

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted** ***Anticipated***	**Date Permit/ Consultation Received** ***Anticipated***
		December 20, 2018.	
National Park Service	Wild and Scenic Rivers Act of 1968, 16 U.S.C. 1271 et. seq.	Woodside Loop; East Sussex Extension; Millsboro Control Upgrade – Online review conducted August 16, 2017. No wild and scenic rivers identified in Project vicinity.	Woodside Loop; East Sussex Extension; Millsboro Control Upgrade – N/A, no consultation required.
		Somerset Extension – Online review conducted on June 7, 2018. No wild and scenic rivers identified in Project vicinity.	Somerset Extension – N/A, no consultation required.
National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 16 U.S.C. 1801	Woodside Loop -Project notification letter submitted on May 18, 2016.	Woodside Loop - "No effect" response received from NMFS on August 3, 2016.
		East Sussex Extension; Millsboro Control Upgrade – Electronic mail message inquiry submitted on August 18. 2017.	East Sussex Extension; Millsboro Control Upgrade - "No effect" response received from NMFS on December 4, 2017.
		Somerset Extension – Electronic mail message inquiry submitted on June 14, 2018.	Somerset Extension - "No effect" response received from NMFS on July 5, 2018.
State			
Delaware Department of Natural Resources and Environmental Control (DNREC) Division of Water Resources	Tidal Wetlands, Tidal and Nontidal Waterbodies Wetlands Act 1973, 7 Del.C. Ch. 66, Section 6607 Subaqueous Lands Act 1986, 7 Del.C. §7212	Woodside Loop, East Sussex Extension - Permit application pending, to be determined based on environmental impacts. JPP meeting held on October 18, 2018. *Anticipate application submittal in March 2019.*	Woodside Loop, East Sussex Extension - *Anticipate approval in May 2019.*
		Millsboro Control Upgrade- N/A, no jurisdictional features present.	Millsboro Control Upgrade - N/A, no jurisdictional features present.
DNREC Division of Water Resources	Section 401 Water Quality Certification	Woodside Loop, East Sussex Extension - *Anticipate permit submittal in March 2019 (with USACE permit application).*	Woodside Loop, East Sussex Extension - *Anticipate approval in May 2019.*

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
		Millsboro Control Upgrade- N/A; No impacts to jurisdictional wetlands or waterbodies.	Millsboro Control Upgrade- N/A- No impacts to jurisdictional wetlands or waterbodies.
Delaware State Historic Preservation Office	National Historic Preservation Act of 1966, Section 106	Woodside Loop- Initial consultation letter submitted on May 12, 2016. Phase I report submitted on June 29, 2018.	Woodside Loop- Received response dated July 6, 2018 indicating that the project will have no adverse effect on historic properties.
		East Sussex Extension- Initial consultation letter submitted on August 22, 2017. Phase I report submitted on November 3, 2017, addendum submitted on January 4, 2018 (excluded denied access areas).	East Sussex Extension- Received response dated November 21, 2017 indicating that the project would not adversely affect architectural resources, and that no archaeological sites were observed (excluding denied access areas). Received response dated January 31, 2018 concurring with the addendum, and that site 7S-F-168 may be eligible for inclusion to the National Register of Historic Places. Site 7S- F-168 will be avoided by the project.
		Millsboro Control Upgrade- Initial consultation letter submitted on August 22, 2017. Phase I report submitted on November 30, 2017.	Millsboro Control Upgrade - Received response dated July 9, 2018 indicating that there are no historic properties present to be affected by the project.
DNREC Division of Fish and Wildlife - Natural Heritage Program	Endangered Species Act of 1973, 16 U.S.C. 1531 et seq., Section 7, Interagency Cooperation	Woodside Loop- Consultation letter submitted April 8, 2016 and February 14, 2019.	Woodside Loop - Received letter dated August 31, 2016 and February 18, 2019 indicating that the Project activities would not impede flow into Derby Pond. September 14, 2017 phone conversation with DNREC Fisheries Section clarified that the flow to Derby Pond would not be impeded.

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
		East Sussex Extension- Consultation letter submitted August 18, 2017.	East Sussex Extension - Received letter dated September 12, 2017 indicating that there are no records of state-rare or federally listed plants, animals or natural communities at the project site.
		Millsboro Control Upgrade- Consultation letter submitted August 18, 2017.	Millsboro Control Upgrade - Received letter dated September 22, 2017 indicating that there are no records of state-rare or federally listed plants, animals or natural communities at the project site.
Delaware Department of Transportation (DELDOT)	DOT Utility Construction Permit Delaware Code Title 2 2400	Woodside Loop- *Anticipate application submittal in March 2019.*	Woodside Loop- *Anticipate receiving approval in April 2019.*
	DOT Utility Construction Permit Delaware Code Title 2 2400	East Sussex Extension, Millsboro Upgrade - *Anticipate application submittal in April 2019.*	East Sussex Extension, Millsboro Upgrade - *Anticipate receiving approval in May 2019.*
DNREC Division of Soil and Water Conservation	Coastal Zone Management Act, 1972, Title 7, Chapter 70	Woodside Loop, East Sussex Extension, Millsboro Control Upgrade - *Anticipate application submittal in April 2019.*	Woodside Loop, East Sussex Extension, Millsboro Control Upgrade - *Anticipate receiving approval in May 2019.*
DNREC Division of Watershed Stewardship	NPDES NOI General Stormwater Permit, 40 CFR 122.28(b)(2)	Woodside Loop - *Anticipate application submittal in March 2019.*	Woodside Loop - *Anticipate receiving approval in April 2019.*
	NPDES NOI General Stormwater Permit, 40 CFR 122.28(b)(2)	East Sussex Extension, Millsboro Control Upgrade - *Anticipate application submittal in April 2019.*	East Sussex Extension, Millsboro Control Upgrade – *Anticipate receiving approval in May 2019.*

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
DNREC Division of Watershed Stewardship	Erosion and Sediment Control Plan Review and Approval for pipeline construction	Woodside Loop, Millsboro Control Upgrade – *Anticipate application submittal in March 2019.*	Woodside Loop, Millsboro Control Upgrade - *Anticipate receiving approval in April 2019.*
		East Sussex Extension- Application submitted March 2019.	East Sussex Extension- *Anticipate receiving approval in May 2019.*
Maryland Department of Natural Resources (MDNR) Wildlife and Heritage Service	Endangered Species Act of 1973, 16 U.S.C. 1531 et seq., Section 7, Interagency Cooperation	Somerset Extension- Consultation letter submitted on June 12, 2018. Staging areas inquiry submitted on December 27, 2018.	Somerset Extension- Received response letter dated June 29, 2018 and January 11, 2019 stating, "there are no official State or Federal records for listed plant or animal species within the delineated area shown on the map provided."
Maryland Department of the Environment (MDE) Wetlands and Waterways Program	Nontidal Wetlands Joint Permit, Tidal Wetlands Joint Permit	Somerset Extension- *Anticipate application submittal in March 2019.*	Somerset Extension- *Anticipate receiving approval in June 2019.*
MDE Coastal Zone Consistency Division	Coastal Zone Management Act, 1972, Title 7, Chapter 70	Somerset Extension- *Anticipate application submittal in March 2019. (Wetlands Joint Permit Application).*	Somerset Extension- *Anticipate receiving approval in June 2019 (would be granted with Wetlands Permit).*
MDE Water Management Administration	Code of Maryland Regulations 26.08.04, NPDES General Discharge Permit-Hydrostatic Testing Discharge	Somerset Extension- *Anticipate application submittal in April 2019.*	Somerset Extension- *Anticipate receiving approval in June 2019.*

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
	Section 401 Water Quality Certification	Somerset Extension- Anticipate application submittal in April 2019. (*Wetlands Joint Permit Application).*	Somerset Extension- *Anticipate receiving approval in July2019 (would be granted with Wetlands Permit).*
MDE Water Management Administration	General Permit for Stormwater Associated with Construction Activity Notice of Intent (NOI)	Somerset Extension - *Anticipate application submittal in May 2019.*	Somerset Extension - *Anticipate response in June 2019.*
Wicomico County Soil Conservation District	Erosion and Sediment Control Plan Review and Approval for Pipeline Construction.	Somerset Extension - *Anticipate application submittal in April 2019.*	Somerset Extension - *Anticipate response in June 2019.*
Somerset County Department of Public Works	Grading Permit	Somerset Extension – *Anticipate application submittal April 2019.*	Somerset Extension – *Anticipate response in June 2019.*
Wicomico County Department of Planning, Zoning and Community Development	Forest Conservation Act of 1992, COMAR Title 08, Subtitle 19	Somerset Extension - *Per telephone conservation on August 28, 2018, the Project is likely exempt, Eastern Shore would submit site plans to confirm.*	Somerset Extension –*Eastern Shore anticipates submitting site plans in March 2019.*

Table B-1 Permits for Proposed Project			
Agency	**Jurisdiction/Regulatory Involvement**	**Date Permit/ Consultation Submitted *Anticipated***	**Date Permit/ Consultation Received *Anticipated***
Somerset County Department of Planning and Zoning	Forest Conservation Act of 1992, COMAR Title 08, Subtitle 19	Somerset Extension – Per telephone conversation on August 29, 2019, the project is exempt, provided a Declaration of Intent is submitted by Eastern Shore.	Somerset Extension – *Eastern Shore anticipates submitting Declaration of Intent in March 2019.*
Maryland Historical Trust	National Historic Preservation Act of 1966, Section 106	Somerset Extension - Phase I Report submitted September 2018. *Anticipate submitting addendum for staging areas in April 2019.*	Somerset Extension - Received response dated January 22, 2019 indicating the Project would have no adverse effect on historic properties.
Maryland State Highway Administration	Utility Permit for work within state roads	Somerset Extension - *Anticipate submittal of application April 2019.*	Somerset Extension – *Anticipate receiving response June 2019.*

Appendix C

Project Tables

Table C-1
Additional Temporary Workspaces Proposed for the Project

County, State	MP	Number of ATWS and Dimensions (feet)	Area (acres)[12]	Justification	Existing Land Use
Woodside Loop					
Kent County, Delaware	0.00 - 0.11	Irregular	0.4	Tie-in & HDD laydown	Open/right-of-way
	0.32 - 0.40	Irregular	1.7	TAR-WS-1 & HDD laydown	Commercial
	0.55 - 0.61	200 x 100	0.5	Railroad crossing	Forest
	1.13 - 1.17	Irregular	0.8	Staging & road crossing	Agricultural
	1.17 - 1.23	Irregular	0.6	Staging & road crossing	Agricultural
	2.10 - 2.18	Irregular	1.3	RAR-WS-2 & HDD laydown	Agricultural
	2.78 - 2.83	Irregular	0.3	Materials storage	Agricultural
	3.11 - 3.14	Irregular	0.2	HDD laydown	Residential
	3.45 - 3.56	Irregular	3.0	TAR-WS-3 & materials storage	Agricultural
	4.40 – 4.47	Irregular	2.3	Staging & road crossing	Agricultural
	4.76 – 4.84	Irregular	2.0	Railroad crossing	Agricultural
	4.84 – 4.90	Irregular	3.4	Materials storage	Agricultural
	4.85 – 4.90	Irregular	0.5	Tie-in	Agricultural
Woodside Loop Total			**17.0**		
East Sussex Extension					
Sussex County, Delaware	0.00-0.01	100 x 104	0.1	Tie-In and Aboveground facility construction & materials storage	Open
	0.00-0.01	90 x 55	<0.1	Aboveground facility construction & materials storage	Forest
	0.02-0.04	155 x 70	0.2	Road crossing	Residential/Agricultural
	0.23-0.28	Irregular	0.8	HDD laydown	Agricultural
	0.61-0.69	Irregular	1.8	HDD laydown	Agricultural/Open/Forest
	0.90-0.95	Irregular	1.1	HDD laydown	Agricultural
	0.95-1.30	1,850 x 15	0.7	Linear widening for topsoil segregation	Agricultural/Stream
	1.30-1.37	Irregular	1.7	Materials storage & HDD laydown	Agricultural
	1.86-1.91	Irregular	1.2	HDD laydown	Agricultural
	2.20-2.23	Irregular	0.2	HDD laydown	Residential
	2.45-2.48	Irregular	0.1	Road crossing	Residential/Agricultural
	2.45-2.48	Irregular	0.1	Road crossing	Agricultural
	3.02-3.04	Irregular	0.4	HDD laydown	Agricultural
	3.24-3.34	Irregular	2.3	HDD laydown	Agricultural

Table C-1
Additional Temporary Workspaces Proposed for the Project

County, State	MP	Number of ATWS and Dimensions (feet)	Area (acres)[12]	Justification	Existing Land Use
	4.17-4.30	Irregular	3.4	Aboveground facility construction & materials storage	Agricultural/Forest
	5.68-5.76	Irregular	3.4	Materials storage	Agricultural
	5.89-6.01	Irregular	2.4	Materials storage	Agricultural
	5.92-5.95	Irregular	0.2	Materials storage	right-of-way/Open
	6.36-6.44	Irregular	0.3	Road crossing	Agricultural
	6.38-6.44	Irregular	0.3	Road crossing	Commercial
	6.48-6.63	Irregular	2.1	Materials storage	Agricultural
	6.63-7.15	Irregular	0.9	Linear widening for topsoil segregation	Agricultural
	7.15-7.24	Irregular	2.6	Road crossing	Agricultural
	7.25-7.33	Irregular	>0.5	Road crossing	Residential
	7.25-7.36	Irregular	1.8	Tie-in and aboveground facility construction	Agricultural
East Sussex Extension Total			**28.5**		
Somerset Extension					
Wicomico County, Maryland	0.00-0.01	Irregular	0.9	Tie-in & HDD laydown	Right-of-way/Commercial
	0.18-0.19	Irregular	<0.1	HDD and supplement to reduced workspace	Forest/Residential
	0.21-0.22	Irregular	<0.1	Staging	Residential
	0.23-0.23	Irregular	<0.1	Staging, railroad bore	Right-of-way
	0.26-0.28	30 x 134	0.1	Railroad bore	Right-of-way/Open
	0.35-0.36	17 x 74	<0.1	Staging	Open
	0.47-0.49	Irregular	<0.1	Staging, road crossing	Open
	0.54-0.55	Irregular	<0.1	Staging, constructability	Open
	0.56-0.58	Irregular	<0.1	Staging, constructability	Commercial/Open
	0.75-0.78	Irregular	0.1	Staging, constructability	Commercial/Right-of-way
	0.85-0.88	Irregular	0.5	Materials storage	Commercial
	0.98-1.02	Irregular	0.3	Staging	Commercial/Right-of-way
	1.49-1.55	12 x 265	0.1	Staging, constructability	Right-of-way/Commercial
	1.58-1.63	12 x 295	0.1	Staging, constructability, HDD installation	Commercial

Table C-1
Additional Temporary Workspaces Proposed for the Project

County, State	MP	Number of ATWS and Dimensions (feet)	Area (acres)[1,2]	Justification	Existing Land Use
	1.74-1.82	Irregular	0.3	Staging, constructability, HDD installation	Commercial
	1.89-1.95	Irregular	0.6	Materials storage, staging, constructability, HDD installation	Commercial/Right-of-way
	1.95-2.01	Irregular	0.2	Materials storage, staging, constructability	Commercial
	2.14-2.18	Irregular	0.1	Staging, constructability	Open
	3.00-3.08	Irregular	0.1	Staging, constructability, HDD installation	Right-of-way/Commercial
	3.24-3.28	Irregular	0.4	Materials storage, staging	Residential/Commercial
	3.48-3.55	Irregular	0.9	materials storage, staging, constructability, HDD installation	Open
	3.57-3.61	Irregular	0.1	staging, constructability	Commercial/Open
	3.69-3.99	Irregular	2.1	Materials storage, staging, road crossing, constructability, mainline valve installation	Open/Forest/Wetland
	3.99-4.51	Irregular	1.7	Materials storage, staging, road crossing, constructability	Right-of-way
	4.57-4.66	Irregular	1.2	Materials storage, staging	Open/Right-of-way
Somerset County, Maryland	6.76-6.83	Irregular	3.8	Materials storage, staging, above ground facility construction	Open/Wetland/Right-of-way
Somerset Extension Total			**13.6**		
Millsboro Pressure Control Station Extension					
Sussex County, Delaware	0.00-0.06	Irregular	1.7	Tie-in	Agricultural
	0.06-0.18	Irregular	0.2	Linear widening for topsoil segregation	Agricultural
	0.17-0.21	Irregular	0.8	Road crossing	Agricultural
	0.21-0.23	Irregular	0.1	Tie-in	Forest
Millsboro Pressure Control Station Extension Total			**2.8**		
TOTAL			**61.9**		

[1]ATWS dimensions are approximate, in some cases, for work spaces with irregular shapes. Acreage column is based on actual work space areas.
[2] Minor discrepancies due to rounding.

Table C-2 Proposed HDD Locations						
Resource Name	**Drill Identification Number**	**Crossing Length**	**Approx. Entry Location (MP)[1]**	**Approx. Exit Location (MP)[1]**	**Drilling Method**	**Rig Type**
Woodside Loop						
Southern Blvd (C.R. 52)	WS-0.1	890	0.1	0.3	Conventional HDD	Stationary
Bison Road/Wetland 1/ Red House Branch	WS-1.7	1,675	2.1	1.7	Conventional HDD	Stationary
Wetland 2/Tidbury Creek	WS-2.5	450	2.6	2.5	Conventional HDD	Stationary
Tuxedo Lane	WS-3.1	691	3.3	3.1	Conventional HDD	Stationary
East Sussex Extension						
Peterkins Branch	ES-0.1	300	0.2	0.1	Small Diameter HDD (Conventional Drill Path)	Portable
Agricultural Field	ES-0.7	1,100	0.9	0.7	Small Diameter HDD (Shallow Drill Path)	Portable
Hollis Road	ES-1.4	380	1.4	1.4	Small Diameter HDD (Conventional Drill Path)	Portable
Gravel Hill Road	ES-1.9	1,475	2.2	1.9	Small Diameter HDD (Shallow Drill Path)	Portable
Wetland 1/Sockorockets Ditch	ES-2.3	425	2.4	2.3	Small Diameter HDD (Shallow Drill Path)	Portable
Forest/Ditch	ES-2.5	1,425	2.8	2.5	Small Diameter HDD (Shallow Drill Path)	Portable
Residential	ES-2.8	1,118	3.0	2.8	Small Diameter HDD (Conventional Drill Path)	Portable
Wetland 4[2]	ES-3.0	1,152	3.3	3.0	Small Diameter HDD (Shallow Drill Path)	Portable
Residential	ES-3.3	1,950	3.7	3.3	Small Diameter HDD (Shallow Drill Path)	Portable
Agricultural Field	ES-3.7	800	3.8	3.7	Small Diameter HDD (Shallow Drill Path)	Portable
Lawson Road/Simpler Branch	ES-3.8	1,650	4.2	3.8	Small Diameter HDD (Conventional Drill Path)	Portable
Unity Branch	ES-4.3	1,050	4.5	4.3	Small Diameter HDD (Conventional Drill Path)	Portable

Table C-2 Proposed HDD Locations						
Resource Name	**Drill Identification Number**	**Crossing Length**	**Approx. Entry Location (MP)[1]**	**Approx. Exit Location (MP)[1]**	**Drilling Method**	**Rig Type**
Agricultural Field	ES-4.6	1,050	4.8	4.6	Small Diameter HDD (Shallow Drill Path)	Portable
Agricultural Field	ES-4.8	1,150	5.0	4.8	Small Diameter HDD (Shallow Drill Path)	Portable
Agricultural Field	ES-5.0	950	5.2	5.0	Small Diameter HDD (Shallow Drill Path)	Portable
Somerset Extension						
South Prong Wicomico River	SE-0.0	1,025	0.0	0.2	Small Diameter HDD (Conventional	Portable
E. Carrol Street & E. Vine Street	SE-0.3	1,500	0.3	0.6	Small Diameter HDD (Shallow Drill Path)	Portable
South Boulevard	SE-0.9	900	0.9	1.0	Small Diameter HDD (Shallow Drill Path)	Portable
West College Avenue	SE-1.3	725	1.5	1.3	Small Diameter HDD (Shallow Drill Path)	Portable
Bateman Street	SE-1.7	375	1.7	1.7	Small Diameter HDD (Shallow Drill Path)	Portable
Milford Street	SE-1.9	1,400	2.2	1.9	Small Diameter HDD (Shallow Drill Path)	Portable
Salisbury Boulevard	SE-2.2	225	2.2	2.3	Small Diameter HDD (Shallow Drill Path)	Portable
Tonytank Pond (tributary of Wicomico River)	SE-2.4	1,025	2.4	2.6	Small Diameter HDD (Conventional Drill Path)	Portable
Cedar Lane	SE-2.7	1,320	2.7	3.0	Small Diameter HDD (Shallow Drill Path)	Portable
Residential/Commercial	SE-3.1	1,725	3.4	3.1	Small Diameter HDD (Shallow Drill Path)	Portable
East Main Street	SE-3.4	650	3.4	3.5	Small Diameter HDD (Shallow Drill Path)	Portable
Wetland 1/South Division Street/Unnamed Tributary to Passerdyke Creek	SE-3.7	1,725	3.7	4.0	Small Diameter HDD (Conventional Drill Path)	Portable

Table C-2
Proposed HDD Locations

Resource Name	Drill Identification Number	Crossing Length	Approx. Entry Location (MP)[1]	Approx. Exit Location (MP)[1]	Drilling Method	Rig Type
Crown Road	SE-4.6	350	4.6	4.7	Small Diameter HDD (Shallow Drill Path)	Portable
Highway Overpass	SE-5.0	500	5.0	5.1	Small Diameter HDD (Shallow Drill Path)	Portable
Stockyard Road	SE-5.8	300	5.8	5.9	Small Diameter HDD (Shallow Drill Path)	Portable
Passerdyke Creek	SE-6.1	950	6.1	6.2	Small Diameter HDD (Conventional Drill Path)	Portable
Ocean Highway	SE-6.7	225	6.8	6.7	Small Diameter HDD (Shallow Drill Path)	Portable
TOTALS		**34,601**				

[1]Entry / Exit locations are subject to change based on the acquisition of HDD design related data including but not limited to geotechnical investigation.
[2] Wetland located within, or partially within, a parcel where Eastern Shore was denied access. Measurements calculated based on aerial photographs and NWI mapping.

Table C-3 Waterbodies Crossed by the Project								
Waterbody Designation	**MP[1]**	**County, State**	**Flow Regime (Waterbody Type)[2]**	**Waterbody Name [3]**	**FERC Waterbody Class [4]**	**State Water Quality Classification[5]**	**Crossing Method**	**Crossing Width[1] (ft)**
Woodside Loop								
A	1.97	Kent, Delaware	Perennial	Red House Branch	Intermediate	Category 5[7]	HDD	33.00
B	2.52	Kent, Delaware	Perennial	Tidbury Creek	Intermediate	Category 5[7]	HDD	37.00
C	2.50	Kent, Delaware	Intermittent	Unnamed tributary to Tidbury Creek	Minor	Category 5[7]	Not Crossed [10]	--
East Sussex Extension								
B	0.15	Sussex, Delaware	Perennial	Peterkins Branch	Intermediate	Category 4a[8]	HDD	16.00
D	1.16	Sussex, Delaware	Perennial	White Oak Swamp Ditch	Minor	Category 4a[8]	Bore	6.00
E	2.37	Sussex, Delaware	Perennial	Sockorockets Ditch	Intermediate	Category 4a[8]	HDD	13.00
F	3.17	Sussex, Delaware	Perennial	Welsh Branch	Minor	Category 4a[8]	HDD	5.00[11]
G	3.91	Sussex, Delaware	Perennial	Simpler Branch	Minor	Category 4a[8]	HDD	12.00[11]
H	4.51	Sussex, Delaware	Perennial	Unity Branch	Minor	Category 5[9]	HDD	6.00[11]
Somerset Extension								
A	0.14	Wicomico, Maryland	Perennial	South Prong Wicomico River	Intermediate	Category 5	HDD	41.00
B	2.54	Wicomico, Maryland	Perennial	Tonytank Pond	Intermediate	Category 5	HDD	12.00
C	4.03	Wicomico, Maryland	Intermittent	Unnamed tributary to Sharps Creek	Intermediate	Category 5	HDD	25.00
D	6.09	Somerset, Maryland	Perennial	Passerdyke Creek	Intermediate	Category 3	HDD	24.00
Millsboro Pressure Control Station Extension								

Table C-3
Waterbodies Crossed by the Project

Waterbody Designation	MP[1]	County, State	Flow Regime (Waterbody Type)[2]	Waterbody Name [3]	FERC Waterbody Class [4]	State Water Quality Classification[5]	Crossing Method	Crossing Width[1] (ft)
--	--	--	--	--	--	--	--	--

[1] Milepost of waterbody and pipeline centerline intersection, or other workspace crossing (e.g., access roads).
[2] Waterbody type includes perennial, intermittent, and ephemeral. A perennial stream has flowing water year-round during a typical year. An intermittent stream has flowing water during certain times of the year when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Ephemeral streams only flow after precipitation events.
[3] As identified on USGS Topographic Series 7.5-minute maps or USGS National Hydrography Dataset (NHD).
[4] Waterbody class includes minor, intermediate, and major waterbodies crossed by the Project. Minor waterbodies include all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing; intermediate waterbodies include all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; and major waterbodies include all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.
[5] In Delaware, the EPA CALM guidance categories used to categorize waterbody/impairment combinations for Delaware's 305(b) Report and 303(d) lists. A Category 5 Waterbody is considered impaired for one or more designated uses, and a TMDL is required for the specific impairment. A Category 4a Waterbody is considered impaired for one or more designated uses, and a TMDL has been completed and approved by EPA. A Category 3 Waterbody is considered to have insufficient or no data and information to determine if any use is attained.
[6] Fishery Type determined based on consultation with the DNREC and DNR.
[7] Waterbody biology impaired, cause of impairment is nonpoint source pollution.
[8] Waterbody bacteria, nutrients, and dissolved oxygen impaired, cause of impairment is nonpoint and point source pollution.
[9] Waterbody bacteria, nutrients, dissolved oxygen, and copper impaired, cause of impairment is nonpoint and point source pollution and unknown (copper).
[10] Waterbodies listed as "Not Crossed" would be temporarily impacted by clearing activities during construction of the facilities.
[11] Waterbody within, or partially within, a parcel where Eastern Shore was denied access, crossing width estimated using aerial photographs and NWI mapping.
Note: All waterbodies are designated as warm water fisheries.

Table C-4
Bird Species identified by the USFWS as Birds of Conservation Concern

Common Name[1,2] (Scientific Name)	Breeds in Region	Aquatic Habitat Association	Ground[3]	Shrub[3]	Tree[3]	Cliff[3]	Human Structure[3]
Bald Eagle (*Haliaeetus leucocephalus*)	-	-	-	-	X	-	-
Peregrine Falcon (*Falco peregrinus*)	-	-	-	-	-	X	-
Black Rail (*Laterallus jamaicensis*)	X	X	X	-	-	-	-
Short-eared Owl (*Asio flammeus*)	-	-	X	-	-	-	-
Whip-poor-will (*Antrostomus vociferous*)	X	-	X	-	-	-	-
Loggerhead Shrike (*Lanius ludovicianus*)	-	-	-	-	X	-	-
Brown-headed Nuthatch (*Sita pusilla*)	X	-	-	-	X	-	-
Sedge Wren (*Cistothorus platensis*)	-	-	-	X	-	-	-
Wood Thrush (*Hylocichla mustelina*)	X	-	-	-	X	-	-
Blue-winged Warbler (*Vermivora cyanoptera*)	-	-	-	-	X	-	-
Prairie Warbler (*Setophaga*)	X	-	-	X	-	-	-
Cerulean Warbler (*Setophaga cerulean*)	-	-	-	-	X	-	-
Kentucky Warbler (*Geothlypis Formosa*)	X	-	-	-	X	-	-
Henslow's Sparrow (*Ammodramus henslowii*)	X	-	X	-	-	-	-
Rusty Blackbird (*Euphagus carolinus*)	-	-	-	-	X	-	-
Pied-billed Grebe (*Podilymbus podiceps*)	-	X	X	-	-	-	-
Horned Grebe (*Podiceps auritus*)	-	X	X	-	-	-	-
Greater Shearwater (*Puffinus gravis*)	-	X	X	-	-	-	-
Audubon's Shearwater (*Puffinus Iherminieri*)	-	X	X	-	-	-	-
American Bittern (*Botaurus lentiginosus*)	X	X	X	-	-	-	-
Least Bittern (*Ixobrychus exilis*)	X	X	X	-	-	-	-
Snowy Egret (*Egretta thula*)	-	X	-	-	X	-	-
Wilson's Plover (*Charadrius wilsonia*)	-	X	X	-	-	-	-
American Oystercatcher (*Haematopus palliates*)	-	X	X	-	-	-	-
Solitary Sandpiper (*Tringa solitaria*)	-	X	-	-	X	-	-
Lesser Yellowlegs (*Tringa flavipes*)	-	X	X	-	-	-	-
Upland Sandpiper (Bartramia longicauda)	-	-	X	-	-	-	-
Whimbrel (Numenius phaeopus)	-	X	X	-	-	-	-

Table C-4
Bird Species identified by the USFWS as Birds of Conservation Concern

Common Name[1,2] (Scientific Name)	Breeds in Region	Aquatic Habitat Association	Ground[3]	Shrub[3]	Tree[3]	Cliff[3]	Human Structure[3]
Hudsonian Godwit (Limosa haemastica)	-	X	X	-	-	-	-
Marbled Godwit (Limosa fedoa)	-	X	X	-	-	-	-
Red Knot (Calidris canutus)	-	X	X	-	-	-	-
Semipalmated Sandpiper (Calidris pusilla)	-	X	X	-	-	-	-
Purple Sandpiper (Calidris maritima)	-	X	X	-	-	-	-
Buff-breasted Sandpiper (Calidris subruficollis)	-	-	X	-	-	-	-
Short-billed Dowitcher (Limnodromus griseus)	-	X	X	-	-	-	-
Least Tern (Sternula antillarum)	X	X	X	-	-	-	-
Black Skimmer (Rynchops niger)	X	X	X	-	-	-	-
Red-headed Woodpecker (Melanerpes erythrocephalus)	X	-	-	-	X	-	-
Golden-winged Warbler (Vermivora chrysoptera)	-	-	-	X	-	-	-
Worm-eating Warbler (Helmitheros vermivorum)	X	-	-	-	X	-	-
Nelson's Sharp-tailed Sparrow (Ammodramus nelsoni)	-	X	X	-	-	-	-
Saltmarsh Sharp-tailed Sparrow (Ammodramus	-	X	X	-	-	-	-
Seaside Sparrow (Ammodramus maritimus)	X	X	X	-	-	-	-
Gull-billed Tern (Gelochelidon nilotica)	X	X	X	-	-	-	-

[1] Source: Birds of Conservation Concern (USFWS 2008a).
[2] The Project is in Bird Conservation Region 30 (New England/Mid-Atlantic Coast).
[3] Preferred nesting substrate.

Table C-5
Land Use Impacts

	Agricultural Land		Forested Uplands		Industrial/ Commercial		Open Land		Residential Land		Road/ /Utility Right-of-way[3]		Emergent Wetlands		Forested Wetlands		Total	
Project Facilities	**Con.[1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**	**Con. [1]**	**Op. [2]**
Woodside Loop, Kent, DE[5]																		
Pipeline right-of-way	16.0	14.8	1.2	1.1	2.9	2.5	1.0	--	1.5	0.9	13.1	3.7	--	--	0.6	0.6	**36.3**	**23.7**
ATWS	--	14.2	0.5	--	1.7	--	0.3	--	0.2	--	0.2	--	--	--	--	--	**17.0**	**--**
Access Roads	--	2.0	0.8	--	0.6	--	--	--	0.2	--	<0.1	--	--	--	--	--	**3.6**	**--**
East Sussex Extension, Sussex, DE[6]																		
Pipeline right-of-way	14.1	3.5	4.3	--	0.6	--	1.5	--	5.4	0.3	27.6	0.2	<0.1	--	0.1	--	**53.7**	**4.1**
ATWS	26.5	--	0.3	--	0.3	--	0.2	--	0.9	--	0.2	--	--	--	--	--	**28.5**	**--**
Access Roads	--	--	--	--	--	--	--	--	--	--	<0.1	<0.1	--	--	--	--	**0.0**	**0.0**
Above ground facilities	2.0	0.3	0.1	<0.1	--	--	0.2	0.1	--	--	--	--	--	--	--	--	**2.4**	**0.4**
Somerset Extension, Wicomico and Somerset, MD[7]																		
Pipeline right-of-way	--	--	0.7	0.1	0.7	0.1	1.6	0.3	<0.1	<0.1	38.3	0.1	0.2	--	0.2	--	**41.9**	**0.6**
ATWS	--	--	1.1	--	3.0	--	4.9	--	0.1	--	4.3	--	<0.1	--	0.2	--	**13.6**	**--**
Staging Area	4.8	--	--	--	5.9	--	0.9	--	--	--	<0.1	--	--	--	--	--	**11.6**	**--**
Above ground facilities	--	--	--	--	0.5	<0.1	2.0	0.1	--	--	--	--	--	--	--	--	**2.5**	**0.1**
Millsboro Pressure Control Station Extension, Sussex, DE[8]																		

Table C-5
Land Use Impacts

	Agricultural Land		Forested Uplands		Industrial/ Commercial		Open Land		Residential Land		Road/ /Utility Right-of-way[3]		Emergent Wetlands		Forested Wetlands		Total	
Pipeline right-of-way	1.1	--	0.3	--	--	--	--	--	0.3	--	2.0	--	--	--	--	--	**3.7**	--
ATWS	2.7	--	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.8**	--
Project Total[9]	**83.3**	**18.7**	**9.3**	**1.2**	**16.1**	**2.6**	**12.7**	**0.5**	**8.6**	**1.2**	**85.7**	**4.0**	**0.3**	**0.0**	**1.2**	**0.6**	**217.5**	**29.0**

Notes:
[1] Construction impacts equal all impacts due to construction and operation (including permanent easement, TWS, ATWS, aboveground facility permanent footprints and construction workspace, access roads, and contractor yard/staging areas).
[2] Operation impacts include the permanent Project impacts (including permanent easement, aboveground facility permanent footprints, and permanent access roads).
[3] Includes railway right-of-way in addition to road/road right-of-way.
[4] Wetlands on East Sussex Extension may be on parcels where access was denied. Estimated wetland impacts are included. Eastern Shore will file updated information when access is obtained.
[5] No staging areas or aboveground facilities are associated with this facility.
[6] No staging areas are associated with this facility.
[7] No access roads are associated with this facility.
[8] No access roads, staging areas, or aboveground facilities are associated with this facility.
[9] Minor discrepancies due to rounding.

Table C-6 Existing Utility Right-of-way Adjacent or Crossed by Proposed Pipelines					
MP Begin	**MP End**	**Length (miles)**	**County**	**Right-of-way Type**	**Operator/Name of Existing Facility**
Woodside Loop					
0.00	0.13	0.13	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
0.13	0.14	0.01	Kent, Delaware	Southern Boulevard (DE Route 15)	DelDOT
0.14	0.39	0.25	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
0.45	0.53	0.08	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
0.81	1.14	0.33	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
1.14	1.16	0.02	Kent, Delaware	Willow Grove Road (DE Route 10)	DelDOT
1.16	1.86	0.80	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
1.86	1.87	0.01	Kent, Delaware	Bison Road (County Road 234)	Kent County
1.87	3.23	1.46	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
3.23	3.24	0.01	Kent, Delaware	Main Street (DE Route 10A)	DelDOT
3.24	3.27	0.03	Kent, Delaware	Norfolk Southern Railroad	Norfolk Southern Railroad
Subtotal		**3.22**			
Sussex Extension					
0.00	0.10	0.10	Sussex, Delaware	Park Avenue (DE Route 9)	DelDOT
0.10	2.20	2.10	Sussex, Delaware	Springfield Road (County Road 47)	Sussex County
2.20	2.21	0.01	Sussex, Delaware	Gravel Hill Road (DE Route 30)	DelDOT
2.21	5.94	3.73	Sussex, Delaware	Johnson Road (County Road 47)	Sussex County
5.94	7.26	1.32	Sussex, Delaware	Harbeson Road (DE Route 5)	DelDOT
Subtotal		**7.26**			
Somerset Extension					
0.00	0.04	0.04	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
0.09	0.10	0.01	Wicomico, Maryland	East Main Street	City of Salisbury
0.10	0.14	0.04	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
0.18	0.25	0.07	Wicomico, Maryland	Buena Vista Avenue	City of Salisbury
0.25	0.31	0.06	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
0.31	0.32	0.01	Wicomico, Maryland	East Carroll Street	City of Salisbury
0.32	0.49	0.17	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
0.49	0.49	--	Wicomico, Maryland	East Vine Street	City of Salisbury
0.49	0.55	0.06	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
0.55	0.56	0.01	Wicomico, Maryland	South Division Street	City of Salisbury
0.56	1.01	0.45	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
1.01	1.03	0.02	Wicomico, Maryland	South Boulevard	City of Salisbury
1.03	1.05	0.02	Wicomico, Maryland	South Tower Drive	City of Salisbury
1.05	1.33	0.28	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
1.33	1.36	0.03	Wicomico, Maryland	South Tower Drive	City of Salisbury
1.36	1.37	0.01	Wicomico, Maryland	West College Avenue	City of Salisbury
1.37	1.47	0.10	Wicomico, Maryland	S Tower Drive	City of Salisbury
1.47	1.67	0.20	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
1.67	1.68	0.02	Wicomico, Maryland	Bateman Street	City of Salisbury
1.68	2.05	0.37	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
2.05	2.05	--	Wicomico, Maryland	Milford Street	City of Salisbury
2.05	2.25	0.20	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
2.25	2.25	--	Wicomico, Maryland	Canal Park Drive	City of Salisbury
2.25	2.72	0.47	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad

2.72	2.73	0.01	Wicomico, Maryland	Pollitte Drive	City of Salisbury
2.73	2.94	--	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
2.94	2.94	--	Wicomico, Maryland	Cedar Lane	City of Salisbury
2.94	3.48	0.28	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
3.48	3.49	0.01	Wicomico, Maryland	East Main Street	City of Fruitland
3.49	3.60	0.11	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
3.60	3.60	--	Wicomico, Maryland	N Dulaney Ave	City of Fruitland
3.60	3.70	0.10	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
3.71	3.98	0.27	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
3.98	3.98	--	Wicomico, Maryland	South Division Street	City of Fruitland
3.98	4.66	0.68	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
4.66	4.67	0.01	Wicomico, Maryland	Crown Road	City of Fruitland
4.67	5.87	1.20	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
5.87	5.88	0.01	Wicomico, Maryland	Old Eden Road	Somerset County
5.88	6.10	0.22	Wicomico, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
6.10	6.21	0.11	Somerset, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
6.21	6.21	--	Somerset, Maryland	Jones Road	Somerset County
6.21	6.21	--	Somerset, Maryland	Jones Road	Somerset County
6.21	6.73	0.51	Somerset, Maryland	Norfolk Southern Railroad	Norfolk Southern Railroad
6.73	6.75	0.02	Somerset, Maryland	Ocean Highway (US Route 13)	Maryland State Highway Authority
Subtotal		**6.18**			
Millsboro Pressure Control Station Extension					
0.02	0.18	0.16	Sussex, Delaware	Hardscrabble Road (DE Route 20)	DelDOT
0.18	0.31	0.13	Sussex, Delaware	Sheep Pen Road (County Road 328)	Sussex County
0.31	0.33	0.02	Sussex, Delaware	DuPont Boulevard (US Route 113)	DelDOT
Subtotal		**0.31**			
TOTALS		**17.45**			

Table C-7 Public Roadways Crossed by the Project					
MP	**County, State**	**Road Names**	**Road Type**	**Crossing Method**	**Right-of-way Width (feet)[1]**
Woodside Loop					
0.13	Kent, Delaware	Southern Boulevard (C.R. 52)	Asphalt	HDD	71
1.15	Kent, Delaware	Willow Grove Road (S.R. 10)	Asphalt	Bore	111
1.87	Kent, Delaware	Bison Road (C.R. 234)	Asphalt	HDD	56
3.26	Kent, Delaware	Main Street (C.R. 54)	Asphalt	HDD	54
4.48	Kent, Delaware	Olin Dill Road (C.R. 236)	Asphalt	Bore	50
4.87	Kent, Delaware	Turkey Point Road (C.R. 237)	Asphalt	Bore	71
East Sussex					
0.01	Sussex, Delaware	Park Avenue (U.S. 9TR)	Asphalt	Bore	61
0.08	Sussex, Delaware	Springfield Road (C.R. 47)	Asphalt	Bore	60
1.35	Sussex, Delaware	Hollis Road (C.R. 295)	Asphalt	HDD	83
2.19	Sussex, Delaware	Gravel Hill Road (S.R. 30)	Asphalt	HDD	71
2.37	Sussex, Delaware	Anderson Corner Road (C.R. 292)	Asphalt	HDD	59
2.46	Sussex, Delaware	Johnson Road (C.R. 47)	Asphalt	Bore	39
3.17	Sussex, Delaware	Avalon Road (C.R. 302A)	Asphalt	HDD	81
4.06	Sussex, Delaware	Lawson Road (C.R. 296)	Asphalt	HDD	53
5.82	Sussex, Delaware	Hurdle Ditch Road (C.R. 290)	Asphalt	Bore	50
6.38	Sussex, Delaware	Harbeson Road (S.R. 5)	Asphalt	Bore	68
7.24	Sussex, Delaware	Beaver Dam Road (S.R. 23)	Asphalt	Bore	63
7.28	Sussex, Delaware	Hollymount Road (C.R. 48)	Asphalt	Bore	57
Somerset Extension					
0.09	Wicomico, Maryland	East Main Street	Asphalt	HDD	50
0.19	Wicomico, Maryland	Pond Street	Asphalt	Open Trench	33
0.30	Wicomico, Maryland	East Carroll Street	Asphalt	HDD	109
0.48	Wicomico, Maryland	East Vine Street	Asphalt	HDD	55
0.55	Wicomico, Maryland	South Division Street	Asphalt	HDD	36
1.01	Wicomico, Maryland	South Boulevard	Asphalt	HDD	51
1.36	Wicomico, Maryland	West College Avenue	Asphalt	HDD	50
1.41	Wicomico, Maryland	South Tower Drive	Asphalt	HDD	25
1.67	Wicomico, Maryland	Bateman Street	Asphalt	HDD	34
2.05	Wicomico, Maryland	Milford Street	Asphalt	HDD	29
2.93	Wicomico, Maryland	Cedar Lane	Asphalt	HDD	83
3.48	Wicomico, Maryland	East Main Street	Asphalt	HDD	33
3.59	Wicomico, Maryland	South Dulany Avenue	Asphalt	Bore	30
3.97	Wicomico, Maryland	South Division Street	Asphalt	HDD	67
4.66	Wicomico, Maryland	Crown Road	Asphalt	HDD	43
5.87	Wicomico, Maryland	Old Eden Road	Asphalt	HDD	53
6.20	Somerset, Maryland	Jones Road	Asphalt	HDD	15
6.72	Somerset, Maryland	Ocean Highway	Asphalt	HDD	200
Millsboro Pressure Control Station Extension					
0.16	Sussex, Delaware	Sheep Pen Road (C.R. 328)	Asphalt	Bore	47
0.18	Sussex, Delaware	Hardscrabble Road (S.R. 20)	Asphalt	Bore	60
[1] Road ROW width estimated using publicly available parcel databases.					

Table C-8 Residences and Structures within 50 feet of Proposed Workspaces					
MP	**County, State**	**Distance from Centerline (feet)**	**Distance from Construction Workspace (feet)**	**Type of Structure**	**Mitigation**
Woodside Loop					
0.11	Kent, DE	81	50	Residence	Fencing
0.64	Kent, DE	61	31	Residence	Fencing
1.82	Kent, DE	58	18	Shed	Fencing
2.02	Kent, DE	53	13	Residence	Fencing
2.71	Kent, DE	48	28	Garage	Fencing
2.72	Kent, DE	35	15	Residence	Fencing
2.78	Kent, DE	46	12	Residence	Fencing
2.83	Kent, DE	80	5	Shed	Fencing
2.84	Kent, DE	108	45	Shed	Fencing
3.01	Kent, DE	64	45	Residence	Fencing
3.05	Kent, DE	68	50	Residence	Fencing
3.16	Kent, DE	54	40	Residence	Fencing
3.19	Kent, DE	46	32	Residence	Fencing
3.21	Kent, DE	17	13	Residence	Fencing
4.90	Kent, DE	40	24	Residence	Fencing
East Sussex Extension					
0.02	Sussex, DE	87	11	Residence	Fencing
0.07	Sussex, DE	56	41	Residence	Fencing
0.12	Sussex, DE	52	17	Residence	Fencing
0.24	Sussex, DE	185	18	Residence	Fencing
0.25	Sussex, DE	64	42	Residence	Fencing
0.48	Sussex, DE	67	32	Shed	Fencing
0.50	Sussex, DE	70	35	Garage	Fencing
0.52	Sussex, DE	66	30	Residence	Fencing
0.80	Sussex, DE	30	11	Residence	Fencing
0.80	Sussex, DE	56	35	Shed	Fencing
1.37	Sussex, DE	15	9	Residence	Fencing
1.39	Sussex, DE	81	48	Garage	Fencing
1.65	Sussex, DE	13	8	Residence	Fencing
1.88	Sussex, DE	75	50	Residence	Fencing
1.90	Sussex, DE	69	45	Residence	Fencing
1.94	Sussex, DE	58	37	Garage	Fencing
2.00	Sussex, DE	39	15	Residence	Fencing
2.16	Sussex, DE	39	18	Residence	Fencing
2.24	Sussex, DE	106	22	Residence	Fencing
2.27	Sussex, DE	84	49	Residence	Fencing
2.28	Sussex, DE	81	47	Residence	Fencing
2.43	Sussex, DE	82	26	Residence	Fencing
2.46	Sussex, DE	113	34	Shed	Fencing
2.47	Sussex, DE	74	14	Residence	Fencing
2.53	Sussex, DE	82	48	Residence	Fencing
2.99	Sussex, DE	64	30	Shed	Fencing
2.99	Sussex, DE	61	26	Residence	Fencing
3.09	Sussex, DE	75	40	Residence	Fencing
3.98	Sussex, DE	73	38	Residence	Fencing
4.34	Sussex, DE	85	50	Residence	Fencing
5.23	Sussex, DE	36	12	Residence	Fencing

5.25	Sussex, DE	72	37	Residence	Fencing
5.30	Sussex, DE	78	45	Garage	Fencing
5.32	Sussex, DE	64	32	Residence	Fencing
5.33	Sussex, DE	72	40	Residence	Fencing
5.40	Sussex, DE	45	17	Residence	Fencing
5.44	Sussex, DE	36	10	Shed	Fencing
5.82	Sussex, DE	45	11	Residence	Fencing
5.87	Sussex, DE	55	34	Shed	Fencing
6.45	Sussex, DE	58	28	Residence	Fencing
Somerset Extension					
0.17	Wicomico, MD	55	41	Residence	Fencing
0.20	Wicomico, MD	25	11	Residence	Fencing
0.20	Wicomico, MD	52	30	Residence	Fencing
0.21	Wicomico, MD	51	31	Residence	Fencing
0.22	Wicomico, MD	27	12	Residence	Fencing
0.22	Wicomico, MD	49	31	Residence	Fencing
0.22	Wicomico, MD	115	30	Residence	Fencing
0.26	Wicomico, MD	105	4	Residence	Fencing
2.15	Wicomico, MD	96	46	Residence	Fencing
6.81	Somerset, MD	70	42	Residence	Fencing
Millsboro Pressure Control Station Extension					
-	-	-	-	-	-

Appendix D

Residential Plans

DESCRIPTION:

THESE DRAWINGS DOCUMENT OCCUPIED BUILDINGS NEAR THE PROPOSED CONSTRUCTION WORK AREA. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS:

1. ALL PROPOSED CONSTRUCTION WORK AREAS ARE CONFINED TO THE LIMITS OF CONSTRUCTION SHOWN ON THIS DRAWING. NO WORK SHALL OCCUR ON LANDOWNER PROPERTY WITHOUT A PROPERLY EXECUTED LANDOWNER AGREEMENT. THE OPEN TRENCH LENGTH SHALL BE LIMITED TO A DISTANCE OF 100 FEET ON EITHER SIDE OF A RESIDENCE OR COMMERCIAL PROPERTY (THOSE WITHIN 50' LIMITS OF CONSTRUCTION).

2. CONTRACTOR SHALL ERECT AND MAINTAIN A TEMPORARY CONSTRUCTION BARRIER FENCE (SAFETY FENCE) BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT STRUCTURES (THOSE WITHIN 50' OF LIMITS OF CONSTRUCTION) DURING THE CONSTRUCTION PERIOD.

3. CONTRACTOR SHALL INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES (SILT FENCE) AS REQUIRED TO ENSURE THAT CONSTRUCTION SPOIL IS CONTAINED WITHIN THE APPROVED CONSTRUCTION WORK AREA.

4. VEHICLE ACCESS SHALL BE MAINTAINED TO RESIDENCES AND COMMERCIAL PROPERTIES DURING THE CONSTRUCTION PERIOD BY UTILIZING FLAGGERS AND STEEL PLATING AS APPLICABLE. FOR EACH RESIDENCE, EASTERN SHORE WILL COMMUNICATE WITH THE PROPERTY OWNER THE ANTICIPATED CONSTRUCTION SCHEDULE AND NOTIFY THEM OF WHAT IMPACTS CONSTRUCTION ACTIVITIES WILL HAVE ON THEIR ACCESS AND WORK WITH THEM TO MINIMIZE ANY IMPACTS.

5. THE PIPE SHALL BE INSTALLED UTILIZING ONE OR MORE OF THE FOLLOWING METHODS WHEN ADJACENT TO RESIDENTIAL AND COMMERCIAL STRUCTURES.

   A. 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.

   B. 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 OR TIMBER MATS.

   C. THE TRENCHLESS CONSTRUCTION TECHNIQUE, WHICH INCLUDES BOTH CONVENTIONAL BORING AS WELL AS HORIZONTAL DIRECTIONAL DRILL (HDD), INVOLVES THE INSTALLATION OF THE PIPE WITHOUT EXCAVATION OF A TRENCH THEREBY MINIMIZING SURFACE IMPACTS AND ASSOCIATED RESTORATION AS WELL MINIMIZING IMPACTS TO VEHICULAR ACCESS. INSTALLATIONS BY HDD WOULD BE SUBJECT TO THE HDD AND INADVERTENT RETURN PLANS.

6. OTHER EXISTING PHYSICAL FEATURES (LANDSCAPE AREAS, COMMERCIAL SIGNS, SPECIMEN TREES, ETC.) THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.

7. DISTURBED ITEMS SUCH AS DRIVEWAYS, LAWNS, AND LANDSCAPED AREAS SHALL BE RESTORED IMMEDIATELY FOLLOWING CLEANUP OPERATIONS AFTER CONSTRUCTION BY A LICENSED CONTRACTOR.

8. CONTRACTOR SHALL ALLOW ROADWAY TRAFFIC FLOW TO CONTINUE DURING CONSTRUCTION IN THIS AREA, UNLESS TRAFFIC DETOURING MEASURES HAVE BEEN APPROVED IN ADVANCE BY APPLICABLE JURISDICTIONAL AGENCIES IN ACCORDANCE WITH MUTCD, DELDOT, AND/OR MDSHA REQUIREMENTS AND GUIDELINES.

9. CONTRACTOR SHALL MINIMIZE NOISE FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES AND SHALL COMPLY WITH ALL LOCAL NOISE ORDINANCES.

10. CONTRACTOR SHALL TAKE APPROPRIATE MEANS TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES. CONTRACTOR SHALL PROVIDE STREET SWEEPING SERVICES, IF NECESSARY, DURING ROADWAY CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES.

LEGEND

- PROPOSED PIPELINE
- EXISTING E.S.N.G.. PIPELINE — ESNG — G —
- LIMITS OF CONSTRUCTION
- LIMITS OF STUDY CORRIDOR
- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- SAFETY FENCE
- RAILROAD TRACK
- ROAD RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- BUILDING
- FENCE
- CENTERLINE OF STREAM
- DELINEATED WETLAND BOUNDARY — NW —
- DELINEATED WATERS OF U.S. — US —
- APPROXIMATE WETLAND BOUNDARY — AWB —
- APPROXIMATE STREAM BOUNDARY — ASB —
- OVERHEAD UTILITY LINE — OHE —
- STORM DRAIN — SD —
- WATER LINE — W —
- SEWER LINE — SAN —
- FORCE MAIN — FM —

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

WOODSIDE LOOP
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
KENT COUNTY, DELAWARE

PROJECT NO:	19927	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	1 OF 12

NADB3 NORTH

1+00
2+00
3+00
4+00
5+00
6+00
7+00

E. RAILROAD AVE

S. RAILROAD AVE

EXISTING 10" E.S.N.G. PIPELINE

PROPOSED 16" E.S.N.G. PIPELINE

LIMITS OF CONSTRUCTION

LIMITS OF CONSTRUCTION

WSA-2

WSI-2

WSA-3

WSI-68

WSI-69

WSI-70

WSI-71

GARAGE
STA 4+29

RESIDENCE
STA 5+02

RESIDENCE
STA 6+30

61'

87'

65'

89'

M.P. 0.1

SOUTHERN BLVD (C.R. 52)

LIMITS OF STUDY CORRIDOR

LIMITS OF STUDY CORRIDOR

WSI-3

WSI-4

50'

81'

ESNG-G

SD

REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

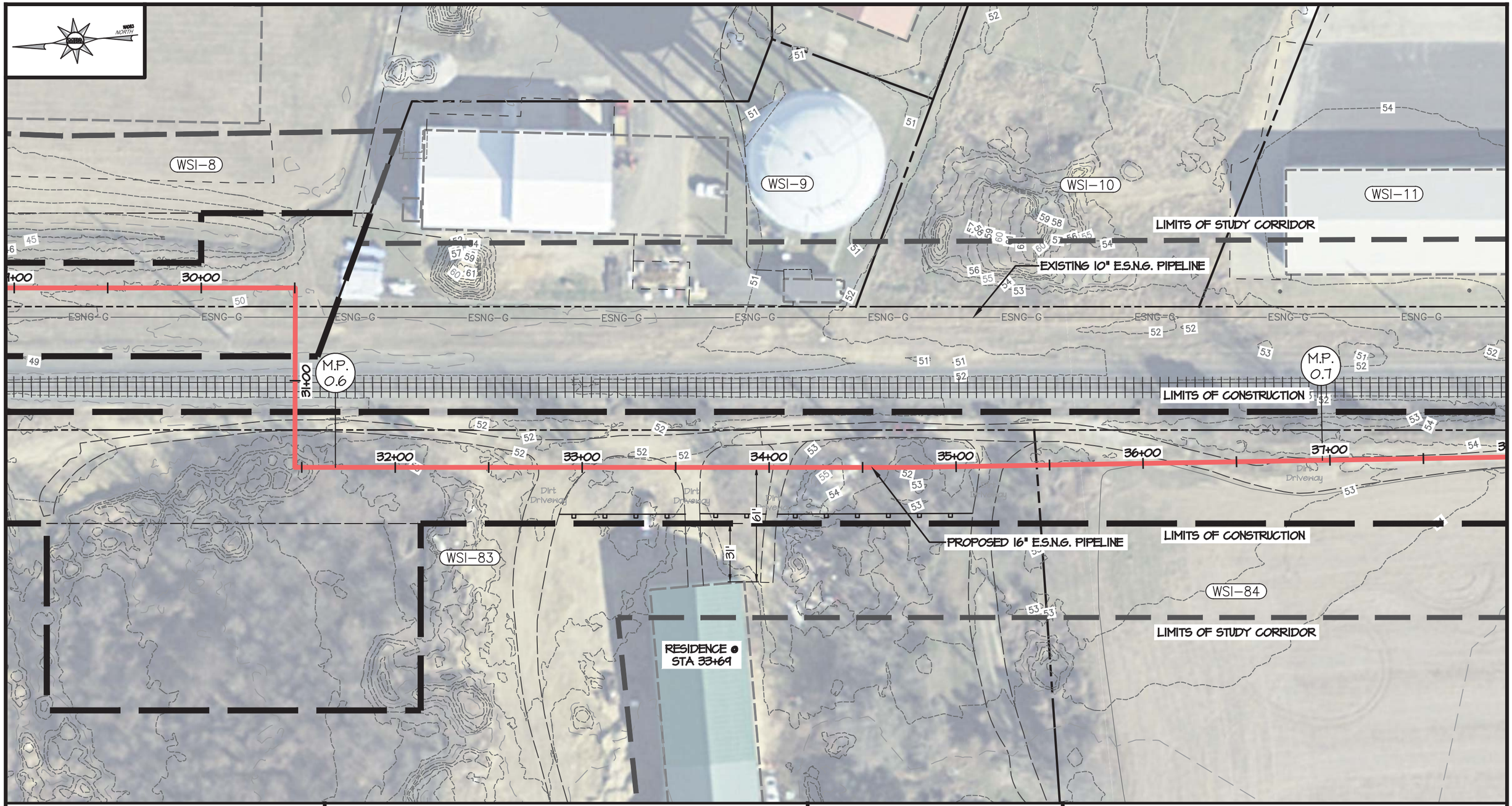
EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	2 OF 12



REVISIONS

NO.	DATE	DESCRIPTION

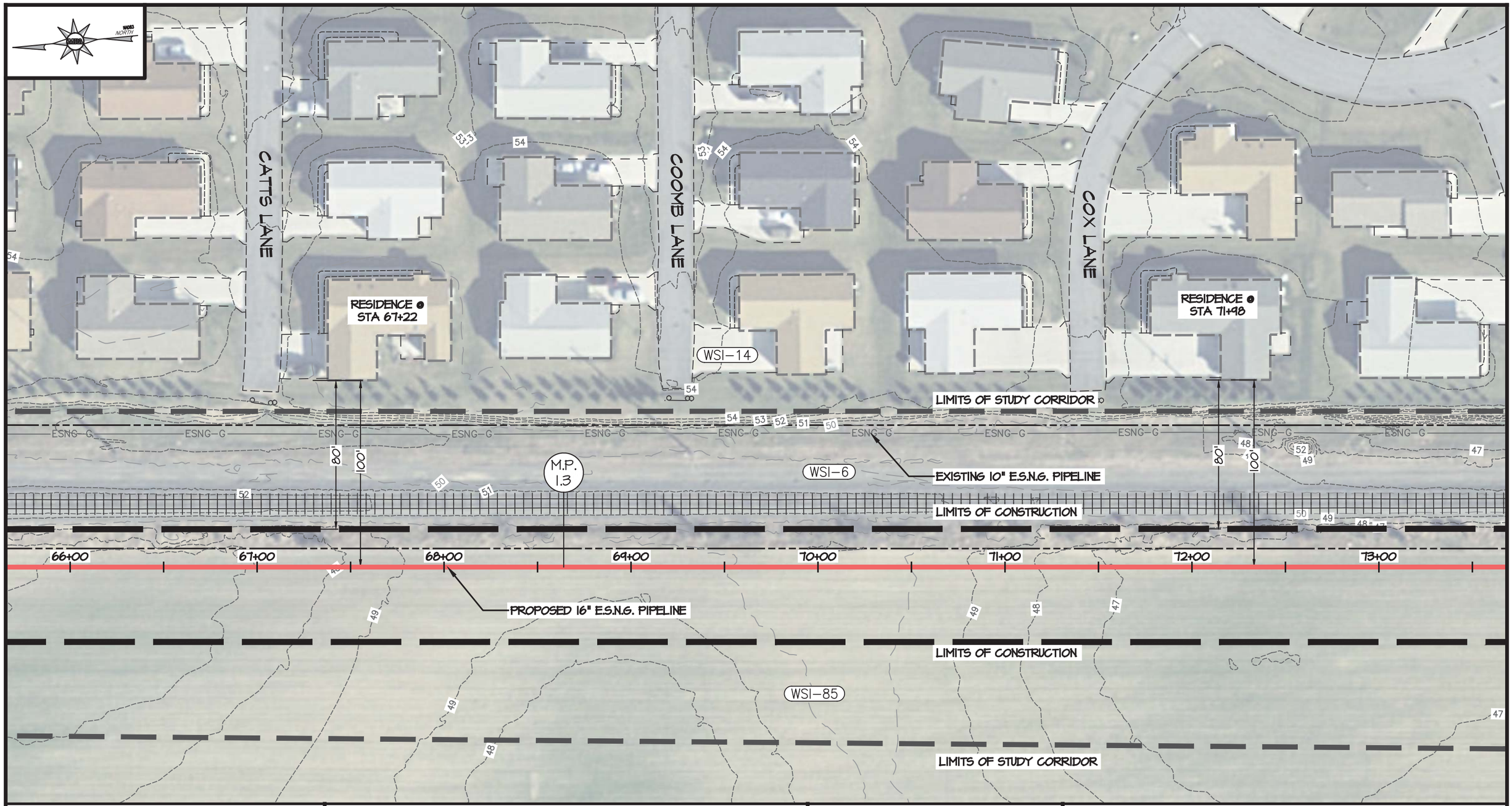
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	3 OF 12



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

WOODSIDE LOOP
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	4 OF 12

NADB3 NORTH

WSI-19 | WSI-20 | WSI-21 | WSI-22 | WSI-23 | WSI-24

SHED @ STA 88+33

LIMITS OF STUDY CORRIDOR

M.P. 1.6

M.P. 1.7

68'

89'

EXISTING 10" E.S.N.G. PIPELINE

LIMITS OF CONSTRUCTION

85+00 | 86+00 | 87+00 | 88+00 | 89+00 | 90+00 | 91+00 | 92+00

PROPOSED 16" E.S.N.G. PIPELINE

LIMITS OF CONSTRUCTION

WSI-86

LIMITS OF STUDY CORRIDOR

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

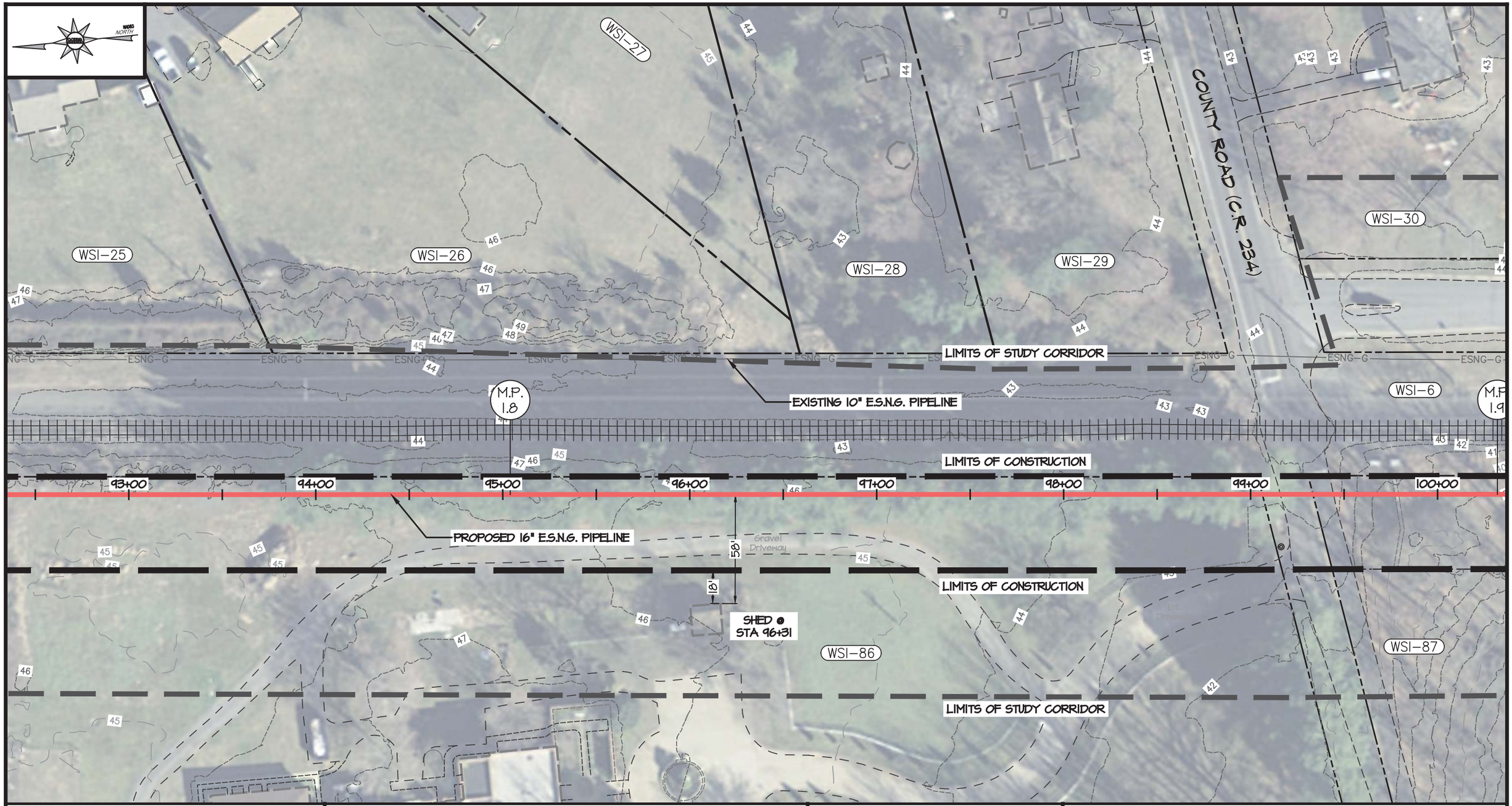
EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	5 OF 12



REVISIONS

NO.	DATE	DESCRIPTION

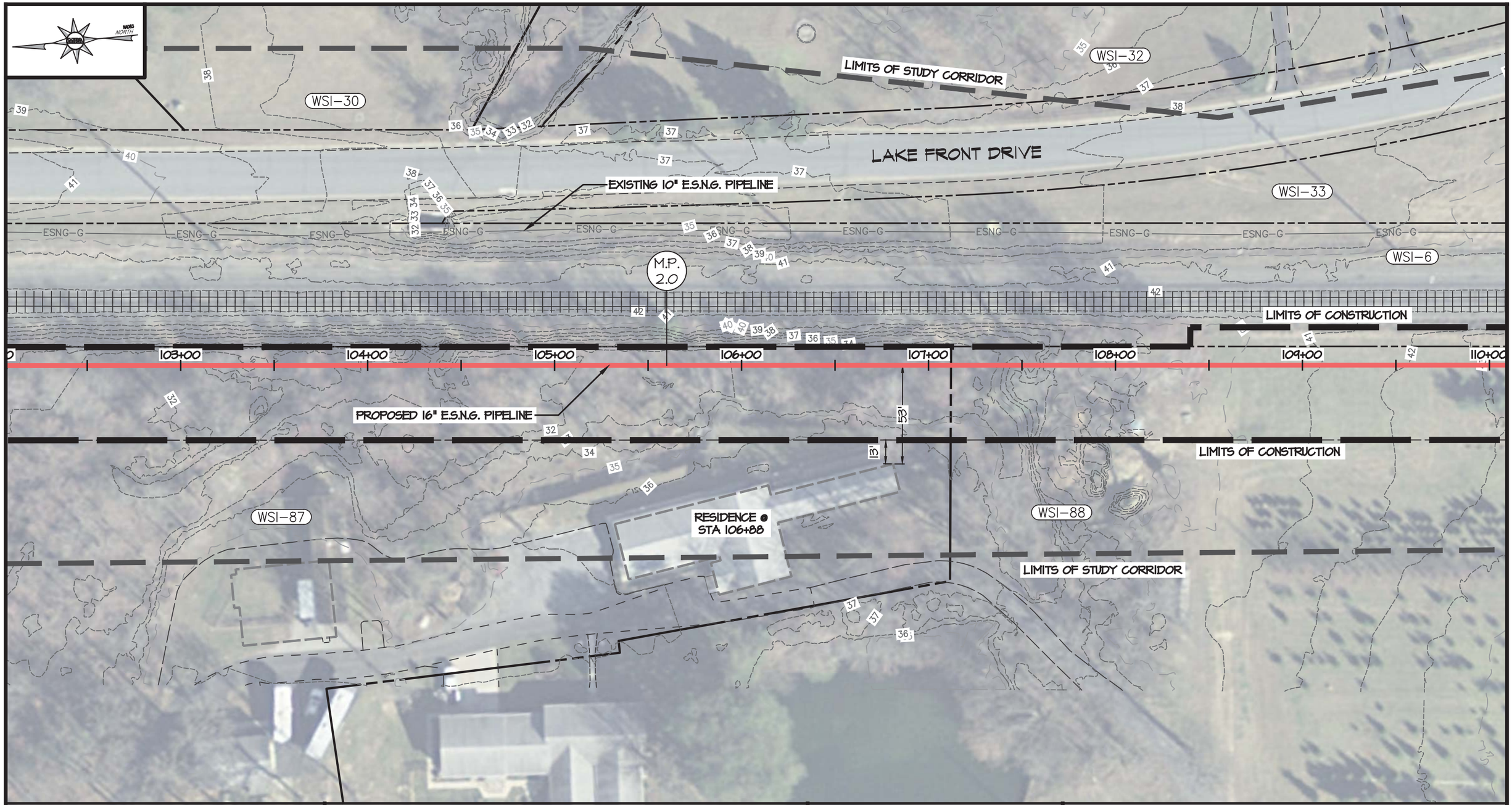
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

WOODSIDE LOOP
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	6 OF 12



REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	7 OF 12

LIMITS OF STUDY CORRIDOR

EXISTING 10" E.S.N.G. PIPELINE

WSI-38

ESNG-G

M.P. 2.7

M.P. 2.8

LIMITS OF CONSTRUCTION

TUXEDO LANE

143+00 144+00 145+00 146+00 147+00 148+00 149+00 150+00

PROPOSED 16" E.S.N.G. PIPELINE

GARAGE ⊙ STA 143+28

RESIDENCE ⊙ STA 143+57

RESIDENCE ⊙ STA 147+00

LIMITS OF CONSTRUCTION

LIMITS OF STUDY CORRIDOR

SHED ⊙ STA 149+42

SHED ⊙ STA 149+71

WSI-90 WSI-91 WSI-92 WSI-93

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	8 OF 12

NADB3 NORTH

LIMITS OF STUDY CORRIDOR

EXISTING 10" E.S.N.G. PIPELINE

WSI-39

ESNG-G

M.P. 2.9

LIMITS OF CONSTRUCTION

TUXEDO LANE

151+00 152+00 153+00 154+00 155+00 156+00 157+00

LIMITS OF CONSTRUCTION

PROPOSED 16" E.S.N.G. PIPELINE

WSI-94 WSI-95 WSI-96 WSI-97 WSI-98 WSI-99

72' 92' 71' 91' 81' 100' 62' 81'

RESIDENCE @ STA 151+52

GARAGE @ STA 152+05

RESIDENCE @ STA 153+65

RESIDENCE @ STA 154+55

LIMITS OF STUDY CORRIDOR

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	9 OF 12

NADB3 NORTH

LIMITS OF STUDY CORRIDOR

EXISTING 10" E.S.N.G. PIPELINE

ESNG-G

WSI-39

WSI-6

M.P. 3.0

M.P. 3.1

LIMITS OF CONSTRUCTION

TUXEDO LANE

158+00 159+00 160+00 161+00 162+00 163+00 164+00

RESIDENCE @ STA 159+08

45' 64'

RESIDENCE @ STA 160+92

50' 68'

RESIDENCE @ STA 162+54

55' 75'

PROPOSED 16" E.S.N.G. PIPELINE

WSI-99

WSI-100

WSI-101

WSI-102

WSI-103

50 25 0 25 50 100

SCALE: 1" = 50'

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	10 OF 12

NADB3 NORTH

WSI–42

WSI–41

MAIN STREET

WSI–39

WSI–40

EXISTING 10" E.S.N.G. PIPELINE

LIMITS OF STUDY CORRIDOR

ESNG–G

M.P. 3.2

LIMITS OF CONSTRUCTION

TUXEDO LANE

166+00 167+00 168+00 169+00 170+00 171+00 172+00 173+00

LIMITS OF CONSTRUCTION

WSI–110

PROPOSED 16" E.S.N.G. PIPELINE

WSI–105

RESIDENCE @ STA 167+03

40' 54'

RESIDENCE @ STA 168+22

32' 46'

RESIDENCE @ STA 169+46

13' 17'

WSI–109

91' 74'

RESIDENCE @ STA 171+81

LIMITS OF STUDY CORRIDOR

WSI–106

WSI–107

WSI–104

SD

REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	11 OF 12

NADB3 NORTH

LIMITS OF STUDY CORRIDOR

FENCE POST LANE

M.P. 4.9

258+56

258+00

40'

24'

RESIDENCE @ STA 258+65

LIMITS OF CONSTRUCTION

EXISTING 10" E.S.N.G. PIPELINE

257+00

TURKEY POINT ROAD (C.R. 240)

M.P. 4.8

LIMITS OF CONSTRUCTION

256+00

253+00

254+00

255+00

LIMITS OF STUDY CORRIDOR

PROPOSED 16" E.S.N.G. PIPELINE

REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

WOODSIDE LOOP
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

KENT COUNTY, DELAWARE

PROJECT NO:	19227	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	12 OF 12

DESCRIPTION:

THESE DRAWINGS DOCUMENT OCCUPIED BUILDINGS NEAR THE PROPOSED CONSTRUCTION WORK AREA. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS:

1. ALL PROPOSED CONSTRUCTION WORK AREAS ARE CONFINED TO THE LIMITS OF CONSTRUCTION SHOWN ON THIS DRAWING. NO WORK SHALL OCCUR ON LANDOWNER PROPERTY WITHOUT A PROPERLY EXECUTED LANDOWNER AGREEMENT. THE OPEN TRENCH LENGTH SHALL BE LIMITED TO A DISTANCE OF 100 FEET ON EITHER SIDE OF A RESIDENCE OR COMMERCIAL PROPERTY (THOSE WITHIN 50' LIMITS OF CONSTRUCTION).

2. CONTRACTOR SHALL ERECT AND MAINTAIN A TEMPORARY CONSTRUCTION BARRIER FENCE (SAFETY FENCE) BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT STRUCTURES (THOSE WITHIN 50' OF LIMITS OF CONSTRUCTION) DURING THE CONSTRUCTION PERIOD.

3. CONTRACTOR SHALL INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES (SILT FENCE) AS REQUIRED TO ENSURE THAT CONSTRUCTION SPOIL IS CONTAINED WITHIN THE APPROVED CONSTRUCTION WORK AREA.

4. VEHICLE ACCESS SHALL BE MAINTAINED TO RESIDENCES AND COMMERCIAL PROPERTIES DURING THE CONSTRUCTION PERIOD BY UTILIZING FLAGGERS AND STEEL PLATING AS APPLICABLE. FOR EACH RESIDENCE, EASTERN SHORE WILL COMMUNICATE WITH THE PROPERTY OWNER THE ANTICIPATED CONSTRUCTION SCHEDULE AND NOTIFY THEM OF WHAT IMPACTS CONSTRUCTION ACTIVITIES WILL HAVE ON THEIR ACCESS AND WORK WITH THEM TO MINIMIZE ANY IMPACTS.

5. THE PIPE SHALL BE INSTALLED UTILIZING ONE OR MORE OF THE FOLLOWING METHODS WHEN ADJACENT TO RESIDENTIAL AND COMMERCIAL STRUCTURES.

   A. 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.

   B. 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 OR TIMBER MATS.

   C. THE TRENCHLESS CONSTRUCTION TECHNIQUE, WHICH INCLUDES BOTH CONVENTIONAL BORING AS WELL AS HORIZONTAL DIRECTIONAL DRILL (HDD), INVOLVES THE INSTALLATION OF THE PIPE WITHOUT EXCAVATION OF A TRENCH THEREBY MINIMIZING SURFACE IMPACTS AND ASSOCIATED RESTORATION AS WELL MINIMIZING IMPACTS TO VEHICULAR ACCESS. INSTALLATIONS BY HDD WOULD BE SUBJECT TO THE HDD AND INADVERTENT RETURN PLANS.

6. OTHER EXISTING PHYSICAL FEATURES (LANDSCAPE AREAS, COMMERCIAL SIGNS, SPECIMEN TREES, ETC.) THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.

7. DISTURBED ITEMS SUCH AS DRIVEWAYS, LAWNS, AND LANDSCAPED AREAS SHALL BE RESTORED IMMEDIATELY FOLLOWING CLEANUP OPERATIONS AFTER CONSTRUCTION BY A LICENSED CONTRACTOR.

8. CONTRACTOR SHALL ALLOW ROADWAY TRAFFIC FLOW TO CONTINUE DURING CONSTRUCTION IN THIS AREA, UNLESS TRAFFIC DETOURING MEASURES HAVE BEEN APPROVED IN ADVANCE BY APPLICABLE JURISDICTIONAL AGENCIES IN ACCORDANCE WITH MUTCD, DELDOT, AND/OR MDSHA REQUIREMENTS AND GUIDELINES.

9. CONTRACTOR SHALL MINIMIZE NOISE FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES AND SHALL COMPLY WITH ALL LOCAL NOISE ORDINANCES.

10. CONTRACTOR SHALL TAKE APPROPRIATE MEANS TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES. CONTRACTOR SHALL PROVIDE STREET SWEEPING SERVICES, IF NECESSARY, DURING ROADWAY CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES.

LEGEND

- PROPOSED PIPELINE
- EXISTING E.S.N.G.. PIPELINE (ESNG—G)
- LIMITS OF CONSTRUCTION
- LIMITS OF STUDY CORRIDOR
- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- SAFETY FENCE
- RAILROAD TRACK
- ROAD RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- BUILDING
- FENCE
- CENTERLINE OF STREAM
- DELINEATED WETLAND BOUNDARY (NW)
- DELINEATED WATERS OF U.S. (US)
- APPROXIMATE WETLAND BOUNDARY (AWB)
- APPROXIMATE STREAM BOUNDARY (ASB)
- OVERHEAD UTILITY LINE (OHE)
- STORM DRAIN (SD)
- WATER LINE (W)
- SEWER LINE (SAN)
- FORCE MAIN (FM)

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	1 OF 23

REVISIONS

NO.	DATE	DESCRIPTION

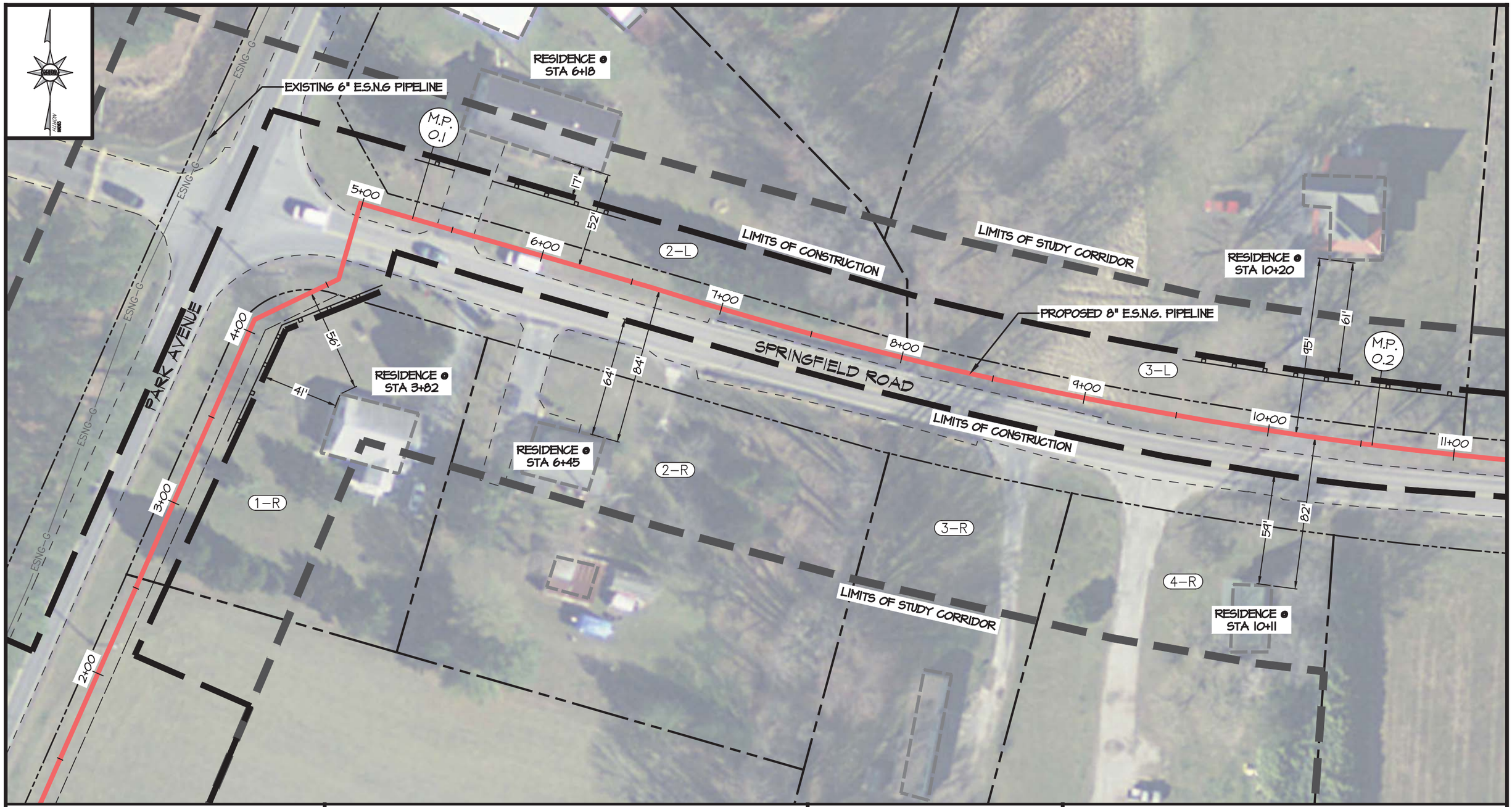
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	2 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100

SCALE: 1" = 50'

EAST SUSSEX EXTENSION
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	3 OF 23

RESIDENCE ●
STA 12+89

181'

185'

M.P.
0.2

PROPOSED 8" E.S.N.G. PIPELINE

4-L

LIMITS OF STUDY CORRIDOR

M.P.
0.3

LIMITS OF CONSTRUCTION

6-L

11+00

12+00

13+00

14+00

15+00

16+00

17+00

18+00

SPRINGFIELD ROAD

64'

42'

42'

71'

LIMITS OF CONSTRUCTION

5-R

RESIDENCE ●
STA 13+32

6-R

GARAGE ●
STA 14+61

7-R

8-R

LIMITS OF STUDY CORRIDOR

REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

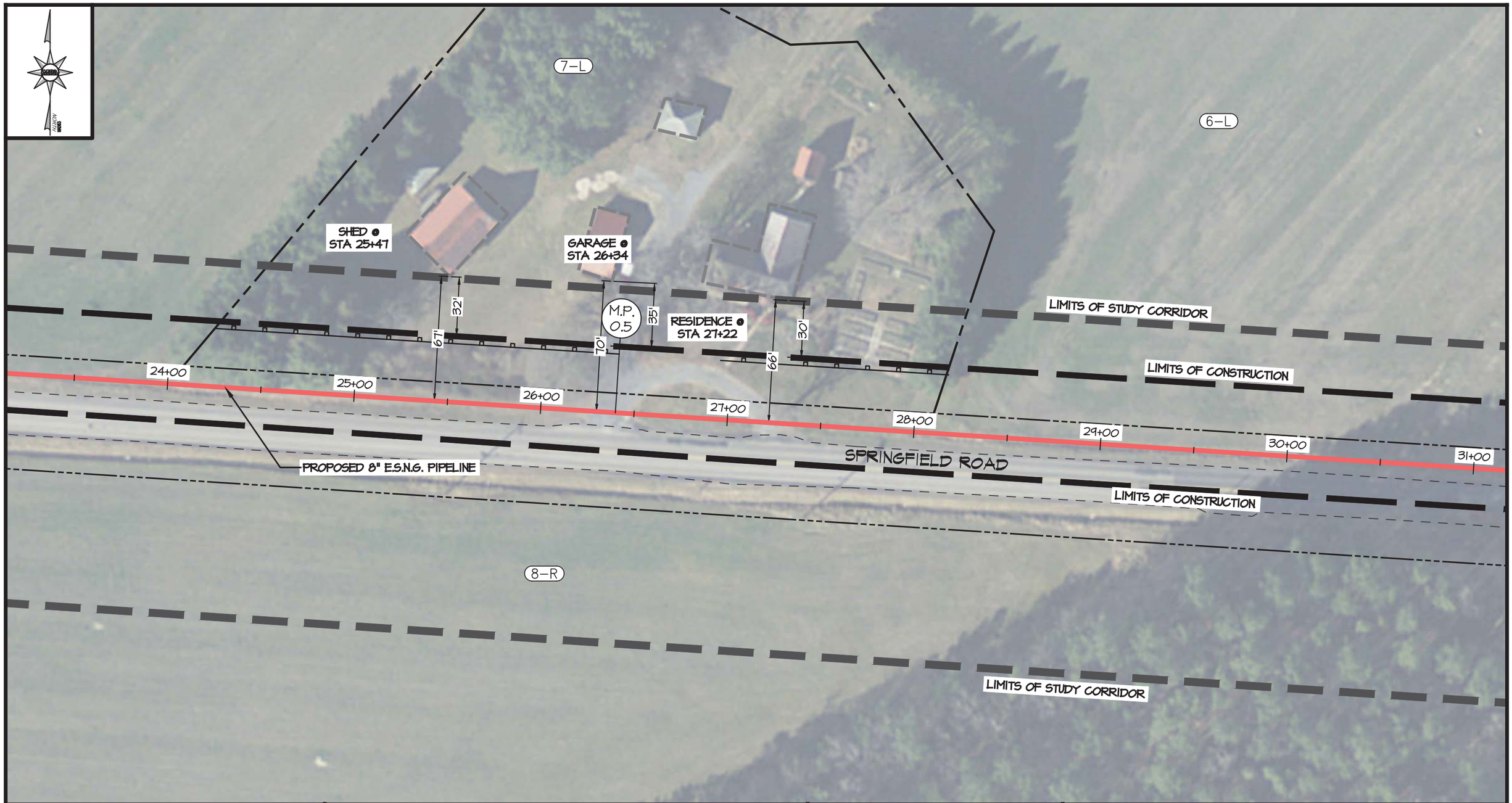
EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	4 OF 23



REVISIONS		
NO.	DATE	DESCRIPTION

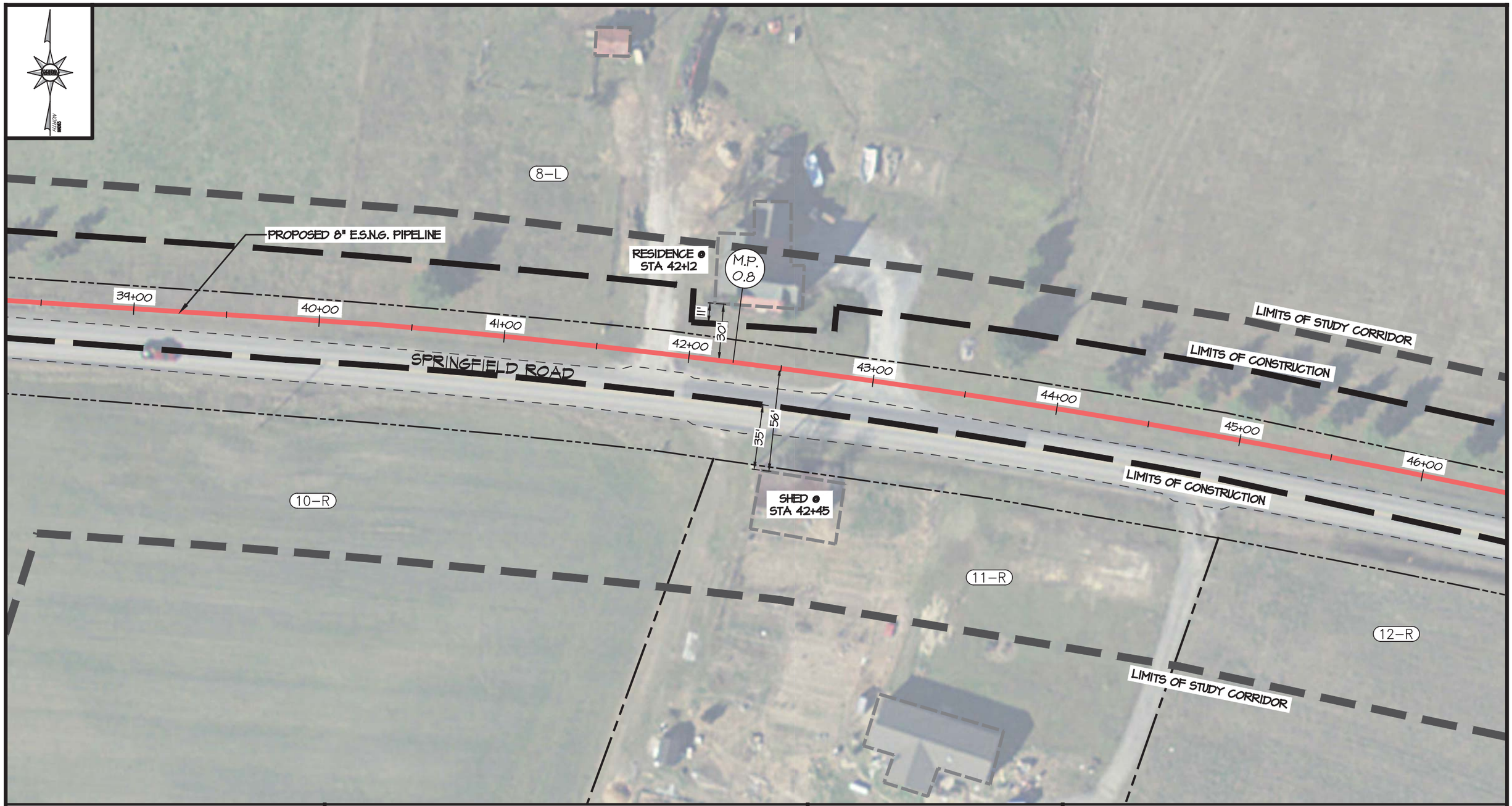
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	5 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

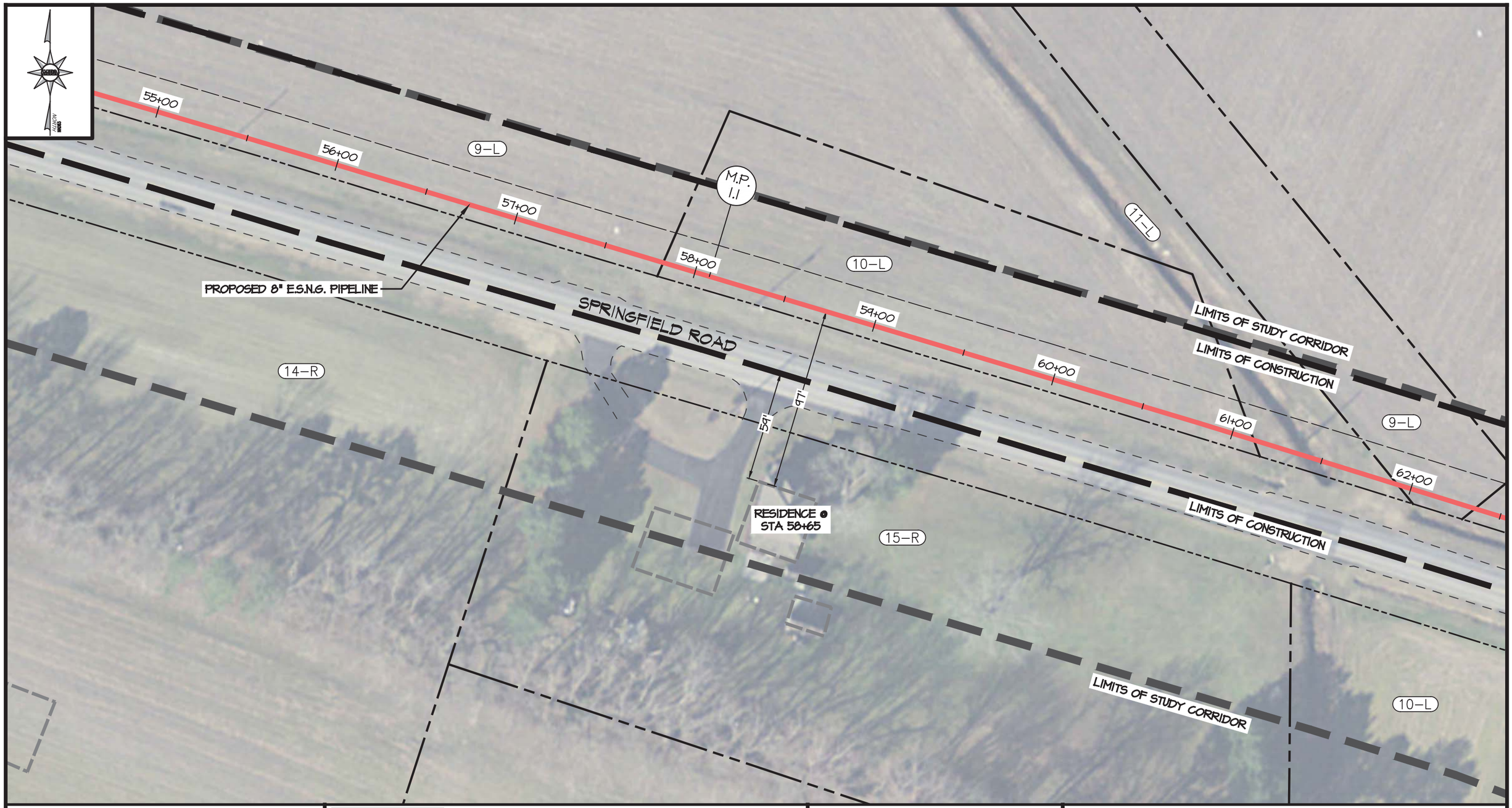
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	6 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

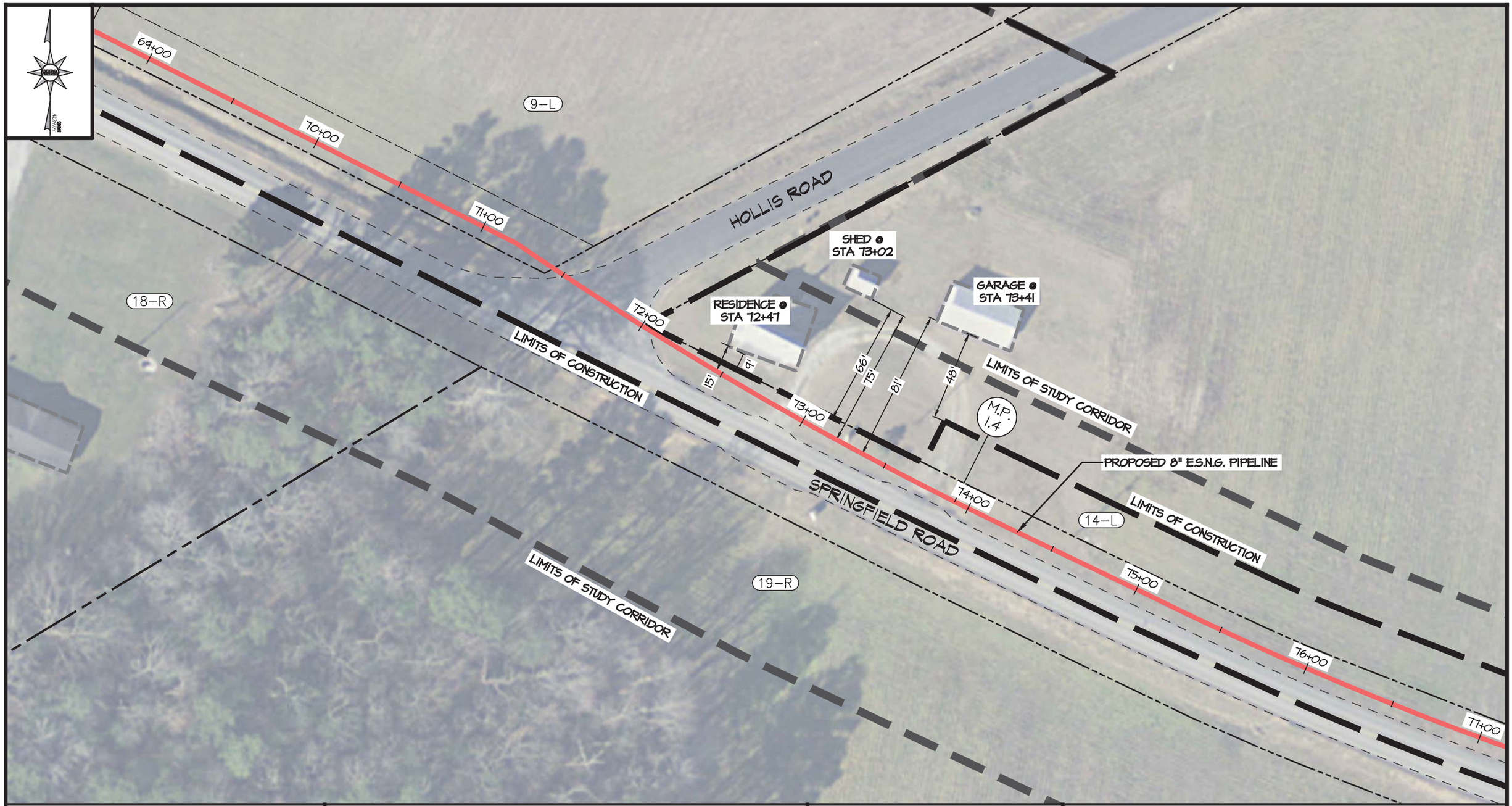
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	7 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

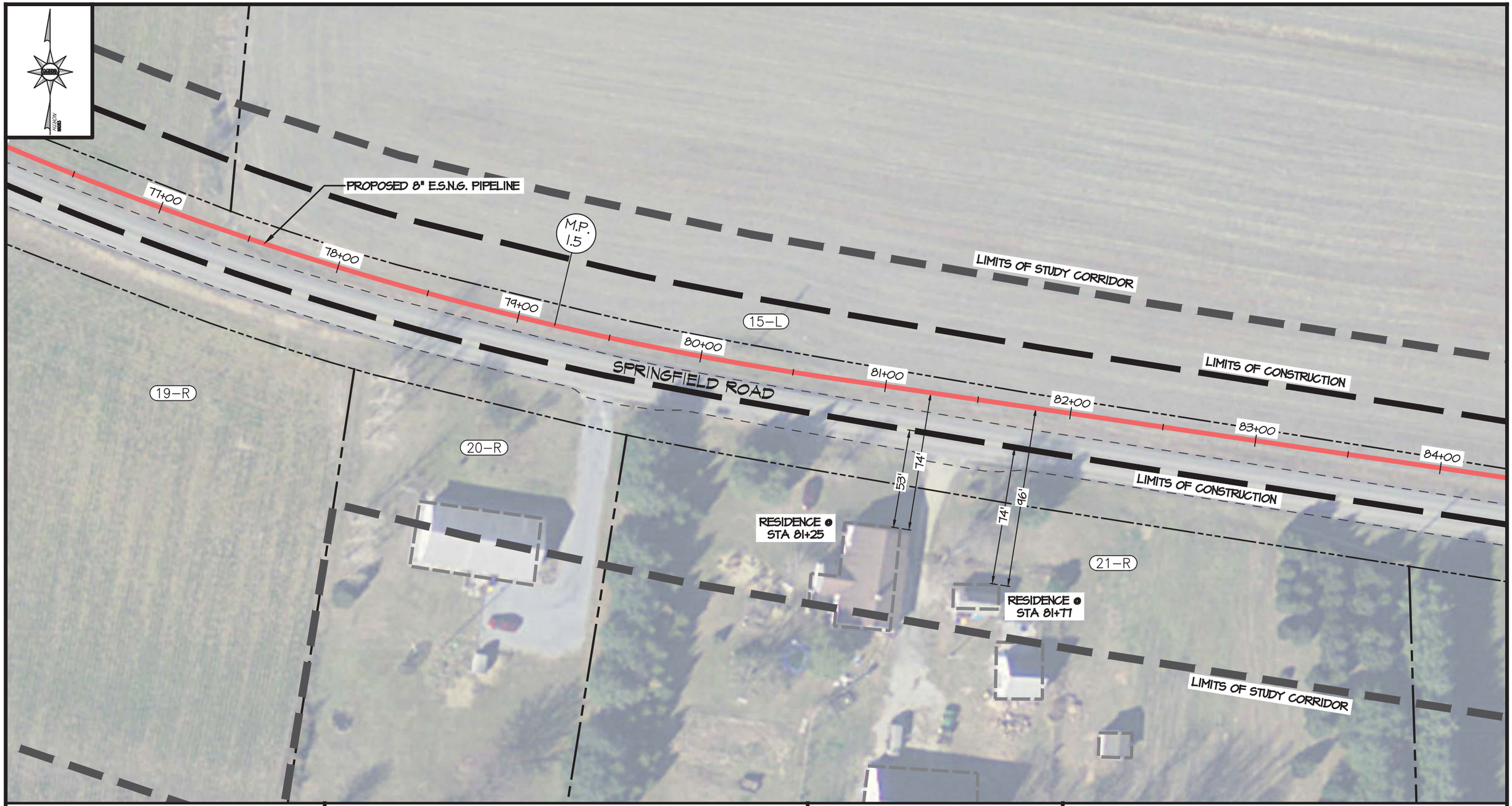
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	8 OF 23



REVISIONS		
NO.	DATE	DESCRIPTION

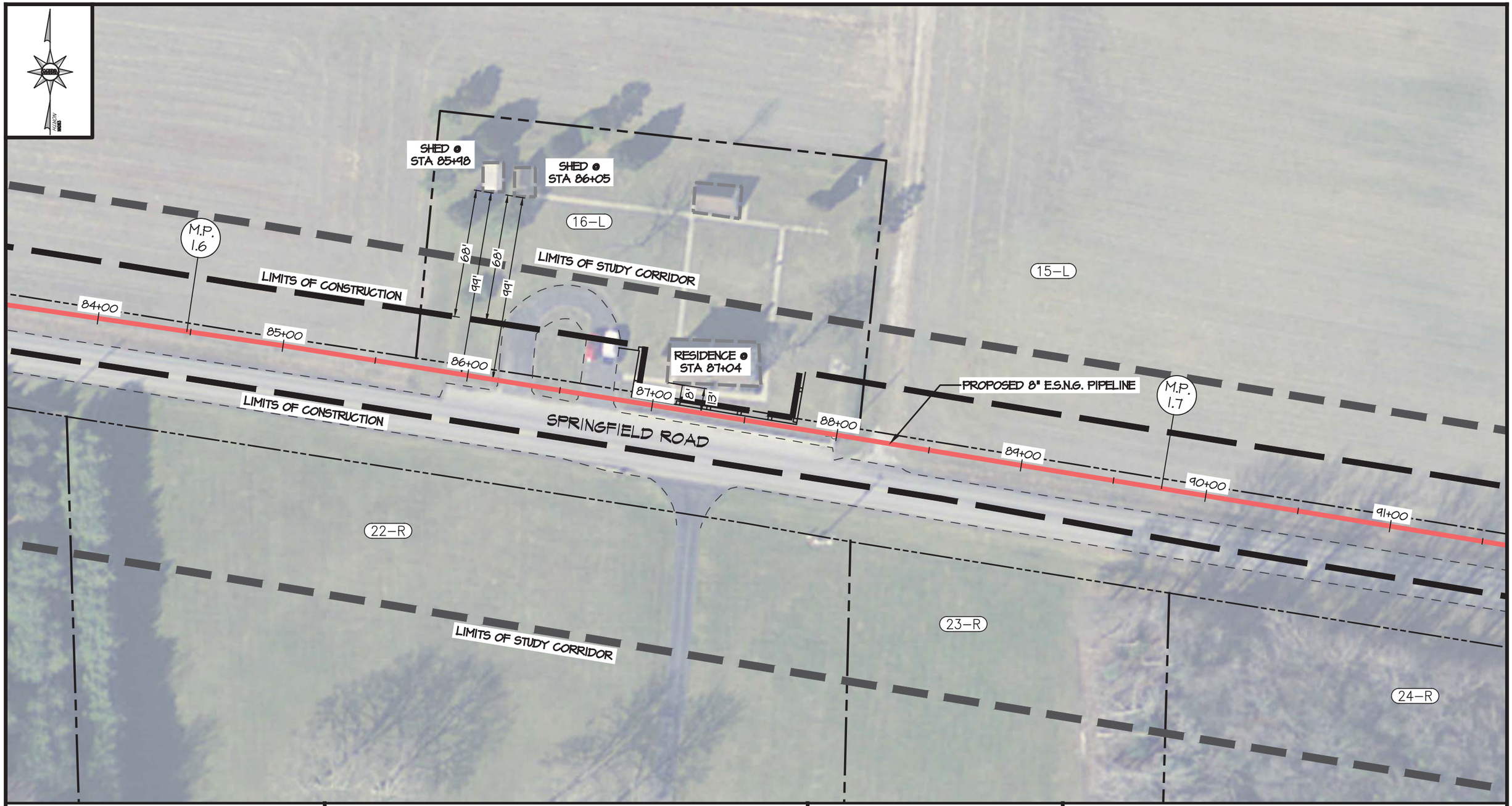
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	9 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

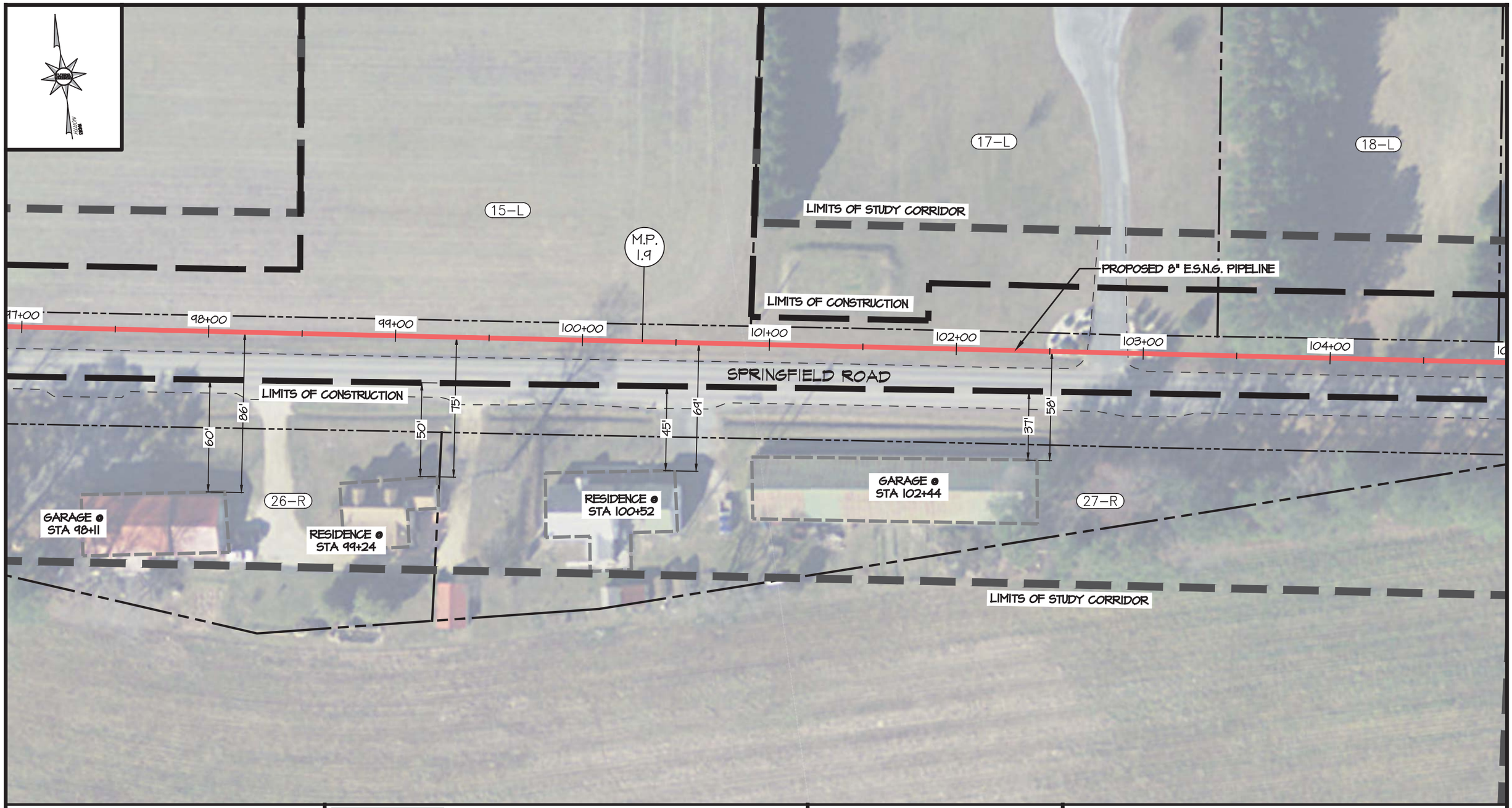
EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	10 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

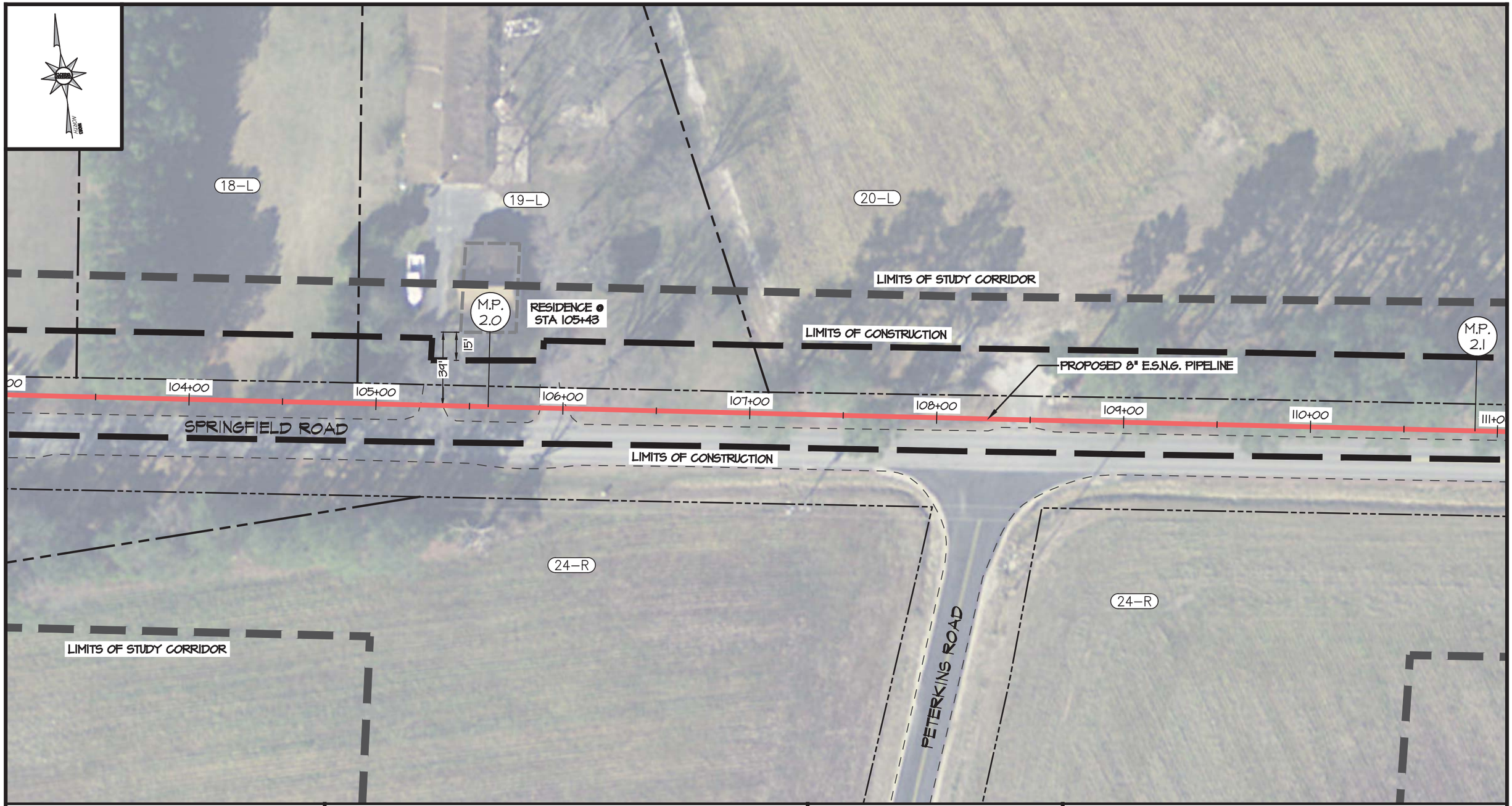
EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	11 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

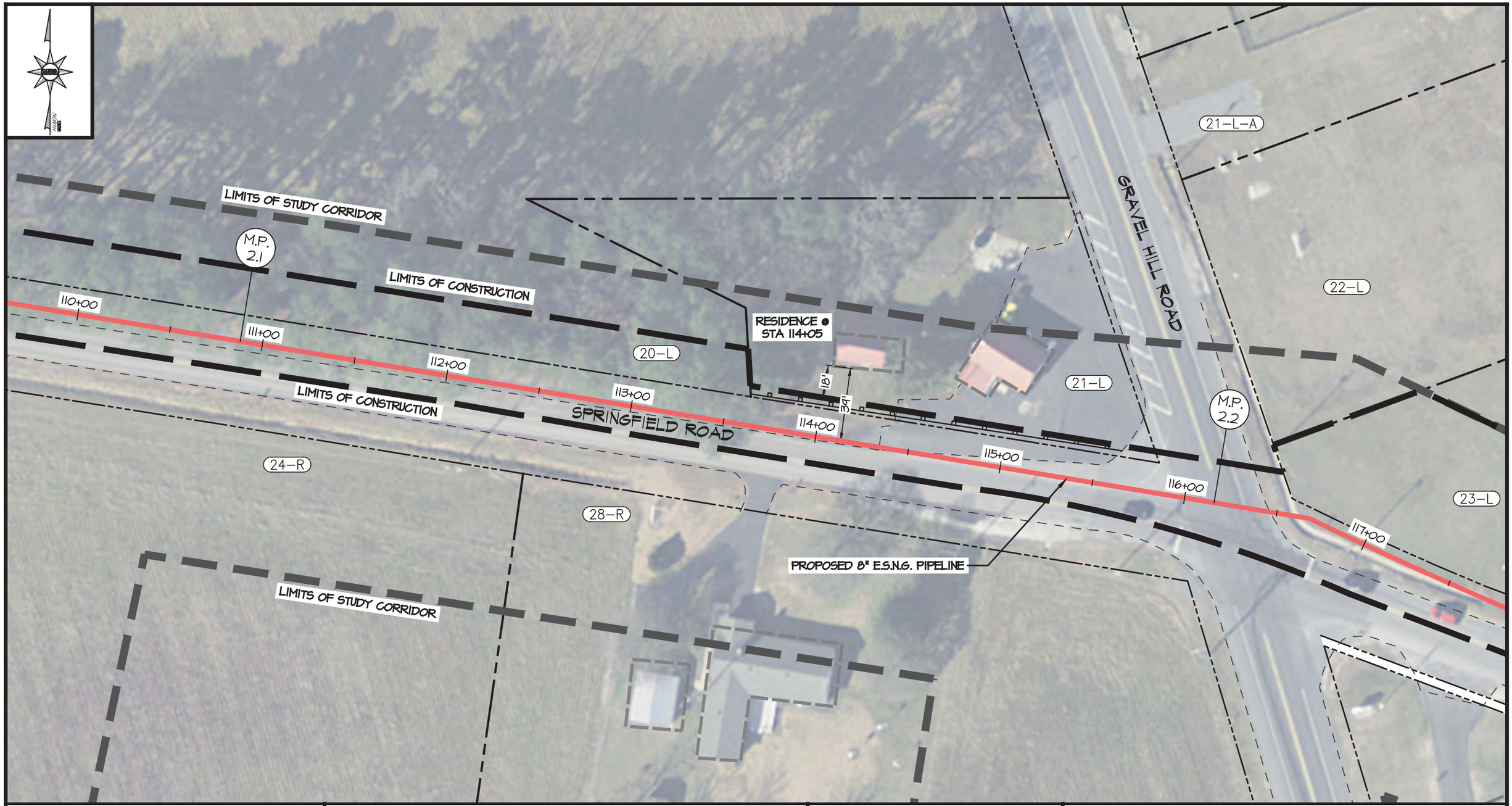
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	12 OF 23



REVISIONS		
NO.	DATE	DESCRIPTION

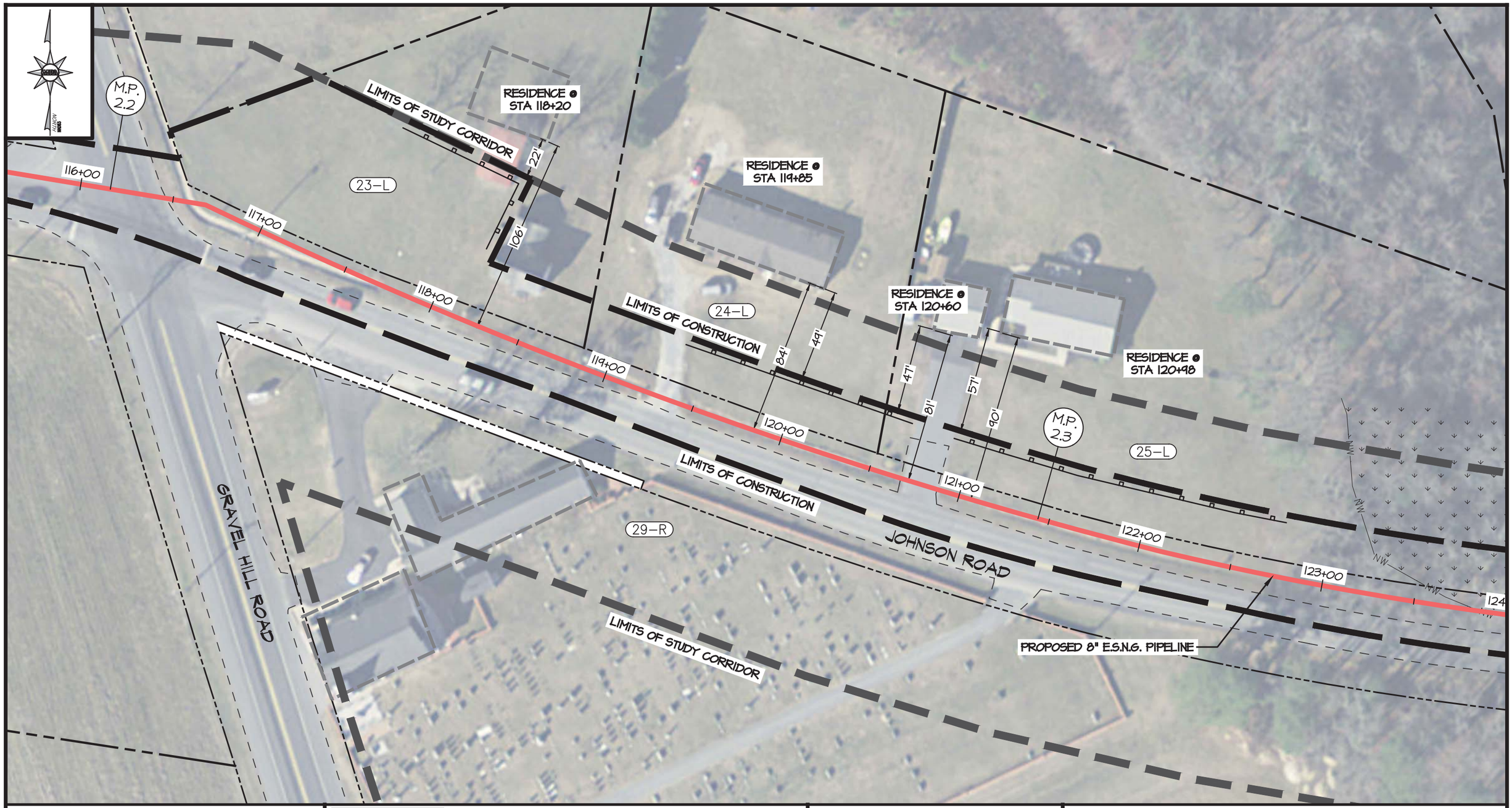
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	13 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	14 OF 23

LIMITS OF CONSTRUCTION

LIMITS OF STUDY CORRIDOR

SHED @ STA 129+94

RESIDENCE @ STA 133+09

RESIDENCE @ STA 128+28

RESIDENCE @ STA 130+44

RESIDENCE @ STA 133+64

JOHNSON ROAD

M.P. 2.5

PROPOSED 8" E.S.N.G. PIPELINE

27–L

28–L

29–L

31–R

32–R

33–R

34–R

35–R

128+00

129+00

130+00

131+00

132+00

133+00

134+00

135+00

34'

113'

82'

62'

26'

74'

14'

84'

69'

48'

82'

NW

NW

50 25 0 25 50 100

SCALE: 1" = 50'

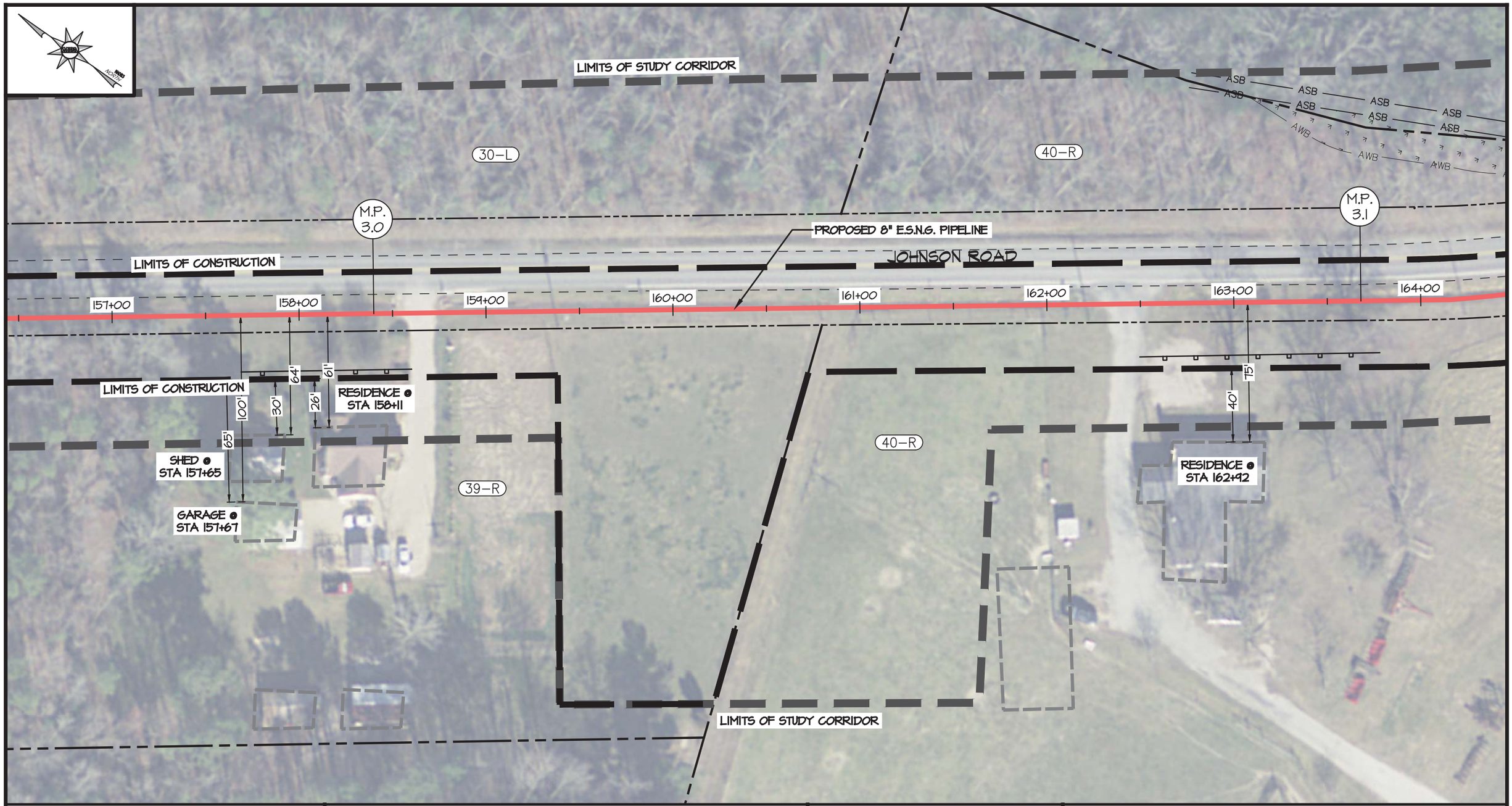
REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	15 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

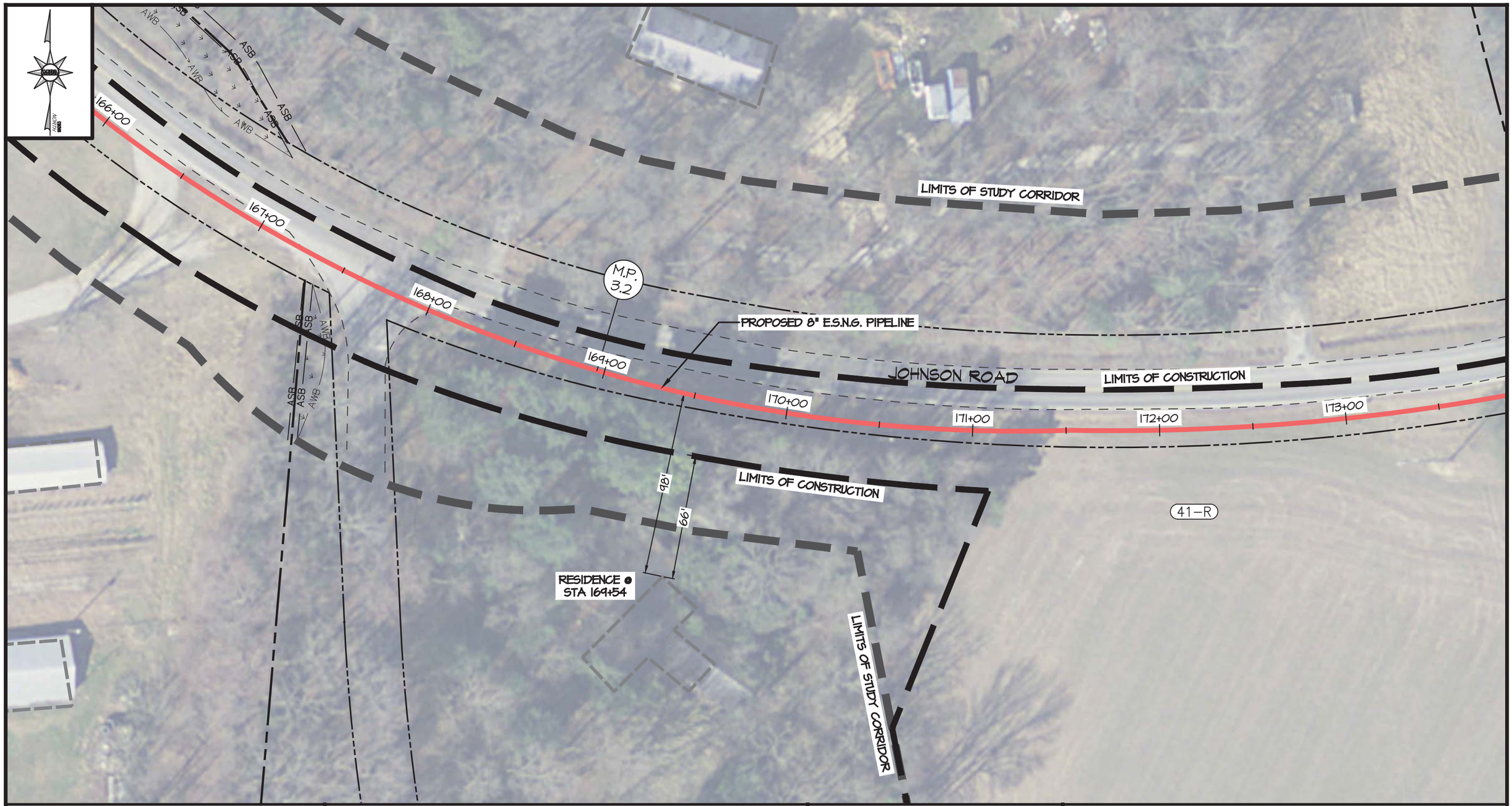
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	16 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

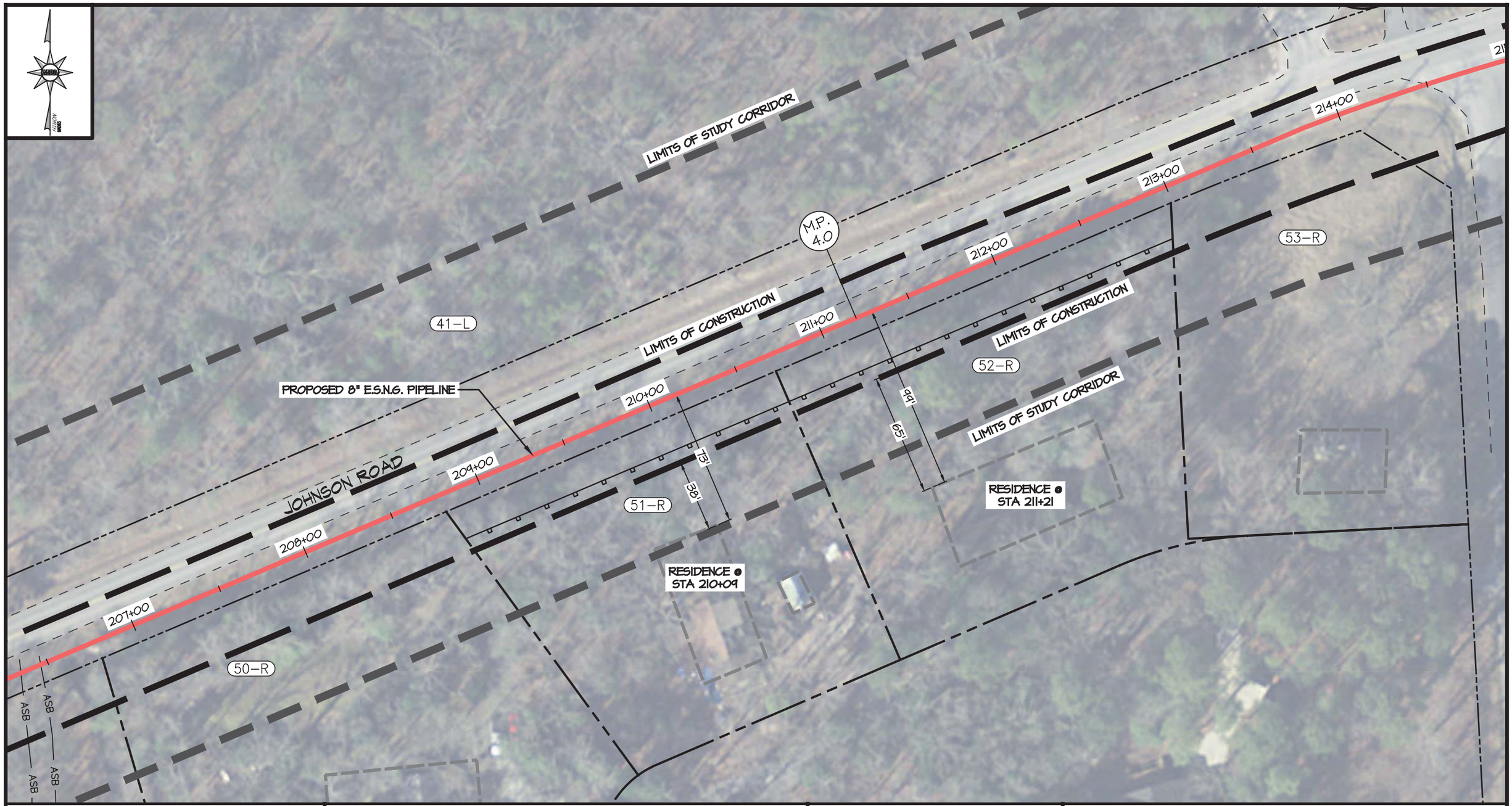
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	17 OF 23



REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	18 OF 23

LIMITS OF STUDY CORRIDOR

48–L

49–L

50–L

M.P. 4.3

PROPOSED 8" E.S.N.G. PIPELINE

JOHNSON ROAD

LIMITS OF CONSTRUCTION

M.P. 4.4

226+00 227+00 228+00 229+00 230+00 231+00 232+00 233+00

85'

50'

56–R

57–R

58–R

LIMITS OF CONSTRUCTION

LIMITS OF STUDY CORRIDOR

RESIDENCE @ STA 229+16

REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100

SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP

DEL-MAR ENERGY PATHWAY PROJECT

SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	19 OF 23

LIMITS OF STUDY CORRIDOR

276+00

277+00

278+00

279+00

280+00

281+00

282+00

283+00

PROPOSED 8" E.S.N.G. PIPELINE

LIMITS OF CONSTRUCTION

LIMITS OF CONSTRUCTION

LIMITS OF STUDY CORRIDOR

JOHNSON ROAD

56-L

M.P. 5.3

64-R

65-R

66-R

67-R

68-R

36'

12'

72'

37'

78'

45'

83'

51'

64'

32'

72'

40'

94'

61'

RESIDENCE @ STA 275+94

RESIDENCE @ STA 278+92

GARAGE @ STA 279+82

GARAGE @ STA 280+07

RESIDENCE @ STA 280+68

RESIDENCE @ STA 281+54

RESIDENCE @ STA 282+48

REVISIONS		
NO.	DATE	DESCRIPTION

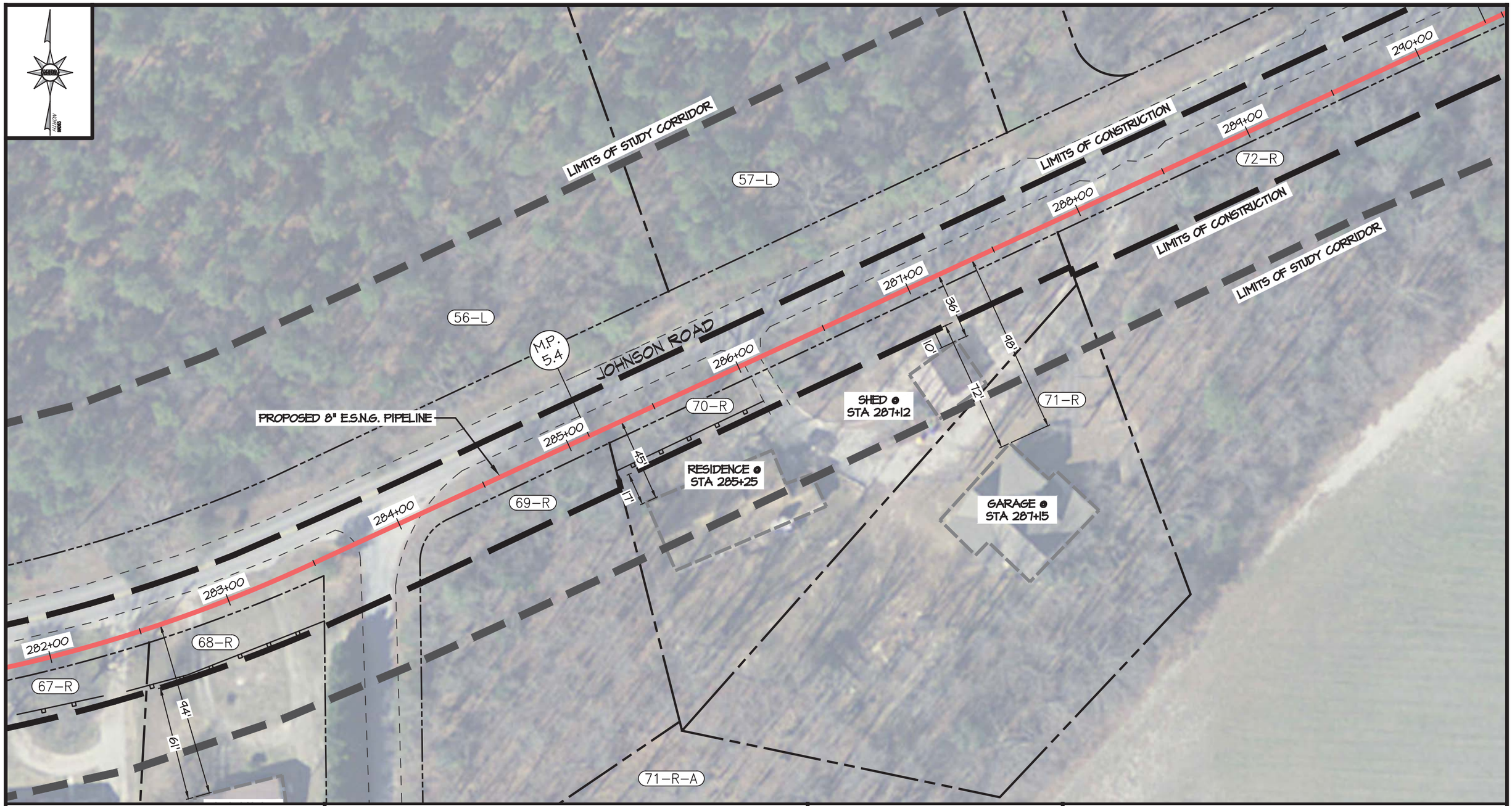
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	20 OF 23



REVISIONS		
NO.	DATE	DESCRIPTION

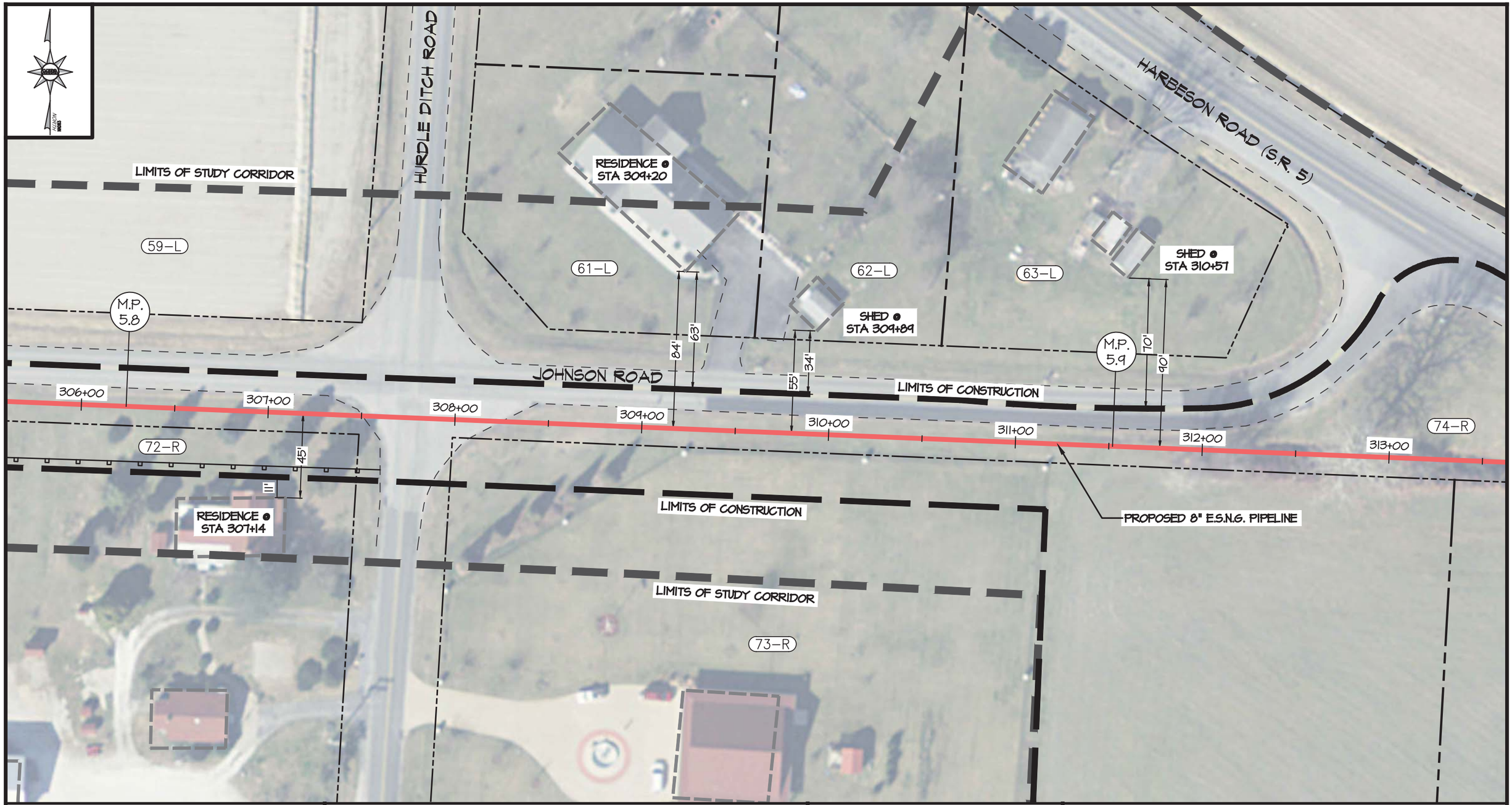
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	21 OF 23



SCALE: 1" = 50'

REVISIONS

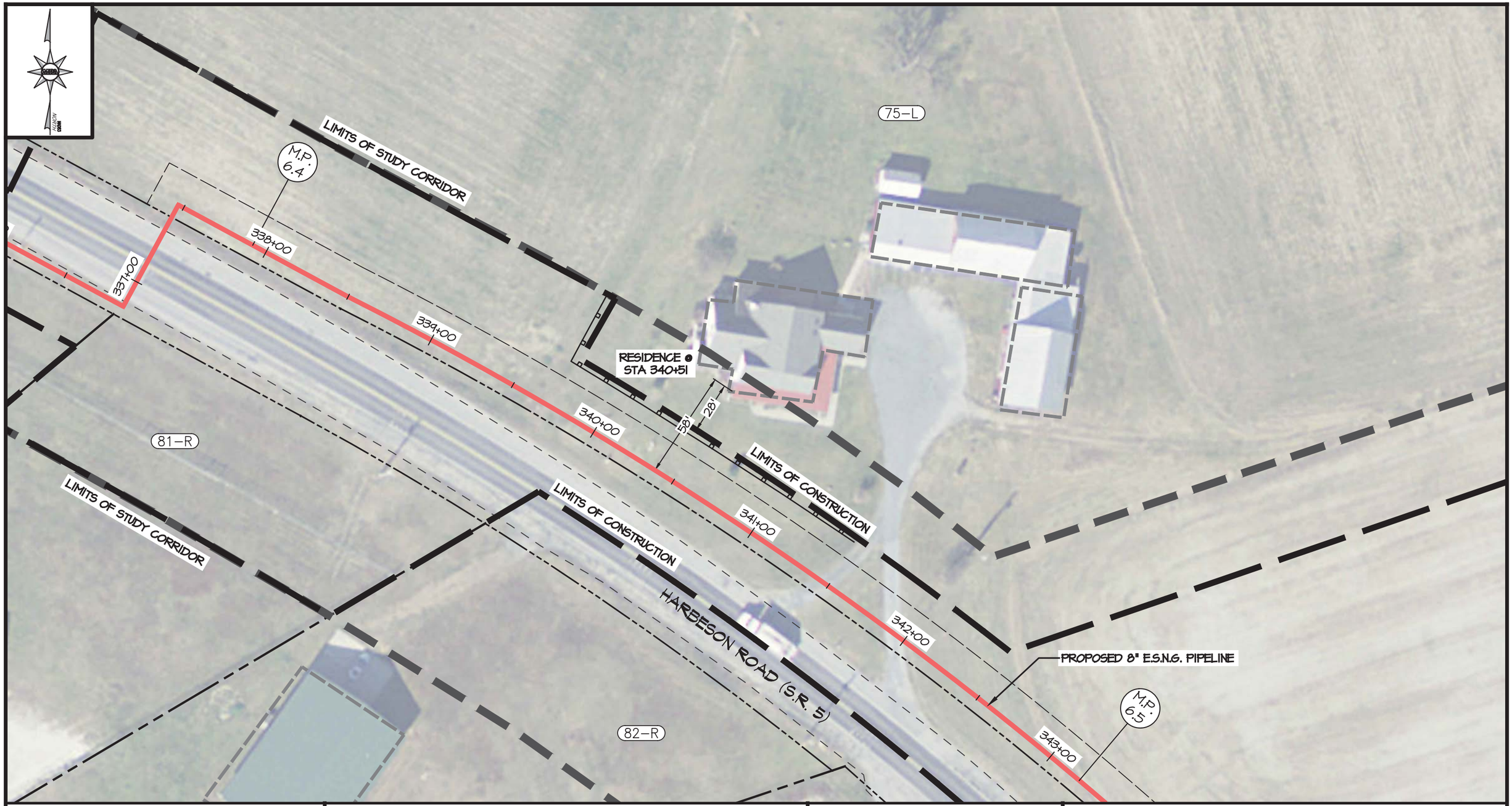
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	22 OF 23



REVISIONS

NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

EAST SUSSEX EXTENSION
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19696	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	23 OF 23

DESCRIPTION:

THESE DRAWINGS DOCUMENT OCCUPIED BUILDINGS NEAR THE PROPOSED CONSTRUCTION WORK AREA. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS:

1. ALL PROPOSED CONSTRUCTION WORK AREAS ARE CONFINED TO THE LIMITS OF CONSTRUCTION SHOWN ON THIS DRAWING. NO WORK SHALL OCCUR ON LANDOWNER PROPERTY WITHOUT A PROPERLY EXECUTED LANDOWNER AGREEMENT. THE OPEN TRENCH LENGTH SHALL BE LIMITED TO A DISTANCE OF 100 FEET ON EITHER SIDE OF A RESIDENCE OR COMMERCIAL PROPERTY (THOSE WITHIN 50' LIMITS OF CONSTRUCTION).

2. CONTRACTOR SHALL ERECT AND MAINTAIN A TEMPORARY CONSTRUCTION BARRIER FENCE (SAFETY FENCE) BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT STRUCTURES (THOSE WITHIN 50' OF LIMITS OF CONSTRUCTION) DURING THE CONSTRUCTION PERIOD.

3. CONTRACTOR SHALL INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES (SILT FENCE) AS REQUIRED TO ENSURE THAT CONSTRUCTION SPOIL IS CONTAINED WITHIN THE APPROVED CONSTRUCTION WORK AREA.

4. VEHICLE ACCESS SHALL BE MAINTAINED TO RESIDENCES AND COMMERCIAL PROPERTIES DURING THE CONSTRUCTION PERIOD BY UTILIZING FLAGGERS AND STEEL PLATING AS APPLICABLE. FOR EACH RESIDENCE, EASTERN SHORE WILL COMMUNICATE WITH THE PROPERTY OWNER THE ANTICIPATED CONSTRUCTION SCHEDULE AND NOTIFY THEM OF WHAT IMPACTS CONSTRUCTION ACTIVITIES WILL HAVE ON THEIR ACCESS AND WORK WITH THEM TO MINIMIZE ANY IMPACTS.

5. THE PIPE SHALL BE INSTALLED UTILIZING ONE OR MORE OF THE FOLLOWING METHODS WHEN ADJACENT TO RESIDENTIAL AND COMMERCIAL STRUCTURES.

   A. 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.

   B. 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 OR TIMBER MATS.

   C. THE TRENCHLESS CONSTRUCTION TECHNIQUE, WHICH INCLUDES BOTH CONVENTIONAL BORING AS WELL AS HORIZONTAL DIRECTIONAL DRILL (HDD), INVOLVES THE INSTALLATION OF THE PIPE WITHOUT EXCAVATION OF A TRENCH THEREBY MINIMIZING SURFACE IMPACTS AND ASSOCIATED RESTORATION AS WELL MINIMIZING IMPACTS TO VEHICULAR ACCESS. INSTALLATIONS BY HDD WOULD BE SUBJECT TO THE HDD AND INADVERTENT RETURN PLANS.

6. OTHER EXISTING PHYSICAL FEATURES (LANDSCAPE AREAS, COMMERCIAL SIGNS, SPECIMEN TREES, ETC.) THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.

7. DISTURBED ITEMS SUCH AS DRIVEWAYS, LAWNS, AND LANDSCAPED AREAS SHALL BE RESTORED IMMEDIATELY FOLLOWING CLEANUP OPERATIONS AFTER CONSTRUCTION BY A LICENSED CONTRACTOR.

8. CONTRACTOR SHALL ALLOW ROADWAY TRAFFIC FLOW TO CONTINUE DURING CONSTRUCTION IN THIS AREA, UNLESS TRAFFIC DETOURING MEASURES HAVE BEEN APPROVED IN ADVANCE BY APPLICABLE JURISDICTIONAL AGENCIES IN ACCORDANCE WITH MUTCD, DELDOT, AND/OR MDSHA REQUIREMENTS AND GUIDELINES.

9. CONTRACTOR SHALL MINIMIZE NOISE FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES AND SHALL COMPLY WITH ALL LOCAL NOISE ORDINANCES.

10. CONTRACTOR SHALL TAKE APPROPRIATE MEANS TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES. CONTRACTOR SHALL PROVIDE STREET SWEEPING SERVICES, IF NECESSARY, DURING ROADWAY CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES.

LEGEND

- PROPOSED PIPELINE
- EXISTING E.S.N.G.. PIPELINE — ESNG—G —
- LIMITS OF CONSTRUCTION
- LIMITS OF STUDY CORRIDOR
- PROPOSED PERMANENT EASEMENT
- EXISTING PERMANENT EASEMENT
- SAFETY FENCE
- RAILROAD TRACK
- ROAD RIGHT-OF-WAY
- PROPERTY LINE
- EDGE OF PAVEMENT
- BUILDING
- FENCE
- CENTERLINE OF STREAM
- DELINEATED WETLAND BOUNDARY — NW —
- DELINEATED WATERS OF U.S. — US —
- APPROXIMATE WETLAND BOUNDARY — AWB —
- APPROXIMATE STREAM BOUNDARY — ASB —
- OVERHEAD UTILITY LINE — OHE —
- STORM DRAIN — SD —
- WATER LINE — W —
- SEWER LINE — SAN —
- FORCE MAIN —FM—

REVISIONS

NO.	DATE	DESCRIPTION

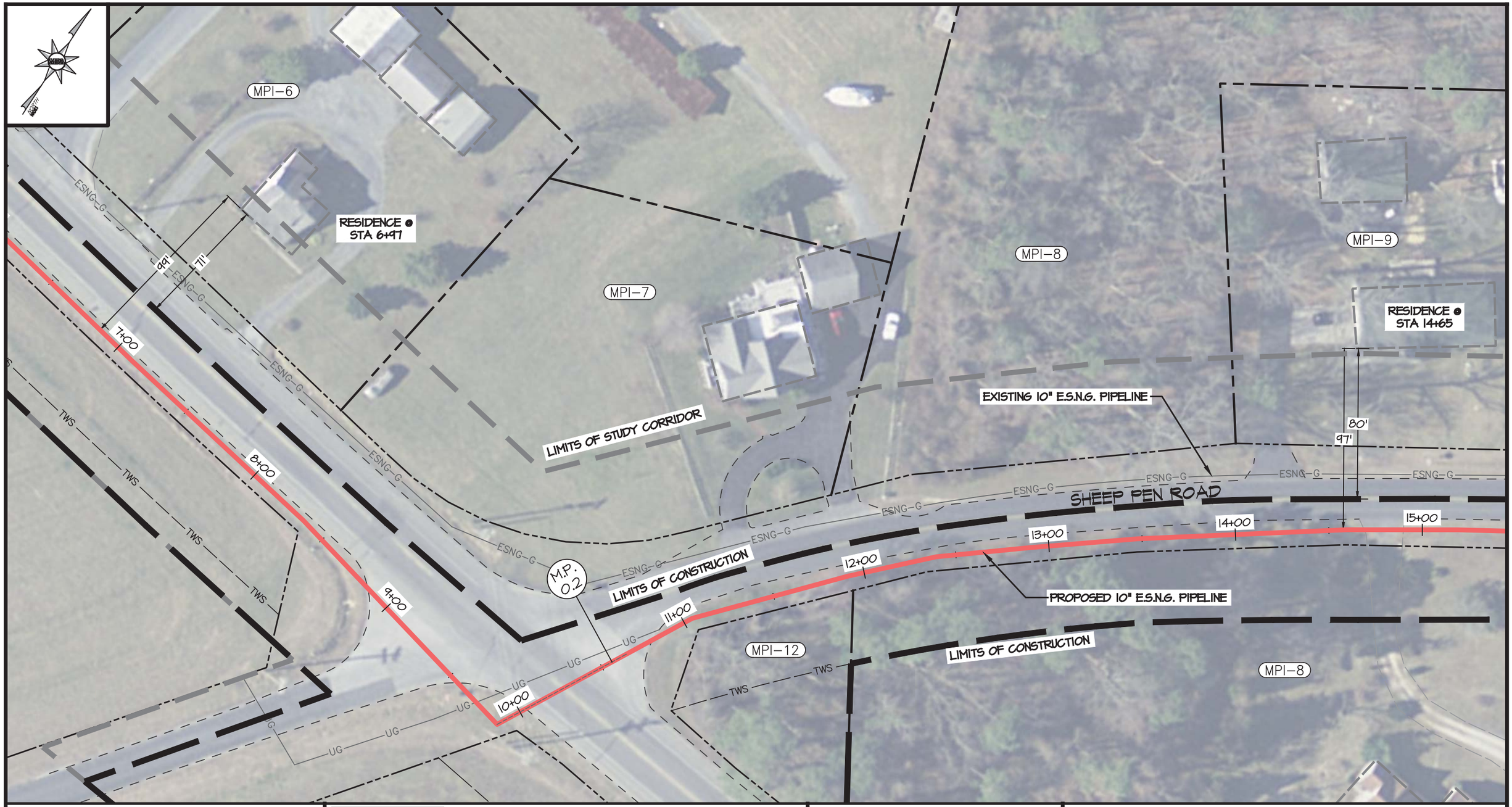
MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

50 25 0 25 50 100
SCALE: 1" = 50'

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

MILLSBORO CONTROLLER UPGRADE
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19697	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	1 OF 2



REVISIONS		
NO.	DATE	DESCRIPTION

MORRIS & RITCHIE ASSOCIATES, INC.
ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
18 BOULDEN CIRCLE, SUITE: 36, WILMINGTON, DE 19720
TEL: (302) 326-2200 FAX: (302) 326-2399
MRAGTA.COM

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

MILLSBORO CONTROLLER UPGRADE
RESIDENTIAL MAP
DEL-MAR ENERGY PATHWAY PROJECT
SUSSEX COUNTY, DELAWARE

PROJECT NO:	19697	DATE:	02/06/2019
DESIGN BY:	JTH	SCALE:	1" = 50'
CHECKED BY:	CWB	SHEET:	2 OF 2

DESCRIPTION:

THESE DRAWINGS DOCUMENT OCCUPIED BUILDINGS NEAR THE PROPOSED CONSTRUCTION WORK AREA. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

CONSTRUCTION REQUIREMENTS:

1. ALL PROPOSED CONSTRUCTION WORK AREAS ARE CONFINED TO THE LIMITS OF CONSTRUCTION SHOWN ON THIS DRAWING. NO WORK SHALL OCCUR ON LANDOWNER PROPERTY WITHOUT A PROPERLY EXECUTED LANDOWNER AGREEMENT. THE OPEN TRENCH LENGTH SHALL BE LIMITED TO A DISTANCE OF 100 FEET ON EITHER SIDE OF A RESIDENCE OR COMMERCIAL PROPERTY (THOSE WITHIN 50' LIMITS OF CONSTRUCTION).
2. CONTRACTOR SHALL ERECT AND MAINTAIN A TEMPORARY CONSTRUCTION BARRIER FENCE (SAFETY FENCE) BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT STRUCTURES (THOSE WITHIN 50' OF LIMITS OF CONSTRUCTION) DURING THE CONSTRUCTION PERIOD.
3. CONTRACTOR SHALL INSTALL AND MAINTAIN SEDIMENT CONTROL STRUCTURES (SILT FENCE) AS REQUIRED TO ENSURE THAT CONSTRUCTION SPOIL IS CONTAINED WITHIN THE APPROVED CONSTRUCTION WORK AREA.
4. VEHICLE ACCESS SHALL BE MAINTAINED TO RESIDENCES AND COMMERCIAL PROPERTIES DURING THE CONSTRUCTION PERIOD BY UTILIZING FLAGGERS AND STEEL PLATING AS APPLICABLE. FOR EACH RESIDENCE, EASTERN SHORE WILL COMMUNICATE WITH THE PROPERTY OWNER THE ANTICIPATED CONSTRUCTION SCHEDULE AND NOTIFY THEM OF WHAT IMPACTS CONSTRUCTION ACTIVITIES WILL HAVE ON THEIR ACCESS AND WORK WITH THEM TO MINIMIZE ANY IMPACTS.
5. THE PIPE SHALL BE INSTALLED UTILIZING ONE OR MORE OF THE FOLLOWING METHODS WHEN ADJACENT TO RESIDENTIAL AND COMMERCIAL STRUCTURES.
   - 5.1. 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.
   - 5.2. 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 OR TIMBER MATS.
   - 5.3. THE TRENCHLESS CONSTRUCTION TECHNIQUE, WHICH INCLUDES BOTH CONVENTIONAL BORING AS WELL AS HORIZONTAL DIRECTIONAL DRILL (HDD), INVOLVES THE INSTALLATION OF THE PIPE WITHOUT EXCAVATION OF A TRENCH THEREBY MINIMIZING SURFACE IMPACTS AND ASSOCIATED RESTORATION AS WELL MINIMIZING IMPACTS TO VEHICULAR ACCESS. INSTALLATIONS BY HDD WOULD BE SUBJECT TO THE HDD AND INADVERTENT RETURN PLANS.
6. OTHER EXISTING PHYSICAL FEATURES (LANDSCAPE AREAS, COMMERCIAL SIGNS, SPECIMEN TREES, ETC.) THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.
7. DISTURBED ITEMS SUCH AS DRIVEWAYS, LAWNS, AND LANDSCAPED AREAS SHALL BE RESTORED IMMEDIATELY FOLLOWING CLEANUP OPERATIONS AFTER CONSTRUCTION BY A LICENSED CONTRACTOR.
8. CONTRACTOR SHALL ALLOW ROADWAY TRAFFIC FLOW TO CONTINUE DURING CONSTRUCTION IN THIS AREA, UNLESS TRAFFIC DETOURING MEASURES HAVE BEEN APPROVED IN ADVANCE BY APPLICABLE JURISDICTIONAL AGENCIES IN ACCORDANCE WITH MUTCD, DELDOT AND / OR MDSHA REQUIREMENTS AND GUIDELINES.
9. CONTRACTOR SHALL MINIMIZE NOISE FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES AND SHALL COMPLY WITH ALL LOCAL NOISE ORDINANCES.
10. CONTRACTOR SHALL TAKE APPROPRIATE MEANS TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES. CONTRACTOR SHALL PROVIDE STREET SWEEPING SERVICES, IF NECESSARY, DURING ROADWAY CONSTRUCTION ACTIVITIES NEAR RESIDENCES AND COMMERCIAL PROPERTIES.

LEGEND

- PROPOSED PIPELINE
- ℄ OF RAILROAD EASEMENT
- RAILROAD EASEMENT
- RESIDENTIAL STRUCTURES
- LIMITS OF CONSTRUCTION
- LIMITS OF STUDY CORRIDOR

REVISIONS

NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

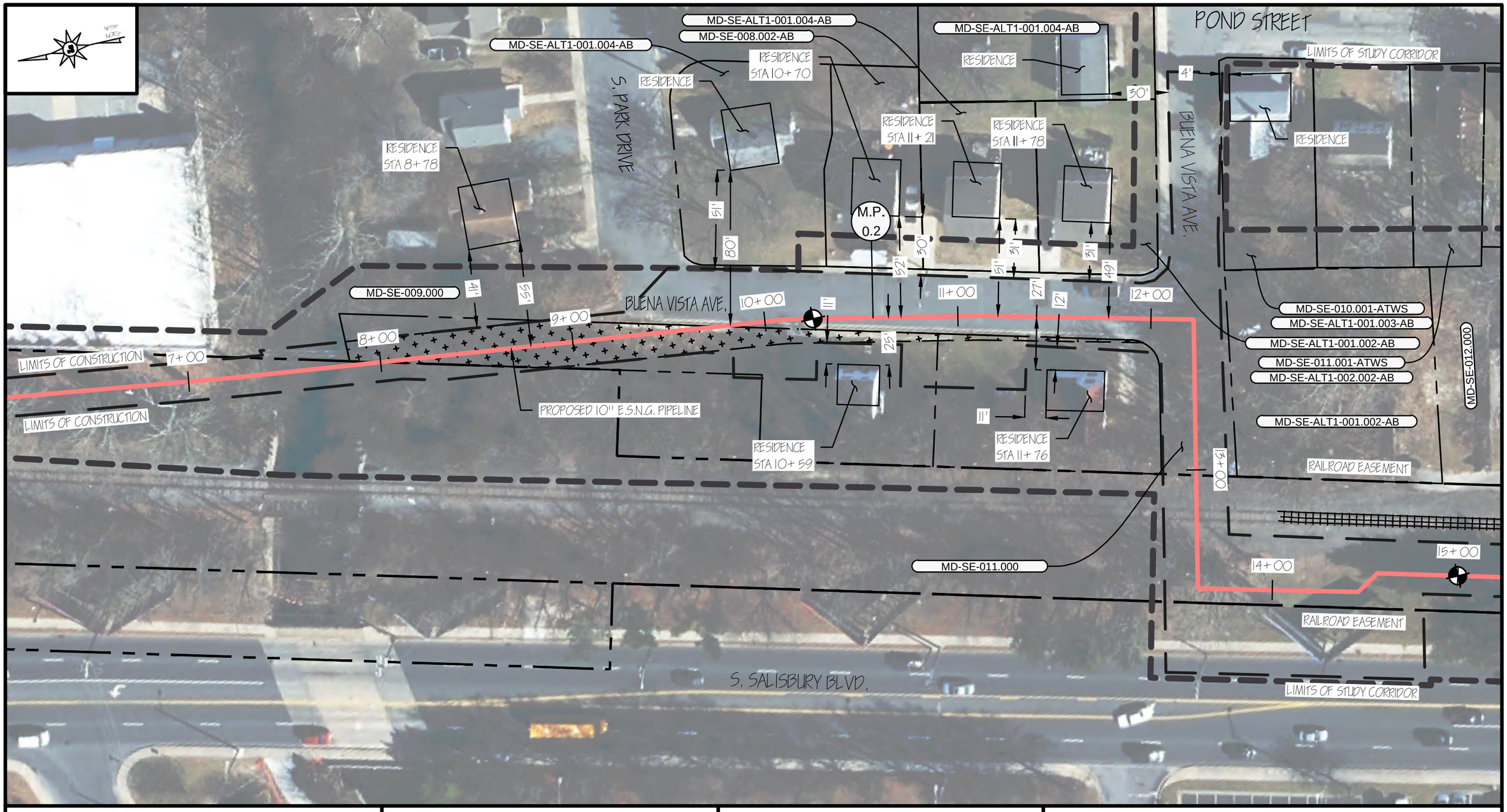
MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

50 25 0 25 50 100
SCALE: 1" = 50'

DRAFT

10" PROPOSED PIPELINE
SOMERSET EXTENSION
DEL–MAR ENERGY PATHWAY PROJECT
WICOMICO & SOMERSET COUNTIES, MARYLAND

PROJECT NO:ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: N.T.S.
CHECKED BY: RWP	SHEET: 1 OF 1



REVISIONS

NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

50 25 0 25 50 100

SCALE: 1" = 50'

DRAFT

SOMERSET EXTENSION
RESIDENTIAL MAP

DEL–MAR ENERGY PATHWAY PROJECT

WICOMICO COUNTY, MARYLAND

PROJECT NO: ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: 1" = 50'
CHECKED BY: RWP	SHEET: 1 OF 5

REVISIONS

NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

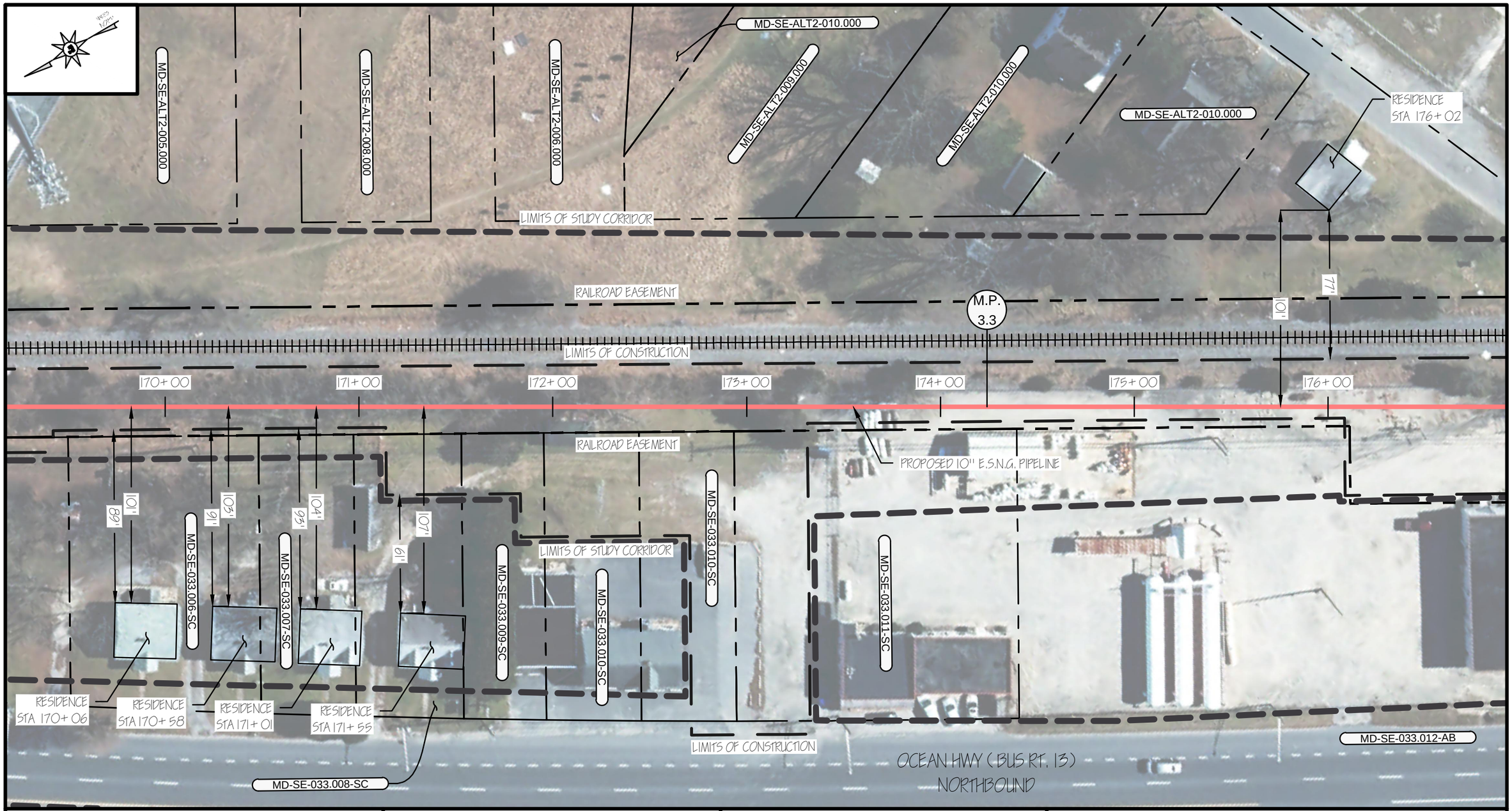
50 25 0 25 50 100
SCALE: 1" = 50'

MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

DRAFT

SOMERSET EXTENSION
RESIDENTIAL MAP
DEL–MAR ENERGY PATHWAY PROJECT
WICOMICO COUNTY, MARYLAND

PROJECT NO: ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: 1" = 50'
CHECKED BY: RWP	SHEET: 2 OF 5



REVISIONS			
NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100

SCALE: 1" = 50'

MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

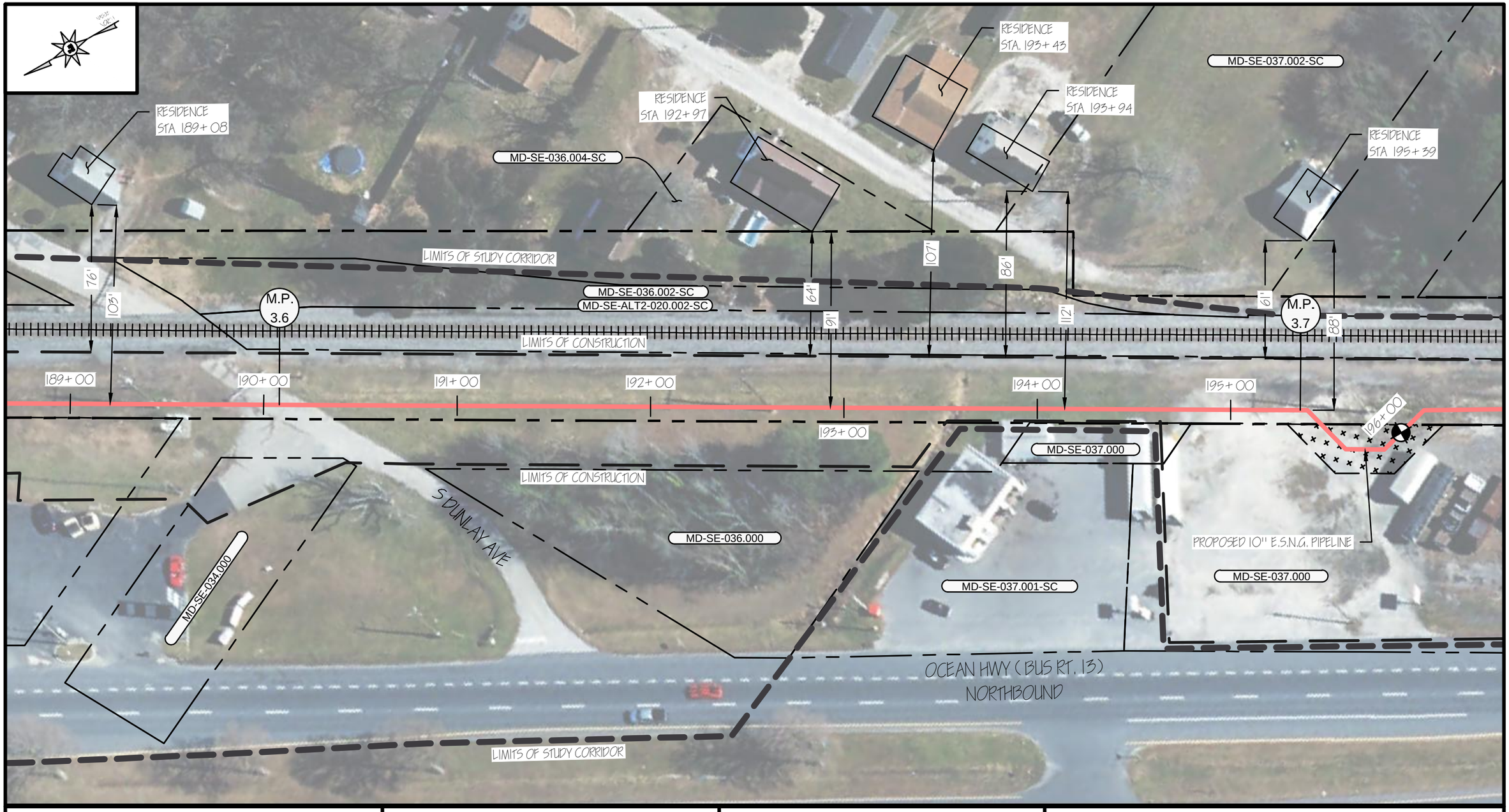
DRAFT

SOMERSET EXTENSION
RESIDENTIAL MAP

DEL–MAR ENERGY PATHWAY PROJECT

WICOMICO COUNTY, MARYLAND

PROJECT NO: ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: 1" = 50'
CHECKED BY: RWP	SHEET: 3 OF 5



REVISIONS			
NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

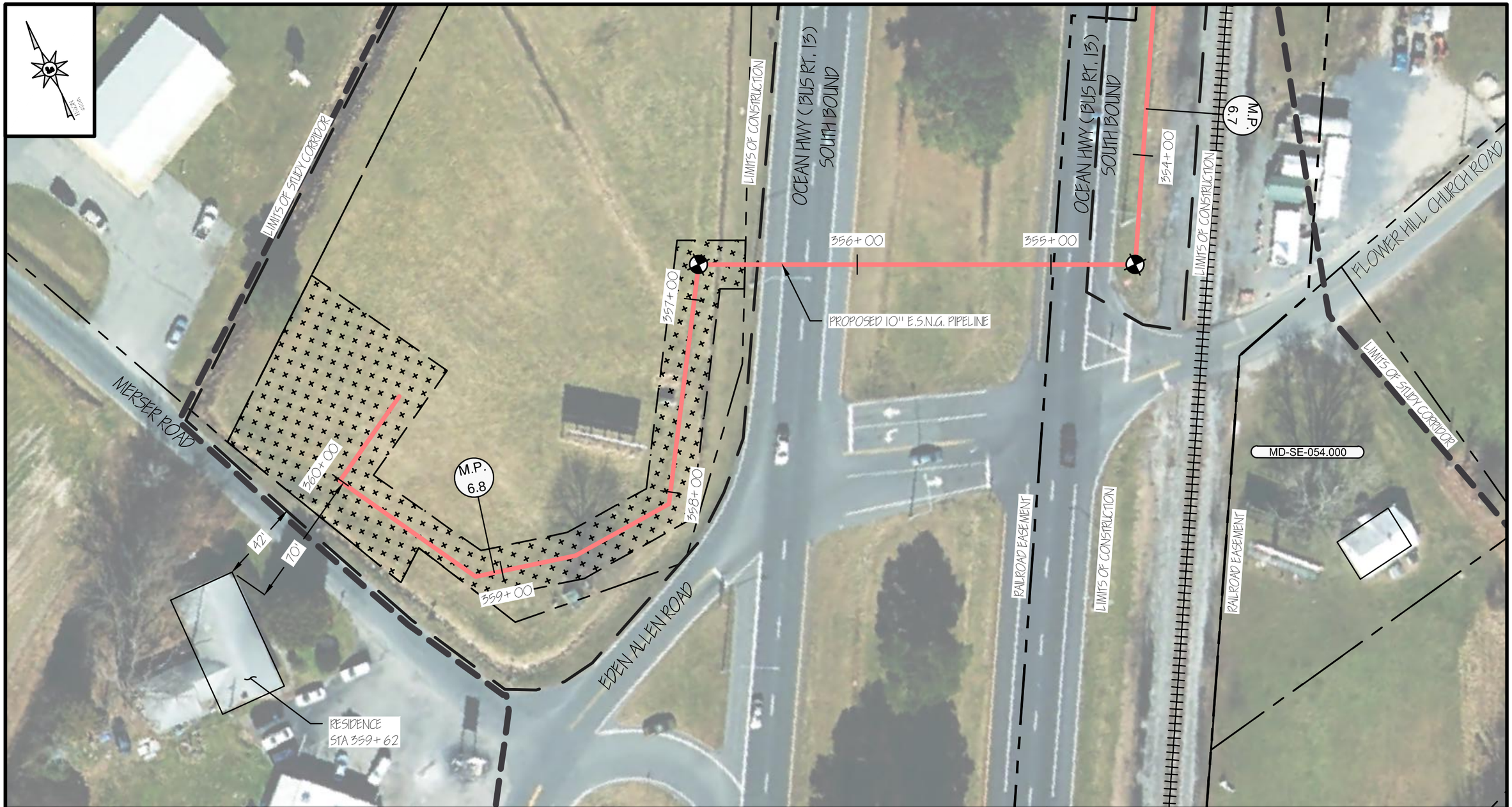
DRAFT

SOMERSET EXTENSION
RESIDENTIAL MAP

DEL–MAR ENERGY PATHWAY PROJECT

WICOMICO COUNTY, MARYLAND

PROJECT NO: ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: 1" = 50'
CHECKED BY: RWP	SHEET: 4 OF 5



REVISIONS			
NO.	DATE	DESCRIPTION	BY
–			

EASTERN SHORE NATURAL GAS
500 ENERGY LANE, SUITE 200 DOVER, DE 19901
TELEPHONE (302) 734-6710 - FAX (302) 734-6745

50 25 0 25 50 100
SCALE: 1" = 50'

MOTT MACDONALD
134 CAPITAL DRIVE SUITE D
WEST SPRINGFIELD, MA 01089
UNITED STATES OF AMERICA

DRAFT

SOMERSET EXTENSION
RESIDENTIAL MAP

DEL–MAR ENERGY PATHWAY PROJECT

WICOMICO COUNTY, MARYLAND

PROJECT NO: ES18050124	DATE: 2/1/2019
DESIGN BY: MM	SCALE: 1" = 50'
CHECKED BY: RWP	SHEET: 5 OF 5